# LIFE AND HEALTH ACTUARIAL TASK FORCE

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## Life and Health Actuarial Task Force San Francisco, CA December 3-4, 2009

The Life and Health Actuarial Task Force met in San Francisco, CA, Dec. 3-4, 2009. The following Task Force members participated: Sandy Praeger, Chair, represented by Larry Bruning (KS); Scott H. Richardson, Vice Chair, represented by Leslie Jones (SC); Linda S. Hall represented by Katie Campbell (AK); Jim L. Ridling represented by Steven Ostlund (AL); Jay Bradford represented by Joe Musgrove (AR); Steve Poizner represented by Perry Kupferman (CA); Thomas R. Sullivan represented by Richard Marcks (CT); Kevin M. McCarty represented by Dalora Schafer (FL); Glenn Wilson represented by Blaine Shepherd (MN); Ann Frohman represented by John Rink (NE); James J. Wrynn represented by Fred Andersen (NY); Mary Jo Hudson represented by Alan Furan (OH); Mike Geeslin represented by Mike Boerner (TX); and Kent Michie represented by Tomasz Serbinowski (UT).

#### 1. Mortality Tables and Margins

Donna Claire (Claire Thinking, Inc.) and Tim Harris (Milliman Inc.) presented a report (Attachment One) by the Society of Actuaries/American Academy of Actuaries (SOA/AAA) Valuation Table Team (VTT) regarding the mortality margins needed for VM-20. The margins are used to: 1) adjust for the confidence in the experience study; 2) cover the variation among companies; 3) address fluctuations caused by having a small number of exposures; and 4) cover one-time events and future trends. Because of the large amount of data in the SOA's 2002–2004 experience study and for the 2008 table, the VTT does not propose an explicit margin for the confidence. The VTT does not recommend any margin for one-time events and future trends. That risk should be covered by capital.

The VTT suggests a loading method for unloaded mortality using a load for random fluctuation risk and a load for company variation risk. The proposal is for a blending of the two different loads using a blending factor determined by the credibility of mortality experience compared to mortality assumptions. If there is no credibility, a company would use a loaded table that covers approximately 85% of contributing companies. Otherwise, a company would blend the loaded table with a table based on expected mortality plus the random fluctuation load.

Random fluctuation is the most critical reason to establish margins for mortality tables for principle-based reserving (PBR), especially for companies that rely on their own experience. This is not something that would ordinarily be built into a valuation table, but the VTT will recommend establishing this margin. The margin would vary by 1) the size of the company and the block of business; 2) the assumed lapse rates; and 3) the length of the projection period. The random fluctuation margin would be from 1% to 10% of the expected mortality.

Analysis of the actual-to-expected ratio, based on the 2001 Commissioners Standard Ordinary mortality table, indicates that covering 85% of the companies contributing to the 2002–2004 experience study requires a margin of approximately 20% at ages 25 to 45, down to 10% at higher ages. This would be covered by the company variation load.

The VTT suggests a percentage load for the 2008 tables because those tables are on a select and ultimate basis. The prior valuation tables have been on an aggregate basis with a loading equal to a constant divided by the curtate expectation of life. The load will be lower at the younger ages and at the earlier durations. This percentage load makes more sense for term insurance. Because smaller companies will have less exposure, which results in lower credibility on their experience mortality, reinsurance and reinsurer credibility should be considered.

Ms. Jones asked why the reinsurance information gives more information about a company. Mr. Harris said a company's reinsurance is pooled with the reinsurance from other companies giving higher credibility.

Paul Graham (American Council of Life Insurers—ACLI) said they have done a lot of testing with various levels of loading on mortality, and the real random fluctuation should sum up to zero—ignoring the time value of money—if the mean is correct.

The present value of benefits using mortality with a random fluctuation loading on each mortality rate may overstate the value. Modeling may have to be done to determine the proper level of random fluctuation loading. This loading should be lower for companies with credible experience.

Ms. Claire said the idea is to avoid margins on margins, but the VTT did some modeling to determine loading between 1% and 10%. Mr. Harris said the random fluctuation loading is less then 10% and varies by size of company and length of projection. The VTT could provide guidance and suggest companies review their own experience.

Mr. Serbinowski said the margin for random fluctuation should not be required, but the Task Force should consider requiring companies to analyze their mortality and put some loading in the mortality. Mr. Andersen said the primary risk in some products is the mortality risk. If a company were fully credible, would that company use the unloaded experience mortality? Mr. Harris said a company with fully credible business would have a random fluctuation load at the low end—1% to 2%.

Ms. Jones asked if the extra mortality is from a one-time event in the RBC calculation. She asked that the question be considered by the Joint Subgroup of the Capital Adequacy (E) Task Force and the Life and Health Actuarial Task Force.

# 2. <u>Payout Annuity and Other Mortality Studies</u>

Mary Bahna-Nolan (PricewaterhouseCoopers) reported that a SOA/AAA group has been formed to study guaranteed issue and simplified issue mortality. This type of business presents several challenges because the market is not homogenous. The makeup of the group receiving a solicitation or offer can have a significant impact on the resulting mortality. The SOA/AAA group is developing a survey to determine how the market is segmented and what companies issue this business.

For guaranteed issued business, the work group has determined that the study will not cover true employer groups, credit life business, company owned life insurance (COLI), and bank owned life insurance (BOLI). Work site marketing group, preneed group, quasi-group, and direct solicitation will be studied.

Ms. Bahna-Nolan asked whether the Task Force would like persistency to be studied in addition to mortality. Mr. Bruning said persistency should be added to the study.

Ms. Bahna-Nolan presented a report from the SOA/AAA Payout Annuity Project Oversight Group (Attachment Two). The group is creating the base payout annuity table and exploring the use of an improvement scale. Because the data for the lower ages is not credible and shows that the industry experience is in excess of the level of the A2000 basic table, there will not be an effort to work on the rates at the lower ages. At the older ages the effect of the mortality variances are significant. The group is considering capping the mortality rates at the higher ages and to extend omega to 121.

## 3. <u>Implementation of Actuarial Guideline XLIII</u>

Ms. Jones said the Task Force had sent a request to the Statutory Accounting Principles (E) Working Group to recognize the effect of Actuarial Guideline XLIII as a change in method, but to allow the impact on surplus to be based on the difference between the reserve under the old and new methods as of the end rather than the beginning of the year (see Attachment Twenty-Two-A). The Working Group replied that the requested change is substantive and could not be accomplished this year (Attachment Three).

Mr. Ostlund moved and Mr. Musgrove seconded to amend Actuarial Guideline XLIII to define the reserve as of Jan. 1, 2009, as the sum of the asset adequacy analysis reserve for Actuarial Guideline XXXIV and Actuarial Guideline XXXIX. The motion passed unanimously.

On the Nov. 13 conference call the Task Force discussed guidance on Interrogatory 9.2 and on the excess of the conditional tail expectation amount over the standard scenario reserve in Exhibit 5. The Task Force recommended sending a memo (Attachment Four) to the Blanks (E) Working Group to post the guidance on the NAIC Web site.

Ms. Jones discussed the amendment to Actuarial Guideline XLIII. She suggested adding the phrase "from the Actuarial Guideline XLIII reserve" after each instance of the word "subtracted." Ms. Jones moved and Mr. Ostlund seconded to adopt the modified amendment as shown below. The motion passed unanimously.

The grading shall be done only on the reserves on the contracts in-force as of Dec. 31, 2009. The reserves under the old basis and new basis shall be compared each year -2/3 of the difference shall be subtracted from the Actuarial Guideline XLIII reserve in 2009 and 1/3 of the difference shall be subtracted from the Actuarial Guideline XLIII reserve in 2010.

Ms. Jones discussed a request from Connecticut to set the due date for the certifications required in Actuarial Guideline XLIII. Tom Campbell (Hartford) said the information is usually available, but there should be some flexibility for the first

few years. At some point the certifications and memorandum should be available at the same time as the actuarial opinion for the annual statement. Mr. Musgrove moved and Mr. Marcks seconded to add due dates and provisions in Actuarial Guideline XLIII similar to the dates and provisions in the *Actuarial Opinion and Memorandum Regulation* (#822). The motion passed unanimously.

Mr. Ostlund moved and Ms. Jones seconded to adopt the revised Actuarial Guideline XLIII (Attachment Five). The motion passed unanimously.

Ms. Jones said there had been an inquiry whether a future clearly defined hedging strategy that increases the reserves must be included. She said the guideline gives the option to exclude the clearly defined hedging strategy if the exclusion would decrease the reserve. Mr. Campbell said the AAA work group has a proposed practice note regarding Actuarial Guideline XLIII with two questions on this topic. With regard to hedging strategies that do not meet the requirements of a clearly defined hedging strategy, some companies are including the strategies in the calculation if the strategies increase the reserves. Those that are including it have different practices in setting the E factor (effectiveness factor) of Appendix 7. Mr. Andersen said the import aspect is that the company is consistent from year to year and does not exclude the strategy in the years in which the inclusion would increase the reserve.

Mr. Campbell, speaking as an actuary from Hartford Life, said if a company's investment strategy includes a hedging strategy, the hedging strategy should be included in the calculation, even if the inclusion increases the reserve. Because of some of the nuances of the calculation, an increase in the reserve because of the hedging strategy may produce an overstatement of the reserve. Some companies may change their hedging strategy to lower the overstatement. Reserve methodology should not drive the structure of a hedging strategy. The Task Force may need to investigate those nuances to consider some changes to the guideline.

## 4. <u>Report of the Accident and Health Working Group</u>

Mr. Ostlund presented a report of the Accident and Health Working Group (Attachment Six). Ms. Schafer moved and Ms. Jones seconded that the Task Force receive the report. The motion passed unanimously.

## 5. <u>Nonforfeiture Improvement</u>

Armand de Palo (Guardian Life) presented the report (Attachment Seven) from the AAA Nonforfeiture Improvement Work Group. The Work Group has a preliminary draft of a nonforfeiture methodology for life insurance and annuity products and plans to present the final report at the Winter National Meeting.

## 6. <u>Net Premium Reserves in VM-20</u>

John Bruins (ACLI) presented an update on the net premium reserve proposal for VM-20 (Attachment Eight). The proposal on fixed premium products was presented at the Fall National Meeting. The comparable proposal on flexible premium products is being tested by several companies. The proposed redraft of VM-20 will be done by the end of December.

The net premium reserve will be calculated for all products using prescribed assumptions and will have a floor equal to the cash value. There will be a stochastic exclusion test to determine if a stochastic reserve should be calculated and a deterministic test to see if a deterministic reserve is required. The deterministic test is done if the net premium, calculated without lapse rates, exceeds the guaranteed gross premium. For flexible premium products the comparison is done to a level annual maturity premium based on contract guarantees at issue.

Initially, the prescribed mortality will be the 2001 CSO tables. The prescribed lapse rates will be at one level during the premium-paying period and another level during a paid-up period. There will be shock lapses on level term insurance at the end of the premium paying period. The prescribed interest rates are those in Section 4b of the *Standard Valuation Law* (#820), with a different set of interest rates for life insurance benefits with no cash surrender value. The expense allowance will also be prescribed.

Mr. Bruins presented results of the testing done by several companies to show the level of the net premium reserves and the deterministic reserves and the relationship of the two reserves.

Ms. Jones said it is misleading to state that the actual reserve is the greater of the net premium reserve and the deterministic reserves when it is on an aggregate basis. Mr. Graham said the primary reason for doing an aggregate comparison is that the

net premium reserve deals with three levels of mortality while the mortality for the deterministic reserves may have five or more levels.

Sheldon Summers (Claire Thinking, Inc.) asked if the net premium reserve would be adjusted for any net deferred premiums.

Mr. Boerner asked how riders would be handled in view of the initial limited scope for PBR. If a base policy is subject to PBR, are all riders subject to PBR? Mr. Graham said they had considered the case in which a base policy would pass at the tests, but a rider on that policy would not. In that case, the recommendation would be to split the base policy and the rider.

## 7. Default Costs on Existing Fixed Income Investments in VM-20

Gary Falde (Pacific Life) and Alan Routhenstein (Milliman Inc.) presented a report (Attachment Nine) by the Asset Subgroup of the AAA Life Reserve Work Group (LRWG) on the "Existing Asset Default Costs: A Prescribed Methodology for VM-20."

Section I of the report contains the objectives of the proposed methodology. Section II describes the methodology and is a precursor to the language for VM-20. Sections III and IV describes the development of the tables that the NAIC will have to maintain and publish to support the methodology. Section V has a list of questions about the methodology. The appendices list tables that are the end result of the research on establishing the baseline default cost, including a margin, for corporate bonds.

There are four items needed for each asset: 1) rating; 2) option adjusted spread; 3) weighted average life (average time to maturity); and 4) investment expense assumptions. The baseline default cost is a table lookup based on the historical distribution of asset default costs. The spread-related component is an adjustment for a temporary period to deal with environments in which spreads widen, but are assumed to return to normal. This component can be positive or negative. The minimum default cost is a floor on the calculated spread. The maximum net spread adjustment is a calculation at the portfolio level and is attributed to each asset in the portfolio.

Section II also contains details of a PBR credit rating system. This stems from the concern to have a better match to the actual risk in each asset. The PBR credit rating has a scale from 1 to 21—unlike the NAIC designation, which has a scale from 1 to 6. There is a subsection containing special instructions for certain asset types: 1) floating rate notes or bonds with embedded derivatives; 2) bonds or preferred stock that are perpetual or mature after 30 years; 3) bonds or preferred stock that are convertible; 4) residential mortgage-backed securities; 5) commercial mortgage-backed securities; and 6) commercial mortgage loans. Mr. Bruning said the special instructions for each category should be filled in as soon as possible.

Mr. Bruning suggested an initial approach would be to map to whatever rating is set by the NAIC Securities Valuation Office (SVO). Alternatively, a simple approach would be to develop a table of default costs based on yield or spread. This table would apply to any asset not categorized.

Residential mortgage-backed securities could be based on the new SVO rating methodology proposed by the Valuation of Securities (E) Task Force. This rating methodology is based on the carrying value, which is a different concept than the rating of other assets.

Commercial mortgage loans is an asset category that does not go through the SVO process. Mr. Routhenstein suggested basing the calculation on a company's internal rating. Mr. Rink said there should be company disclosure if the internal rating was used. Mr. Falde suggested a certification by an investment officer and noted that commercial mortgage loans are a core investment for insurance companies, not an exotic investment. Ms. Jones said using the internal rating may give companies incentive to invest in riskier assets. Mr. Andersen suggested using the current reinvestment requirement for the S&P 500 total return assumption for the deterministic reserve, equal to the then-current U.S. Treasury interest rate curve plus 4% of the appropriate U.S. Treasury interest rate curve plus .25%.

Mr. Falde suggested an approach for commercial mortgage-backed securities to set the PBR rating lower by one or two levels or to put a limit on the PBR rating.

Mr. Andersen said for non-rated assets, the approach should be to use the current valuation interest rate defined in Section 4b of the *Standard Valuation Law* for the stochastic net investment earned rate and for the deterministic net asset earned rate. Mr. Graham said this approach ignores some elements of the asset, such as call provisions and prepayment options. The effect is to replace the real asset, and risk is not being reflected properly.

Mr. Andersen moved and Ms. Jones seconded that, for assets not independently rated, the stochastic net investment earned rate and the deterministic net asset earned rate will be capped at a prescribed rate. The motion passed, with eight in favor (Alabama, Arkansas, California, Connecticut, Florida, New York, Ohio and South Carolina), four against (Alaska, Minnesota, Nebraska and Texas), and one abstention (Utah).

Mr. Andersen said he will provide more details on what the prescribed rate cap would be.

# 8. <u>PBR for Variable Annuities (VM-21)</u>

Mr. Campbell presented a report from the AAA Annuity Reserve Work Group. The group was requested to review the proposed VM-21, Requirements for Principle-Based Reserves for Variable Annuities, and recommend any modifications to ensure that VM-21 was equivalent to Actuarial Guideline XLIII. The Background section was restored. This included the "Principles" subsection and the "Risks Reflected" subsection. There were style changes made to be consistent with the style of VM-20. The reference to the *Standard Valuation Law* was updated, and reference to *Actuarial Standard of Practice No. 23* was restored.

The scope section states that the requirements are for contracts issued on or after 1981. One major issue is whether a section of the valuation manual can apply to contracts issued prior to the operative date of the valuation manual. If VM-21 applies only to contracts issued prior to the operative date of the valuation manual, and Actuarial Guideline XLIII applies to prior issues, can the two eras be aggregated for calculation purposes? If these two documents that are meant to be equivalent continue to be the guidance for variable annuities, there is the problem of keeping them equivalent when changes are made.

Mr. Boerner said there is an amendment to VM-00 to provide direction in the use of both documents.

Mr. Ostlund moved and Ms. Jones seconded to adopt VM-21 with section 1.D.1 removed. The motion passed unanimously.

# 9. <u>PBR Life (VM-20)</u>

Ms. Campbell reported that the VM PBR Life subgroup had five conference calls during the quarter. The subgroup asked the AAA to provide feedback on the Analysis of Proposed Principle-Based Approach report, prepared for the SOA by Milliman, Inc. The subgroup requested that the Task Force be responsible for reviewing 1) the net premium reserve proposal; 2) the prescribed default cost on existing investments and the spreads on reinvestment; 3) the appropriate level of aggregation; and 4) guidance on margins on assumptions. The subgroup will continue to work on other issues. There was no objection to this assignment of responsibility. Attached are proposed amendments to VM-20 (Attachment Ten).

## 10. PBR Reporting and Review (VM-30, VM-31)

Ms. Campbell reported that the VM PBR Reporting and Review Subgroup had adopted amendment VM-30\_090515\_003 regarding the reliance statements. When the chair implemented that amendment, there were more wording changes because the actuarial opinion used different terms than *Actuarial Standards of Practice No. 22*. Therefore, a separate amendment (VM-30\_090515\_009) was prepared to highlight those changes. Mr. Musgrove moved and Mr. Ostlund seconded to adopt this second amendment. The motion passed unanimously.

The Task Force considered amendment VM-30\_090515\_004 to move the reliance wording to the Regulatory Asset Adequacy Issues Summary. Ms. Campbell said several regulators said they would prefer keeping the reliance wording in the actuarial opinion. Mr. Musgrove moved and Ms. Jones seconded to reject the amendment. The motion passed unanimously. Attached are proposed amendments to VM-30 (Attachment Eleven).

Ms. Campbell moved and Mr. Musgrove seconded to adopt Section VM-30. The motion passed unanimously.

## 11. <u>PBR Process and Coordination (VM-00 and VM-01)</u>

Mr. Boerner reported that there were two amendments to Section VM-00 (Attachment Twelve).

The first amendment, VM-00\_090921\_01, was adopted by the VM PBR Process and Coordination Subgroup. The amendment adds to the scope of VM-26 a type of credit life insurance that is not within the definition of credit life insurance, but should be reserved on the basis specified in VM-26. Mr. Ostlund moved and Ms. Jones seconded to adopt the amendment. The motion passed unanimously.

The *Standard Valuation Law* states that for policies issued on or after the operative date of the valuation manual, the standards prescribed in the valuation manual are the minimum standards of valuation. Amendment VM-00\_090921\_02 allows contracts issued prior to the operative date to be valued under the provisions of VM-21 because that section is identical to Actuarial Guideline XLIII. Mr. Graham said there should be wording that issues before and after the operative date of the valuation manual may be aggregated for purposes of modeling. Ms. Campbell moved and Ms. Jones seconded to adopt the amendment with Mr. Graham's language included as shown below. The motion passed unanimously.

The requirements of VM-21, for issues on and after the VM operative date, are equivalent to the requirements for issues prior to the VM operative date as found in Actuarial Guideline XLIII, Appendix C, of the *Accounting Practices and Procedures Manual*. Because of this equivalence, contracts issued before and after the operative date of the valuation manual may be aggregated for purposes of modeling under VM-21, and it is acceptable to calculate reserves for issues on and after the VM operative date by applying the VM-21 requirements to all such issues both before and on and after the VM operative date.

Mr. Ostlund moved and Mr. Musgrove seconded to adopt Sections VM-00 and VM-01. The motion passed unanimously.

Mr. Boerner said Appendix A and Appendix C could be set up to refer to the comparable sections in the *Accounting Practices and Procedures Manual*, or those sections could be copied into the appendices. There are two amendments for each appendix, one of which does the referral and the other does the copying. Mr. Boerner recommended the referral approach. Therefore, Mr. Shepherd moved and Ms. Campbell moved to adopt VM-A\_080228\_01, with the reference to A-010 included, and to defer VM-A\_080228\_02. The motion passed unanimously. Mr. Bruning moved and Ms. Jones seconded to adopt VM-C\_080228\_01and to defer VM-C\_080228\_02. The motion passed unanimously. Attached are proposed amendments to VM-A and VM-C (Attachments Thirteen and Fourteen).

## 12. <u>PBR Experience Reporting (VM-50, VM-51)</u>

Mr. Andersen summarized the proposed experience reporting process. There would be two categories of data submissions one would be for the development of industry experience tables and the other would be for the validation of the PBR assumptions.

The data for the development of industry experience tables would be collected from companies with large amounts of relevant blocks of business. The data would be submitted to the statistical agent (or agents) that would verify and correct the data. The data will be aggregated by one of the statistical agents (if there is more than one) and then sent to an organization such as the SOA for the purpose of developing experience studies/tables.

The data for the validation of a company's PBR assumptions would be submitted directly to a requesting regulator. For a company required to submit data to a statistical agent, the company would submit the verified, corrected data (signed off on by the statistical agent) to the regulator.

The first step in the submission of data for development of industry experience reports would be a submission by each company of a survey. The companies that would be required to submit data for an industry study would be determined most likely by an NAIC group such as the Life and Health Actuarial Task Force, which would review the surveys and consider the size of blocks of business being studied. There would be an assessment of all companies by the NAIC to pay for the experience reporting process.

A reason for splitting the data submission into two categories is an attempt to balance between providing individual companies assurance that their data is not being evaluated out of context while also providing requesting regulators with what they need to evaluate PBR assumptions.

## 13. <u>PBR Scenarios Subgroup</u>

Mr. Andersen discussed his Nov. 20 e-mail (Attachment Fifteen) regarding the need for stochastic testing of non-variable product. He looked at the profile of life insurance reserves as interest rates varied and compared that profile with variable annuity reserves as the equity market changed. The reserves for variable annuities were very small until near the 100<sup>th</sup> percentile, at which time there was a sudden spike in the reserves. That is why the CTE(70) metric was used for variable annuities.

Life reserves show a more gradual increase as interest rates fall. In most cases a CTE(70) metric gives an answer between the 85<sup>th</sup> and 88<sup>th</sup> percentile. Considering the amount of work to model 1,000 scenarios, the PBR requirements may not be efficient. In most cases, the answer will be similar to the reserve using one scenario.

The stochastic exclusion test evaluates if a product is sensitive to changes in interest rates. It does not evaluate whether the CTE metric is necessary to evaluate that change in interest rates. It would make more sense to test if the CTE metric is necessary. An alternative would be to test a limited set of scenarios and compare a weighted average with reserves in the  $85^{\text{th}}$  to  $90^{\text{th}}$  percentile.

Mr. Serbinowski asked if it were easy to identify a scenario that would produce a reserve in the 90<sup>th</sup> percentile. Mr. Andersen said it may be necessary to run a representative sample to indentify the limited set of scenarios.

Dave Neve (Aviva) said the AAA Life Reserve Work Group has a number of concerns with this approach. Stochastic modeling is a fundamental element of the principle-based reserving concept to get at the real risks of a product. It is difficult to know in advance which scenarios will produce the highest reserves. The assumption seems to be that the severity of the interest path determines the percentile. The alternative stochastic exclusion test may result in very few situations in which stochastic modeling is done.

If stochastic modeling is required, a smaller number of scenarios may be run. Also, the specific scenarios could be different by plan. All products should be run against the same scenarios.

Attached is a report regarding the mean reversion assumption in the scenario generator from the AAA Economic Scenario Implementation Work Group (Attachment Sixteen).

# 14. <u>PBR Reinsurance (VM-20)</u>

The VM PBR Reinsurance Subgroup had one conference call on which the subgroup discussed the Analysis of Proposed Principle-Based Approach report prepared for the SOA by Milliman, Inc. The report showed that the reinsurance credit was considerably higher than the credit under current statutory requirements.

The subgroup asked for additional information regarding the reinsurance, including: 1) an explanation for the magnitude of reserve reduction due to reinsurance under the PBR; 2) the relationship between the mortality underlying the reinsurance premium and prudent estimate mortality assumption underlying the reserve; 3) the assumptions regarding future reinsurance premiums if not guaranteed; and 4) the relationship between the mortality margins for the reinsured and retained portions of the business.

## 15. <u>Valuation Manual</u>

At the beginning of the meeting, Mr. Ostlund moved and Mr. Musgrove seconded to set the goal for the Task Force to adopt a version of the valuation manual by the end of the meeting. Mr. Boerner said that does not preclude more work on the manual in the future. The motion passed with six in favor (Alabama, Arkansas, California, Connecticut, Nebraska and South Carolina), four against (Alaska, New York, Texas and Utah), and three abstentions (Florida, Minnesota and Ohio).

Ms. Campbell said there was a misunderstanding as to the status of the life insurance requirements. She suggested sending a letter requesting an extension. Mr. Rink asked what a reasonable time frame was to complete the manual. She moved and Mr. Boerner seconded to ask the Life Insurance and Annuities (A) Committee to extend the date until the Summer National Meeting in August and give several options. Mr. Serbinowski said he was not comfortable with a six-month time frame. The motion passed with 11 in favor (Alaska, Arkansas, California, Connecticut, Florida, Minnesota, Nebraska, New York, Ohio, South Carolina and Texas), one against (Alabama), and one abstention (Utah). The letter to the A Committee is attached (Attachment Seventeen).

Mr. Boerner moved and Ms. Jones seconded to adopt VM-26, Credit Life and Disability Reserve Requirements. The motion passed unanimously.

Mr. Ostlund moved and Ms. Jones seconded to adopt the valuation manual consisting of VM-00, VM-01, VM-21, VM-26, VM-30, VM-A, and VM-C (Attachment Eighteen). The motion passed with New York abstaining.

Attached is exposed VM-20 and VM-25 (Attachments Nineteen and Twenty).

## 16. <u>Other Matters</u>

Dave Sandberg (Allianz) gave a status report (Attachment Twenty-One) on the review of country-specific regulatory responses to the financial crisis, including a list showing the responses in 12 countries. Canada specified that if cash flows are in the future, the capital requirements can be lower.

Alice Fontaine (Fontaine Consulting) reported on the activities of the Interstate Compact Commission. The long-term care standards are near completion and are in their exposure period at the standards committee level. After a public call there will be a 60-day exposure period. The next set of standards to be up for approval is disability income.

## 17. <u>Approve Minutes</u>

Mr. Rink moved and Mr. Musgrove seconded that the Task Force approve the minutes dated Nov. 13 (Attachment Twenty-Two) and Oct. 20 (Attachment Twenty-Three). The motion carried unanimously.

Having no further business, the Life and Health Actuarial Task Force adjourned.

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# Valuation Table Team's Views on Margins for 2008 Tables Random Fluctuations

- The random fluctuation discussed in the 2001 CSO Report considered a single year's experience
  - For PBR, we should consider the effects of random fluctuation on the present value of future mortality
  - "Present value" takes account of many years experience, so random fluctuation is reduced compared with a single year's experience
- It is not practical to have a valuation mortality table with loading that varies by the size of the block of business
- RBC factors for mortality are larger for smaller volumes
- Companies with credible mortality experience should perform an analysis of random fluctuations in mortality

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Valuation Table Team's Views on Margins for 2008 Tables Unknown Variation • The Valuation Table Team (VTT) suggests that "one-time" events be covered by surplus, not reserves This leaves unknown trends and other unknowns to be covered Note that the absence of future mortality improvement in the VBT can be considered a margin vs. anticipated experience - The "company variation" component of margin at the higher ages may reflect an element of trend variance (where trends are caused by items such as anti-selection) PBR methodology will reflect changes in experience as they become known n Academy of Actuaries fe and Health Actuarial Task Force Meeting Society of Actuaries AMERICAN ACADEMY of ACTUARIES













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SOCIETY OF ACTUARIES

# MEMORANDUM

TO:	Larry Bruning, Chair, NAIC Life and Health Actuarial Task Force
FROM:	Scott Claflin, Chair, Academy-SOA Payout Annuity Project Oversight Group
RE:	Update on Payout Annuity Mortality Table Project
DATE:	December 3, 2009

The American Academy of Actuaries-Society of Actuaries Payout Annuity Project Oversight Group (POG) submitted a report in September to the Life and Health Actuarial Task Force (LHATF) for the NAIC's Fall 2009 National Meeting. This report included the POG's recommendations regarding three issues relating to the creation of a new payout annuity valuation mortality table to replace the A2000 Table. The recommendations were to 1) create a new base payout annuity valuation table; 2) create or use an associated projection scale; and 3) not consider mortality variations based on payout amounts. LHATF agreed with the recommendations, and thus the POG is pursuing the creation of a new valuation table that will be further modified by either an existing or a new mortality improvement projection scale.

## **TABLE**

The POG has examined some preliminary base tables based upon the 2000-2004 Payout Study data. Data at the higher and lower ages are not deemed to be as credible due to lower exposure.

The POG performed sensitivity analysis at these ages to determine the effect of mortality variance upon the resulting reserves. The POG believes that, at the younger ages, the effect is minimal and transient. Specifically, halving the mortality rate of the A2000 Basic from ages 60-69 would raise reserves by 3.8% at a 5% discount rate. The 3.8% would grade off to 0% by age 70. The lower age data suggests that mortality is actually well above the level that A2000 Basic indicates. For example, according to the Payout Study data, actual mortality is almost four times what is expected based on the A2000 Basic by amount for ages below 50. On the same basis, actual to expected ratios for age groups 50-54 and 55-59 are 398% and 151% respectively. The POG therefore is not considering expending any significant effort to improve the mortality measures in the lower age ranges.

However, at the older ages, the effect of mortality variances can be significant. The POG has discussed obtaining alternate data or additional breakdowns of the Payout Study data. Another alternative/additional measure that has been discussed is to cap the mortality rates at the highest ages similar to modern U.S. pension tables (UP-94, RP-2000). Specifically, capping the A2000 q's at .4 (and extending omega to age 121) increases reserves by 1% at age 100, 11% at age 105 and 150% at age 110. This notion of roughly equal probability of death at the highest ages has been suggested by other mortality investigations. Although these reserve increases appear significant, the POG notes that the actual number of survivors will be insignificant at those ages.

## **IMPROVEMENT SCALE**

Since there is no direct measure of improvements relative to the 2000-2004 Payout Study, the POG has discussed various approaches and has settled upon investigating the applicability of Projection Scale AA. As part of the investigation, the POG will consider the study data, population data and possibly past study data. The challenge is to find consistent, applicable, credible data sets at different points in time.

The group has already investigated the effect of Projection Scale AA upon reserves calculated using the A2000 and 5% assuming a 2009 issue. It was demonstrated that use of the improvements has a significant but variable effect upon reserves both at issue and over time. For example, for a male age 70 issue, the reserve is increased by 5.4% at issue, 7.5% at duration 15 and 4.2% at duration 25. For a female age 60 issue, the increase is 2.2% at issue, 5.5% at duration 15 and 6.8% at duration 25.

# MARGINS

The group has not discussed potential table margins extensively but has measured the effect of the A2000's load relative to the A2000 Basic reserves at 5%. In general, the reserves will increase with age until the highest ages (when the load is graded away).

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- TO: Larry Bruning (KS), Chair, Life and Health Actuarial Task Force
- FROM: Joseph Fritsch (NY), Chair, Statutory Accounting Principles (E) Working Group
- DATE: December 2, 2009
- RE: Actuarial Guideline XLIII

This memo is in response to your October 20, 2009 inquiry on variable annuities under Actuarial Guideline XLIII. The guidance in SSAP No. 51—Life Contracts, paragraph 32, has been the guidance on how to do a change in valuation basis, since codification went into effect in 2000. SSAP No. 51 paragraph 32 states as follows:

32 Consistent with SSAP No. 3, any increase (strengthening) or decrease (destrengthening) in actuarial reserves resulting from such a change in valuation basis shall be recorded directly to surplus rather than as a part of the reserve change recognized in the summary of operations. The impact on surplus is based on the difference between the reserve under the old and new methods as of the beginning of the year.

Furthermore, this treatment is consistent through out several other SSAPs, including, SSAP No. 52—Deposit-Type Contracts, SSAP No. 54—Individual and Group Accident and Health Contracts, and SSAP No. 59—Credit Life and Accident and Health Insurance Contracts.

Providing this treatment, ensures, that major changes in the valuation basis is accounted for consistently across companies to provide comparability. Any change in this language would require what would be considered a substantive change, and likely could not be accomplished and adopted through the committee structure by December 31, 2009.

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- TO: Jacob Garn, Chair Blanks (E) Working Group
- FROM: Larry Bruning (KS), Chair, Life and Health Actuarial Task Force
- DATE: December 4, 2009
- RE: Actuarial Guideline XLIII

In discussing some of the issues with the implementation of Actuarial Guideline XLIII, on variable annuities, the Life and Health Actuarial Task Force noted that this actuarial guideline which is effective as of December 31, 2009, may cause some questions regarding how to complete general interrogatory 9.2 for life entities. The Task Force recommends that the Blanks Working Group post the following as non-binding guidance for entities which file on the life blank for year-end 2009 reporting.

#### **Interrogatory 9.2**

Interrogatory 9.2 of the annual statement was intended to identify the types of guarantees a company is making, the waiting period of each guarantee, the account values and the reserves. Actuarial Guidelines XXXIV and XXXIX had explicit reserves attributable to particular benefits. Under Actuarial Guideline XLIII there is only an aggregate reserve and there is no specific reserve for each guarantee. For reserves calculated according to Actuarial Guideline XLIII column 6 (gross reserve) of each row of tables in the interrogatory should be calculated using the reserve allocated to each contract by calculating the difference between the total reserve and the basic adjusted reserve, which would include any excess stochastic reserve.

#### Extra Reserve under Actuarial Guideline XLIII

The portion of the reserve calculated according to Actuarial Guideline XLIII held in the general account may be split between a reserve supporting the fixed account portion of the variable annuity and the reserve supporting the guaranteed benefits. The reserve supporting the guaranteed benefits may be reported in either the Annuities section or the Miscellaneous Reserves section of Section 5. However, that reserve should be identified separately.

The Task Force also notes that this interrogatory may need some adjustments for future periods and may make additional recommendations at a later date.

cc: Engelhardt; Marcotte; Caswell

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Draft: 12/4/09 Adopted by the Life and Health Actuarial Task Force, 12/4/09

# ACTUARIAL GUIDELINE XLIII CARVM FOR VARIABLE ANNUITIES

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#### Section I) Background

The purpose of this Actuarial Guideline (Guideline) is to interpret the standards for the valuation of reserves for variable annuity and other contracts involving certain guaranteed benefits similar to those offered with variable annuities. The Guideline codifies the basic interpretation of the Commissioners Annuity Reserve Valuation Method (CARVM) by clarifying the assumptions and methodologies that will comply with the intent of the Standard Valuation Law (SVL). It also applies similar assumptions and methodologies to contracts that contain characteristics similar to those described in the scope, but that are not directly subject to CARVM.

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, contractholder 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 Guideline addresses these issues by including an approach that applies principles of asset adequacy analysis directly to the risks associated with these products and guarantees.

The NAIC is currently using a similar approach to calculate risk-based capital (RBC) for similar contracts (i.e., the C-3 Phase II project). The methodology in the Guideline is based on that approach, and the intent of the Guideline is to, where possible, facilitate a framework whereby companies may determine both reserve and RBC in a consistent calculation.

In developing the Guideline, two regulatory sources were looked to for guidance. First, the SVL requires that CARVM be based on the greatest present value of future guaranteed benefits. Second, the NAIC Model Variable Annuity Regulation (VAR) states that the "reserve liability for variable annuities shall be established pursuant to the requirements of the Standard Valuation Law in accordance with actuarial procedures that recognize the variable nature of the benefits provided and any mortality guarantees."

The Guideline requires that reserves for contracts falling within its scope be based on a minimum floor determined using a standard scenario (referred to as the Standard Scenario Amount) plus the excess over this minimum floor, if any, of a reserve calculated using a projection of the assets and estimated liabilities supporting these contracts over a broad range of stochastically generated projection scenarios and using prudent estimate assumptions (referred to as the Conditional Tail Expectation Amount). Within each of these scenarios, the greatest of the present values of accumulated losses ignoring

Federal Income Tax is determined. The assumed fund performance for these scenarios must meet the mandated calibration standards contained in the Guideline. The reserve calculated using projections is based on a Conditional Tail Expectation measure of the results for each scenario.

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 recognizes a portion of the tail by providing the average over all values in the tail beyond the CTE percentile. Thus where the tail of the distribution of losses approximates that of a standard normal distribution, CTE (70) will approximate the 88th percentile; where the tail is "fatter" than that of a standard normal distribution, CTE (70) will exceed the 88th percentile; and where the tail is not as "fat" as a standard normal distribution, CTE (70) will be lower than the 88th percentile. Therefore, for distributions with "fat tails" from low probability, high impact events, such as those covered by the Guideline, the use of CTE will provide a more revealing measure than use of a single percentile requirement.

For certain products (e.g., variable annuities with Guaranteed Minimum Death Benefits only), a company can use an Alternative Methodology in place of the modeling approach outlined above to determine the Conditional Tail Expectation Amount.

The projection methodology used to calculate the Conditional Tail Expectation Amount, as well as the approach used to develop the Alternative Methodology, is based on the following set of principles. These principles should be followed when applying the methodology in the Guideline and analyzing the resulting reserves.<sup>1</sup>

**Principle 1.** The objective of the approach used to determine the Conditional Tail Expectation Amount is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed.

**Principle 2.** The calculation of the Conditional Tail Expectation Amount is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash flow model to equity return and interest rate scenarios. For each scenario the greatest present value of accumulated surplus deficiency is calculated. The analysis reflects Prudent Estimate (see the definition of Prudent Estimate in Section III) assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions)<sup>2</sup> to allow the natural offset of risks within a given scenario. The methodology utilizes a projected total statutory balance sheet approach by including all projected income, benefit and expense items related to the business in the model and sets the Conditional Tail Expectation Amount at a degree of confidence using the conditional tail expectation measure applied to the set of scenario specific greatest present values of accumulated statutory deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

**Principle 3.** The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, 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,<sup>3</sup> the choice of assumptions and the modeling decisions should be made so that the final result approximates what would be obtained for the Conditional Tail Expectation Amount 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 Conditional Tail Expectation Amount, the actuary should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

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

a. The principles should be considered in their entirety.

b. The Guideline requires companies to meet these principles with respect to only those contracts that fall within the scope of the Guideline and are inforce as of the valuation date to which the requirements are applied.

 $<sup>^{2}</sup>$  Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

<sup>&</sup>lt;sup>3</sup> The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Appendix 9 provides the requirements and guidance for setting contractholder behavior and includes alternatives to this framework if the actuary is unable to fully apply this principle.

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**Principle 4.** 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 Conditional Tail Expectation Amount 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. Any disconnect between the model and reality should be reflected in setting Prudent Estimate assumptions to the extent not addressed by other means.

**Principle 5.** 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. 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 Conditional Tail Expectation Amount without also reducing risk on scenarios similar to those used in the actual cash flow modeling are inconsistent with these principles. 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.

The methodology prescribed in the Guideline is applied to a company's entire portfolio of variable annuities (whether or not they contain guaranteed benefits), as well as other affected products that contain guaranteed benefits. Current guaranteed benefits include Guaranteed Minimum Death Benefits, Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Withdrawal Benefits, and Guaranteed Payout Annuity Floors. It is also expected that the methodology in the Guideline will 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 Guideline clarifies standards for adjusting the various components of the reserve so that the reserve may be reported both prior to and net of reinsurance.

The Guideline 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 Guideline. A qualified actuary (referred to throughout the Guideline as "the actuary") shall certify that the work has been done in a way that meets all applicable Actuarial Standards of Practice.

For more details on the development of these requirements, including the development of the calibration criteria, see the American Academy of Actuaries recommendation on C-3 Phase II risk-based capital.

This Guideline and its Appendices require the actuary to make various determinations, verifications and certifications. The company shall 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*.

The risks reflected in the calculation of reserves under this Guideline arise from actual or potential events or activities which are both:

- a) Directly related to the contracts falling under the scope of this Guideline or their supporting assets; and
- b) Capable of materially affecting the reserve.

Categories and examples of risks reflected in the reserve calculations include but are not necessarily limited to:

- a) Asset Risks
  - (i) Separate Account fund performance;
  - (ii) Credit risks (e.g., default or rating downgrades);
  - (iii) Commercial mortgage loan rollover rates (roll-over of bullet loans);
  - (iv) Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk));
  - (v) Performance of equities, real estate, and Schedule BA assets;

- (vi) Call risk on callable assets;
- (vii) Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions); and
- (viii) Currency risk.
- b) Liability Risks
  - (i) Reinsurer default, impairment or rating downgrade known to have occurred before or on the valuation date;
  - (ii) Mortality/longevity, persistency/lapse, partial withdrawal and premium payment risks;
  - (iii) Utilization risk associated with guaranteed living benefits;
  - (iv) Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted;
  - (v) Annuitization risks; and
  - (vi) Additional premium dump-ins (high interest rate guarantees in low interest rate environments);
- c) Combination Risks
  - (i) Risks modeled in the company's risk assessment processes that are related to the contracts, as described above;
  - (ii) Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits); and
  - (iii) Risks associated with Revenue Sharing Income.

The risks not necessarily reflected in the calculation of reserves under this Guideline are:

- a) Those not reflected in the determination of Risk-Based Capital; and
- b) Those reflected in the determination of Risk-Based Capital but arising from obligations of the company not directly related to the contracts falling under the scope of this Guideline, or their supporting assets, as described above.

Categories and examples of risks not reflected in the reserve calculations include but are not necessarily limited to:

- a) Asset Risks
  - Liquidity risks associated with a "run on the bank."
- b) Liability Risks
  - (i) Reinsurer default, impairment or rating downgrade occurring after the valuation date;
  - (ii) Catastrophic events (e.g., epidemics or terrorist events);
  - (iii) Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience; and
  - (iv) Significant future reserve increases as an unfavorable scenario is realized.
- c) General Business Risks
  - (i) Deterioration of reputation;
  - (ii) Future changes in anticipated experience (reparameterization in the case of stochastic processes) which would be triggered if and when adverse modeled outcomes were to actually occur;
  - (iii) Poor management performance;
  - (iv) The expense risks associated with fluctuating amounts of new business;
  - (v) Risks associated with future economic viability of the company;
  - (vi) Moral hazards; and
  - (vii) Fraud and theft.

#### Section II) Scope

- A) The Guideline applies to contracts, whether directly written or assumed through reinsurance, falling into any of the following categories:
  - 1) Variable deferred annuity contracts subject to the Commissioner's Annuity Reserve Valuation Method (CARVM), whether or not such contracts contain Guaranteed Minimum Death Benefits (GMDBs), or Variable Annuity Guaranteed Living Benefits (VAGLBs);
  - 2) Variable immediate annuity contracts, whether or not such contracts contain GMDBs or VAGLBs;

- 3) Group annuity contracts that are not subject to CARVM, but contain guarantees similar in nature<sup>4</sup> to GMDBs, VAGLBs, or any combination thereof; and
- 4) All other products that contain guarantees similar in nature to GMDBs or VAGLBs, even if the insurer does not offer the mutual funds or variable funds to which these guarantees relate, where there is no other explicit reserve requirement.<sup>5</sup>

If such a benefit is offered as part of a contract that has an explicit reserve requirement and that benefit does not currently have an explicit reserve requirement:

- a) The Guideline shall be applied to the benefit on a standalone basis (i.e., for purposes of the reserve calculation, the benefit shall be treated as a separate contract);
- b) The reserve for the underlying contract is determined according to the explicit reserve requirement; and
- c) The reserve held for the contract shall be the sum of a) and b).
- B) The Guideline does not apply to contracts falling under the scope of the NAIC Model Modified Guaranteed Annuity Regulation (MGAs); however, it does apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in MGAs (e.g., market value adjustments).
- C) Separate account products that guarantee an index and do not offer GMDBs or VAGLBs are excluded from the scope of the Guideline.

## Section III) Definitions

- A) <u>Definitions of Benefit Guarantees</u>
  - 1) <u>Guaranteed Minimum Death Benefit (GMDB)</u>. A GMDB is a guaranteed benefit providing, or resulting in the provision that, an amount payable on the death of a contractholder, annuitant, participant, or insured will be increased and/or will be at least a minimum amount. Only such guarantees having the potential to produce a contractual total amount payable on death that exceeds the account value, or in the case of an annuity providing income payments, an amount payable on death other than continuation of any guaranteed income payments, are included in this definition. GMDBs that are based on a portion of the excess of the account value over the net of premiums paid less partial withdrawals made (e.g., an Earnings Enhanced Death Benefit) are also included in this definition.
  - 2) <u>Variable Annuity Guaranteed Living Benefit (VAGLB)</u>. A VAGLB is a guaranteed benefit providing, or resulting in the provision that, one or more guaranteed benefit amounts payable or accruing to a living contractholder or living annuitant, under contractually specified conditions (e.g., at the end of a specified waiting period, upon annuitization, or upon withdrawal of premium over a period of time), will increase contractual benefits should the contract value referenced by the guarantee (e.g., account value) fall below a given level or fail to achieve certain performance levels. Only such guarantees having the potential to provide benefits with a present value as of the benefit commencement date that exceeds the contract value

<sup>&</sup>lt;sup>4</sup> The term "similar in nature," as used in sections II)A)3) and II)A)4) is intended to capture both current products and benefits as well as product and benefit designs that may emerge in the future. Examples of the currently known designs are listed in footnote #5 below. Any product or benefit design that does not clearly fit the Scope should be evaluated on a case-by-case basis taking into consideration factors that include, but are not limited to, the nature of the guarantees, the definitions of GMDB and VAGLB in sections III)A)1) and III)A)2) and whether the contractual amounts paid in the absence of the guarantee are based on the investment performance of a market-value fund or market-value index (whether or not part of the company's separate account).

<sup>&</sup>lt;sup>5</sup> For example, a group life contract that wraps a GMDB around a mutual fund would generally fall under the scope of the Guideline since there is not an explicit reserve requirement for this type of group life contract. However, for an individual variable life contract with a GMDB and a benefit similar in nature to a VAGLB, the Guideline would generally apply only to the VAGLB-type benefit, since there is an explicit reserve requirement that applies to the variable life contract and the GMDB.

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referenced by the guarantee are included in this definition. Payout annuities without minimum payout or performance guarantees are neither considered to contain nor to be VAGLBs.

- 3) <u>Guaranteed Minimum Income Benefit (GMIB)</u>. A GMIB is a VAGLB design for which the benefit is contingent on annuitization of a variable deferred annuity or similar contract. The benefit is typically expressed as a contractholder option, on one or more option dates, to have a minimum amount applied to provide periodic income using a specified purchase basis.
- 4) <u>Guaranteed Payout Annuity Floor (GPAF)</u>. A GPAF is a VAGLB design guaranteeing that one or more of the periodic payments under a variable immediate annuity will not be less than a minimum amount.

### B) Definitions of Reserve Methodology Terminology

- 1) <u>Scenario</u>. A scenario consists of a set of asset growth rates and investment returns from which assets and liabilities supporting a set of contracts may be determined for each year of a projection.
- 2) <u>Cash Surrender Value</u>. For purposes of the Guideline, the Cash Surrender Value for a contract is the amount available to the contractholder upon surrender of the contract. 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. For contracts where all or a portion of the amount available to the contractholder upon surrender is subject to a market value adjustment, however, the Cash Surrender Value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the Cash Surrender Value shall reflect any market value adjustments where the underlying assets are reported at market value, but shall not reflect any market value adjustments where the underlying assets are reported at book value.
- 3) <u>Scenario Greatest Present Value</u>. For a given scenario, the Scenario Greatest Present Value is the sum of:
  - a) The greatest of the present values, as of the projection start date, of the projected Accumulated Deficiencies for the scenario; and
  - b) The Starting Asset Amount, as defined below.
- 4) <u>Conditional Tail Expectation Amount</u>. The Conditional Tail Expectation Amount is equal to the numerical average of the 30 percent largest values of the Scenario Greatest Present Values.
- 5) <u>Working Reserve</u>. The Working Reserve is the assumed reserve used in the projections of Accumulated Deficiencies supporting the calculation of the Scenario Greatest Present Values. At any point in the projections, including at the start of the projection, the Working Reserve shall equal the projected Cash Surrender Value.

For a variable payout annuity without a Cash Surrender Value, the Working Reserve shall equal the present value, at the valuation interest rate and the valuation mortality table specified for such a product by the Standard Valuation Law of future income payments projected using a return based on the valuation interest rate less appropriate asset based charges. For annuitizations that occur during the projection, the valuation interest rate as of the current valuation date may be used in determining the Working Reserve. Alternatively, if an integrated model of equity returns and interest rates is used, a future estimate of valuation interest rates may be incorporated into the Working Reserve.

For contracts not covered above, the actuary shall determine the Working Reserve in a manner that is consistent with the above requirements.

6) <u>Accumulated Deficiency</u>. Accumulated Deficiency is an amount measured as of the end of a projection year and equals the projected Working Reserve less the amount of projected assets, both as of the end of the projection year. Accumulated Deficiencies may be positive or negative.<sup>6</sup>

<sup>&</sup>lt;sup>6</sup> Note that a positive Accumulated Deficiency means that there is a cumulative loss and a negative Accumulated Deficiency means that there is a cumulative gain.

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- 7) <u>Starting Asset Amount</u>. The Starting Asset Amount equals the value of the assets at the start of the projection, as defined in section A1.4)A) of Appendix 1.
- 8) <u>Prudent Estimate</u>. The deterministic assumptions to be used for projections are to be the actuary's Prudent 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 Estimate assumption is developed by applying a margin for uncertainty to the "Anticipated Experience" assumption. The margin for uncertainty shall provide for estimation error and margins for adverse deviation. The resulting Prudent Estimate assumption shall be reasonably conservative over the span of economic cycles and over a plausible range of expected experience, in recognition of the Principles described in Section I. "Anticipated Experience" would typically be the actuary's 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 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 Anticipated Experience 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.

This means that valuation assumptions not stochastically modeled are to be consistent with the stated Principles in Section I, be based on any relevant and credible experience that is available, and should be set to produce, in concert with other Prudent Estimate assumptions, a Conditional Tail Expectation Amount that is consistent with the stated CTE level.

The actuary shall follow the principles discussed in Appendices 9 and 10 in determining Prudent Estimate assumptions.

- 9) <u>Gross Wealth Ratio</u>. The Gross Wealth Ratio is the cumulative return for the indicated time period and percentile (e.g., 1.0 indicates that the index is at its original level).
- 10) <u>Clearly Defined Hedging Strategy</u>. The designation of Clearly Defined Hedging Strategy applies to strategies undertaken by a company to manage risks through the future purchase or sale of hedging instruments and the opening and closing of hedging positions. In order to qualify as a Clearly Defined Hedging Strategy, the strategy must meet the principles outlined in the Background section of the Guideline (particularly Principle 5) and shall, at a minimum, identify:
  - a) The specific risks being hedged (e.g., delta, rho, vega, etc.),
  - b) The hedge objectives,
  - c) The risks not being hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.),
  - d) The financial instruments that will be used to hedge the risks,
  - e) The hedge trading rules including the permitted tolerances from hedging objectives,
  - f) The metric(s) for measuring hedging effectiveness,
  - g) The criteria that will be used to measure effectiveness,
  - h) The frequency of measuring hedging effectiveness,
  - i) The conditions under which hedging will not take place, and
  - j) The person or persons responsible for implementing the hedging strategy.

The hedge strategy may be dynamic, static, or a combination thereof.

It is important to note that strategies involving the offsetting of the risks associated with variable annuity guarantees with other products outside of the scope of the Guideline (e.g., equity-indexed annuities) do not currently qualify as a Clearly Defined Hedging Strategy under the Guideline.

- 11) <u>Revenue Sharing</u>. Revenue Sharing, for purposes of the Guideline, means any arrangement or understanding by which an entity responsible for providing investment or other types of services makes payments to the company (or to one of its affiliates). Such payments are typically in exchange for administrative services provided by the company (or its affiliate), such as marketing, distribution and recordkeeping. Only payments that are attributable to charges or fees taken from the underlying variable funds or mutual funds supporting the contracts that fall under the scope of the Guideline shall be included in the definition of Revenue Sharing.
- 12) <u>Domiciliary Commissioner</u>. For purposes of the Guideline, this term refers to the chief insurance regulatory official of the state of domicile of the company.
- 13) <u>Aggregate Reserve</u>. The minimum reserve requirement as of the valuation date for the contracts falling within the scope of the Guideline.
- 14) <u>1994 Variable Annuity MGDB Mortality Table</u>. This mortality table is shown in Appendix 11.

## Section IV) Definition of General Reserve Methodology

- A) <u>General Description</u>. The Aggregate Reserve for contracts falling within the scope of the Guideline shall equal the Conditional Tail Expectation Amount but not less than the Standard Scenario Amount, where the Aggregate Reserve is calculated as the Standard Scenario Amount plus the excess, if any, of the Conditional Tail Expectation Amount over the Standard Scenario Amount.
- B) <u>Impact of Reinsurance Ceded</u>. 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 statutory requirements that would allow the treaty to be accounted for as reinsurance.

An Aggregate Reserve before reinsurance shall also be calculated if needed for regulatory reporting or other purposes, using methods described in Appendix 2.

- C) <u>The Standard Scenario Amount</u>. The Standard Scenario Amount is the aggregate of the reserves determined by applying the Standard Scenario method to each of the contracts falling within the scope of the Guideline. The Standard Scenario method is outlined in Appendix 3.
- D) <u>The Conditional Tail Expectation Amount</u>. The Conditional Tail Expectation Amount shall be determined based on a projection of the contracts falling within the scope of the Guideline, and the assets supporting these contracts, over a broad range of stochastically generated projection scenarios and using Prudent Estimate assumptions.

The stochastically generated projection scenarios shall meet the Scenario Calibration Criteria described in Appendix 5.

The Conditional Tail Expectation Amount may be determined in aggregate for all contracts falling within the scope of the Guideline (i.e., a single grouping). At the option of the company, it may be determined by applying the methodology outlined below to sub-groupings of contracts, in which case, the Conditional Tail Expectation Amount shall equal the sum of the amounts computed for each such sub-grouping.

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

1) For each scenario, projected aggregate Accumulated Deficiencies are determined at the start of the projection (i.e., "time 0") and at the end of each projection year as the sum of the Accumulated Deficiencies for each contract grouping.

- 2) The Scenario Greatest Present Value is determined for each scenario based on the sum of the aggregate Accumulated Deficiencies<sup>7</sup> and aggregate Starting Asset Amounts for the contracts for which the Aggregate Reserve is being computed.
- 3) The Scenario Greatest Present Values for all scenarios are then ranked from smallest to largest and the Conditional Tail Expectation Amount is the average of the largest 30 percent of these ranked values.

The projections shall be performed in accordance with Appendix 1. The actuary shall document the assumptions and procedures used for the projections and summarize the results obtained as described in Appendix 2 and Appendix 8.

E) <u>Alternative Methodology</u>. For variable deferred annuity contracts that contain either no guaranteed benefits or only GMDBs (i.e., no VAGLBs), the Conditional Tail Expectation Amount may be determined using the Alternative Methodology described in Appendix 4 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 Conditional Tail Expectation Amount 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 2 and Appendix 8.

- F) <u>Allocation of Results to Contracts</u>. The Aggregate Reserve shall be allocated to the contracts falling within the scope of the Guideline using the method outlined in Appendix 6.
- <u>G)</u> Reserve As of January 1, 2009. The reserve as of January 1, 2009 shall be the sum of the reserves from the asset adequacy analysis requirements in Actuarial Guideline XXXIV and Actuarial Guideline XXXIX.

## Section V) Effective Date

The Guideline affects all contracts issued on or after January 1, 1981, effective December 31, 2009. Where the application of the Guideline produces higher reserves than the company had otherwise established by their previously used interpretation, such company may request a grade-in period, 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. The grading shall be done only on the reserves on the contracts in-force as of Dec. 31, 2009. The reserves under the old basis and new basis shall be compared each year - 2/3 of the difference shall be subtracted from the reserve under the new basis in 2009 and 1/3 of the difference shall be subtracted from the reserve under the new basis in 2010.

<sup>&</sup>lt;sup>7</sup> The Scenario Greatest Present Value is therefore based on the greatest projected Accumulated Deficiency, in aggregate, for all contracts for which the Aggregate Reserve is computed hereunder, rather than based on the sum of the greatest projected Accumulated Deficiency for each grouping of contracts.

## **APPENDIX 1 - Determination of Conditional Tail Expectation Amount Based on Projections**

#### A1.1) Projection of Accumulated Deficiencies

A) <u>General Description of Projection</u>. The projection of Accumulated Deficiencies shall be made ignoring Federal Income Tax and reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including the guarantees provided under the contracts. Insurance company expenses (including overhead and investment expense), fund expenses, contractual fees and charges, revenue sharing income received by the company (net of applicable expenses) and cash flows associated with any reinsurance or hedging instruments are to be reflected on a basis consistent with the requirements herein. Cash flows from any fixed account options shall also be included. Any market value adjustment assessed on projected withdrawals or surrenders shall also be included (whether or not the Cash Surrender Value reflects market value adjustments). Throughout the projection, where estimates are used, such estimates shall be on a Prudent Estimate basis.

Federal Income Tax shall not be included in the projection of Accumulated Deficiencies.

B) Grouping of Variable Funds and Subaccounts. The portion of the Starting Asset Amount held in the Separate Account represented by the variable funds and the corresponding account values may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of the funds. In assigning each variable fund and the variable subaccounts to a grouping for projection purposes, the fundamental characteristics of the fund shall be reflected and the parameters shall have the appropriate relationship to the required calibration points of the S&P 500. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

An appropriate proxy for each variable subaccount shall be designed in order to develop the investment return paths. The development of the scenarios for the proxy funds is a fundamental step in the modeling and can have a significant impact on results. As such, the actuary must map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices (or sub-indices).

- C) <u>Grouping of Contracts</u>. Projections may be performed for each contract inforce on the date of valuation or by grouping contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Grouping shall be the responsibility of the actuary but may not be done in a manner that intentionally understates the resulting reserve.
- D) <u>Modeling of Hedges</u>. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of the Guideline shall be included in the projections. If the company is following a Clearly Defined Hedging Strategy and the hedging strategy meets the requirements of Appendix 7, the projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of that strategy.

To the degree either the currently held hedge positions or the hedge positions expected to be held in the future introduce basis, gap, price, or assumption risk, a suitable reduction for effectiveness of hedges shall be made. The actuary is responsible for verifying compliance with a Clearly Defined Hedging Strategy and the requirements in Appendix 7 for all hedge instruments included in the projections.

While hedging strategies may change over time, any change in hedging strategy shall be documented and include an effective date of the change in strategy.

The use of products not falling under the scope of the Guideline (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of Accumulated Deficiencies.

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

Upon request of the company's domiciliary commissioner and for information purposes to show the effect of including future hedge positions in the projections, the company shall show the results of performing an additional

set of projections reflecting only the hedges currently held by the company in support of the contracts falling under the scope of the Guideline. Because this additional set of projections excludes some or all of the derivative instruments, the investment strategy used may not be the same as that used in the determination of the Conditional Tail Expectation Amount.

- E) <u>Revenue Sharing</u>.
  - 1) Projections of Accumulated Deficiencies may include income from projected future Revenue Sharing, as defined in Section III) net of applicable projected expenses ("Net Revenue Sharing Income") if the following requirements are met:
    - a) The Net Revenue Sharing Income is received<sup>8</sup> by the company,<sup>9</sup>
    - b) Signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the Net Revenue Sharing Income; and
    - c) The Net Revenue Sharing Income is not already accounted for directly or indirectly as a company asset.
  - 2) The amount of Net Revenue Sharing Income to be used shall reflect the actuary's assessment of factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
    - a) The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the Net Revenue Sharing as part of the agreement(s);
    - b) The relationship between the company and the entity providing the Net Revenue Sharing Income that might affect the likelihood of payment and the level of expenses;
    - c) The benefits and risks to both the company and the entity paying the Net Revenue Sharing Income of continuing the arrangement.
    - d) The likelihood that the company will collect the Net Revenue Sharing Income during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended;
    - e) The ability of the company to replace the services provided to it by the entity providing the Net Revenue Sharing Income or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide; and
    - f) The ability of the entity providing the Net Revenue Sharing Income to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.
  - 3) The amount of projected Net Revenue Sharing Income shall also reflect a margin (which decreases the assumed Net Revenue Sharing Income) directly related to the uncertainty of the revenue. The greater the uncertainty, the larger the margin. Such uncertainty is driven by many factors including the potential for changes in the securities laws and regulations, mutual fund board responsibilities and actions, and industry trends. Since it is prudent to assume that uncertainty increases over time, a larger margin shall be applied as time that has elapsed in the projection increases.
  - 4) All expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the Net Revenue Sharing Income, as well as any expenses assumed to be incurred by the

<sup>&</sup>lt;sup>8</sup> For purposes of this section, Net Revenue Sharing Income is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the Net Revenue Sharing Income or an affiliated company that receives the Net Revenue Sharing Income. Net Revenue Sharing Income would also be considered to be received, if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case the actuary needs to assess the likelihood that future Net Revenue Sharing Income is reduced due to the reported statutory income of the subsidiary being less than future Net Revenue Sharing Income received.

<sup>&</sup>lt;sup>9</sup> As in other sections of the Guideline, the term "the company" is used exclusively as a reference to the insurance company writing the business falling under the scope of the Guideline. The term "entity providing the Net Revenue Sharing Income" is self-explanatory and is used consistently in this subsection.

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company in conjunction with the assumed replacement of the services provided to it (as discussed in subsection 2)e) above) shall be included in the projections as a company expense under the requirements of section A1.1)A). In addition, expenses incurred by either the entity providing the Net Revenue Sharing Income or an affiliate of the company shall be included in the applicable expenses discussed in section A1.1)A) and A1.1)E)1) that reduce the Net Revenue Sharing Income.

- 5) The actuary is responsible for reviewing the revenue sharing agreements, verifying compliance with these requirements, and documenting the rationale for any source of Net Revenue Sharing Income used in the projections.
- 6) The amount of Net Revenue Sharing Income assumed in a given scenario shall not exceed the sum of a) and b), where:
  - a) Is the contractually guaranteed Net Revenue Sharing Income projected under the scenario, and
  - b) Is the actuary's estimate of non-contractually guaranteed Net Revenue Sharing Income before reflecting any margins for uncertainty multiplied by the following factors:
    - (i) 1.0 in the first projection year;
    - (ii) 0.9 in the second projection year;
    - (iii) 0.8 in the third projection year;
    - (iv) 0.7 in the fourth projection year;
    - (v) 0.6 in the fifth projection year;
    - (vi) 0.5 in the sixth and all subsequent projection years. The resulting amount of noncontractually guaranteed Net Revenue Sharing Income after application of this factor shall not exceed 0.25% per year on separate account assets in the sixth and all subsequent projection years.
- F) <u>Length of Projections</u>. Projections of Accumulated Deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.
- G) <u>AVR/IMR</u>. The AVR and the IMR shall be handled consistently with the treatment in the company's cash flow testing.

## A1.2) Determination of Scenario Greatest Present Values

- A) <u>Scenario Greatest Present Values</u>. For a given scenario, the Scenario Greatest Present Value is the sum of:
  - 1) The greatest present value, as of the projection start date, of the projected Accumulated Deficiencies defined in Section III)B)6); and
  - 2) The Starting Asset Amount.
- B) <u>Discount Rates</u>. In determining the Scenario Greatest Present Values, Accumulated Deficiencies shall be discounted using the same interest rates at which positive cash flows are invested, as determined in section A1.4)D). Such interest rates shall be reduced to reflect expected credit losses. Note that the interest rates used do not include a reduction for Federal Income Taxes.

#### A1.3) **Projection Scenarios**

- A) <u>Minimum Required Scenarios</u>. The number of scenarios for which projected greatest present values of Accumulated Deficiencies shall be computed shall be the responsibility of the actuary and shall be considered to be sufficient if any resulting understatement in total reserves, as compared with that resulting from running additional scenarios, is not material.
- B) <u>Scenario Calibration Criteria</u>. Returns for the groupings of variable funds shall be determined on a stochastic basis such that the resulting distribution of the Gross Wealth Ratios of the scenarios meets the Scenario Calibration Criteria specified in Appendix 5.

## A1.4) **Projection Assets**

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- A) <u>Starting Asset Amount</u>. For the projections of Accumulated Deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:
  - 1) All of the Separate Account assets supporting the contracts;
  - 2) An amount of assets held in the General Account equal to the approximate value of statutory reserves as of the start of the projections less the amount in 1), above.

In many instances the initial General Account assets may be negative, resulting in a projected interest expense. General Account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

Any hedge assets meeting the requirements described in section A1.1)D) shall be reflected in the projections and included with other General Account assets under item 2) above. To the extent the sum of the value of such hedge assets and the value of assets in item 1) above is greater than the approximate value of statutory reserves as of the start of the projections, then item 2) above may include enough negative General Account assets or cash such that the sum of items 1) and 2) above equals the approximate value of statutory reserves as of the start of the projections.<sup>10</sup>

The actuary shall document which assets were used as of the start of the projection, the approach used to determine which assets were chosen and shall verify that the value of the assets equals the approximate value of statutory reserves at the start of the projection.

- B) <u>Valuation of Projected Assets</u>. For purposes of determining the projected Accumulated Deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics.
- C) <u>Separate Account Assets</u>. For purposes of determining the Starting Asset Amounts in subsection A) and the valuation of projected assets in subsection B), assets held in a Separate Account shall be summarized into asset categories determined by the actuary as discussed in section A1.1)B).
- D) <u>General Account Assets</u>. General Account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested at interest rates, which, at the option of the actuary, are one of the following:
  - 1) The forward interest rates implied by the swap  $curve^{11}$  in effect as of the valuation date,
  - 2) The 200 interest rate scenarios available as prescribed for Phase I, C-3 Risk Based Capital calculation, coupled with the Separate Account return scenarios by mating them up with the first 200 such scenarios and repeating this process until all Separate Account return scenarios have been mated with a Phase I scenario, or
  - 3) Interest rates developed for this purpose from a stochastic model that integrates the development of interest rates and the Separate Account returns.

http://www.iedefaileserve.gov/ieleases/iii/s/default.htm.

<sup>&</sup>lt;sup>10</sup> Further elaboration on potential practices with regard to this issue may be included in a practice note.

<sup>&</sup>lt;sup>11</sup> The swap curve is based on the Federal Reserve H.15 interest swap rates. The rates are for a Fixed Rate Payer in return for receiving three month LIBOR. One place where these rates can be found is http://www.federalreserve.gov/releases/h15/default.htm.

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When the option described in 1) above (the forward interest rates implied by the swap curve) is used, an amount shall be subtracted from the interest rates to reflect the current market expectations about future interest rates using the process described in section A1.5)A).

The actuary may switch from 1) to 2), from 1) to 3) or from 2) to 3) from one valuation date to the next, but may not switch in the other direction without approval from the Domiciliary Commissioner.

## A1.5) Projection of Annuitization Benefits (including GMIBs)

A) <u>Assumed Annuitization Purchase Rates at Election</u>. For purposes of projecting annuitization benefits (including annuitizations stemming from the election of a GMIB), the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project General Account Assets, as determined in A1.4)D). However, where the interest rates used to project General Account Assets are based upon the forward interest rates implied by the swap curve in effect as of the valuation date (i.e., the option described in section A1.4)D)1) is used, herein referred to as a point estimate), the margin between the cost to purchase an annuity using the guaranteed purchase basis and the cost using the interest rates prevailing at the time of annuitization shall be adjusted as discussed below.

If a point estimate is being used, it is important that the margin assumed reflects the current market expectations about future interest rates at the time of annuitization, as described more fully below, and a downward adjustment to the interest rate assumed in the purchase rate basis. The latter adjustment is necessary since a greater proportion of contractholders will select an annuitization benefit when it is worth more than the cash surrender value then when it is not. As a practical matter, this effect can be approximated by using an interest rate assumption in the purchase rate basis that is 0.30 percent below that implied by the forward swap curve, as described below.

To calculate market expectations of future interest rates, the par or current coupon swap curve is used (documented daily in Federal Reserve H.15 with some interpolation needed). Deriving the expected rate curve from this swap curve at a future date involves the following steps:

- 1) Calculate the implied zero-coupon rates. This is a well documented "bootstrap" process. For this process we use the equation  $100=C^n * (v + v^2 + ... + v^n) + 100v^n$  where the "v<sup>t</sup>" terms are used to stand for the discount factors applicable to cash flows 1,2,...n years hence and  $C^n$  is the n-year swap rate. Each of these discount factors are based on the forward curve and therefore are based on different rates, however (i.e. "v<sup>2</sup>" does not equal v times v). Given the one year swap rate, one can solve for v. Given v and the two year swap rate one can then back into v<sup>2</sup>, and so on.
- 2) Convert the zero coupon rates to one year forward rates by calculating the discount factor needed to get from  $v^{t-1}$  to  $v^t$ .
- 3) Develop the expected rate curve.

This recognizes that, for example, the five-year forward one-year rate is not the rate the market expects on one year instruments five years from now. The reason is that as the bond gets shorter the "risk premium" in the rate diminishes. This is sometimes characterized as "rolling down" the yield curve. Table A shows the historic average risk premium at various durations. From this table, one can see that to get the rate the market expects a 1 year swap to have five years from now; one must subtract the risk premium associated with six year rates (.95%) and add back that associated with 1 year rates (.50%). This results in a net reduction of .45%.

Duration	Risk Premium	Duration	Risk Premium
1	0.500%	6	0.950%
2	0.750%	7	1.000%
3	0.750%	8	1.100%
4	0.850%	9+	1.150%
5	0.900%		

Table A: Risk Premium by Duration

The Exhibit below combines the three steps. Columns A through D convert the swap curve to the implied forward rate for each future payment date. Columns E through H remove the current risk premium, add the risk premium t years in the future (the Exhibit shows the rate curve five years in the future), and uses that to get the discount factors to apply to the 1 year, 2 year,...5 year cash flows 5 years from now.

	А	В	С	D	Е	F	G	Н
1 2 3	Projection Years	Swap Curve Rate	PV of Zero Coupon	Forward 1 Year Rate	Risk Premium	Risk Premium 5 Years Out	Expected Forward Rate In Five Years	PV of Zero Coupon In 5 Years
4	1	2.57%	0.97494	2.5700%	0.50000%			
5	2	3.07%	0.94118	3.5879%	0.75000%			
6	3	3.44%	0.90302	4.2251%	0.75000%			
7	4	3.74%	0.86231	4.7208%	0.85000%			
8	5	3.97%	0.82124	5.0010%	0.90000%			
9	6	4.17%	0.77972	5.3249%	0.95000%	0.50000%	4.8749%	0.95352
10	7	4.34%	0.73868	5.5557%	1.00000%	0.75000%	5.3057%	0.90547
11	8	4.48%	0.69894	5.6860%	1.10000%	0.75000%	5.3360%	0.85961
12	9	4.60%	0.66050	5.8209%	1.15000%	0.85000%	5.5209%	0.81463
13	10	4.71%	0.62303	6.0131%	1.15000%	0.90000%	5.7631%	0.77024
14	Cell formulas for Projection Year 10:		=(1-B13* SUM(\$C\$ 4:C12)) /(1+B13)	=C12/C13-		=E8	=D13- E13+F13	=H12/(1+G1

Exhibit: Derivation of discount rates expected in the future

Where interest rates are projected stochastically using an integrated model, although one would "expect" the interest rate n years hence to be that implied for an appropriate duration asset by the forward swap curve as described above, there is a steadily widening confidence interval about that point estimate with increasing time until the annuitization date. The "expected margin" in the purchase rate is less than that produced by the point estimate based on the expected rate, since a greater proportion of contractholders will have an annuitization benefit whose worth is in excess of cash surrender value when margins are low than when margins are high. As a practical matter, this effect can be approximated by using a purchase rate margin based on an earnings rate .30 percent below that implied by the forward swap curve. If a stochastic model of interest rates is used instead of a point estimate then no such adjustment is needed.

- B) <u>Projected Election of Guaranteed Minimum Income Benefit and other Annuitization Options</u>. For contracts projected to elect annuitization options (including annuitizations stemming from the election of a GMIB), the projections may assume one of the following at the actuary's option:
  - 1) The contract is treated as if surrendered at an amount equal to the statutory reserve that would be required at such time for the payout annuity benefits, or
  - 2) The contract is assumed to stay inforce, the projected periodic payments are paid, and the Working Reserve is equal to one of the following:
    - a) The statutory reserve required for the payout annuity, if it is a fixed payout annuity, or
    - b) If it is a variable payout annuity, the Working Reserve for a variable payout annuity as defined in Section III)B)5).

If the projected payout annuity is a variable payout annuity containing a floor guarantee (such as a GPAF) under a specified contractual option, only option 2) above shall be used.

Where mortality improvement is used to project future annuitization purchase rates, as discussed in A) above, mortality improvement shall also be reflected on a consistent basis in either the determination of the reserve in 1) above or the projection of the periodic payments in 2) above.

### A1.6) Relationship to Risk Based Capital Requirements

- A) The Guideline anticipates that the projections described herein may be used for the determination of Risk Based Capital (the "RBC requirements") for some or all of the contracts falling within the scope of the Guideline. There are several differences between the requirements of the Guideline and the RBC requirements, and among them are two major differences. First, the Conditional Tail Expectation level is different (CTE (70) for the Guideline and CTE (90) for the RBC requirements). Second, the projections described in the Guideline are performed on a basis that ignores Federal Income Tax. That is, under the Guideline, the Accumulated Deficiencies do not include projected Federal Income Tax and the interest rates used to discount the Scenario Greatest Present Value (i.e., the interest rates determined in section A1.4)D)) contain no reduction for Federal Income Tax. Under the RBC requirements, the projections do include projected Federal Income Tax and the discount interest rates used in the RBC requirement do contain a reduction for Federal Income Tax.
- B) To further aid the understanding of the Guideline and any instructions relating to the RBC requirement, it is important to note the equivalence in meaning between the following terms, subject to the differences noted above:
  - 1) The amount that is added to the Starting Asset Amount in Section III)B)6) of the Guideline is similar to the Additional Asset Requirement referenced in the RBC requirement.
  - 2) The Conditional Tail Expectation Amount referenced in the Guideline is similar to the Total Asset Requirement referenced in the RBC requirement.

## A1.7) Compliance with Actuarial Standards of Practice (ASOPs)

When determining the Conditional Tail Expectation Amount using projections, the analysis shall conform to the Actuarial Standards of Practice as promulgated from time to time by the Actuarial Standards Board.

## A1.8) Compliance with Principles

When determining the Conditional Tail Expectation Amount using projections, any interpretation and application of the requirements of the Guideline shall follow the principles discussed in the Section I) Background.

# **APPENDIX 2 - Reinsurance and Statutory Reporting Issues**

## A2.1) Treatment of Reinsurance Ceded in the Aggregate Reserve

- A) <u>Aggregate Reserve Net of and Prior to Reinsurance Ceded</u>. As noted in Section IV)B), the Aggregate Reserve is determined net of reinsurance ceded. Therefore, it is necessary to determine the components needed to determine the Aggregate Reserve (i.e., the Standard Scenario Amount, and either the Conditional Tail Expectation Amount determined using projections or the Conditional Tail Expectation Amount determined using the Alternative Methodology) on a net of reinsurance basis. In addition, as noted in Section IV)B), it may be necessary to determine the Aggregate Reserve determined on a "direct" basis, or prior to reflection of reinsurance ceded. Where this is needed, each of these components shall be determined prior to reinsurance. Sections B) through D) below discuss methods necessary to determine these components on both a "net of reinsurance" and a "prior to reinsurance" basis. Note that due allowance for reasonable approximations may be used where appropriate.
- B) <u>Conditional Tail Expectation Amount Determined using Projections</u>. In order to determine the Aggregate Reserve net of reinsurance ceded, Accumulated Deficiencies, Scenario Greatest Present Values, and the resulting Conditional Tail Expectation Amount shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within the projections. This involves including, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries, where both premiums and recoveries are determined by recognizing any limitations in the reinsurance treaties, such as caps on recoveries or floors on premiums.

In order to determine the Conditional Tail Expectation Amount prior to reinsurance ceded, Accumulated Deficiencies, Scenario Greatest Present Values, and the resulting Conditional Tail Expectation Amount shall be determined ignoring the effects of reinsurance within the projections. One acceptable approach involves a projection based on the same Starting Asset Amount as for the Aggregate Reserve net of reinsurance and by ignoring, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries in the projections.

- C) Conditional Tail Expectation Amount Determined using the Alternative Methodology. If a company chooses to use the Alternative Methodology, as allowed in Section IV)E), it is important to note that the methodology produces reserves on a prior to reinsurance ceded basis. Therefore, where reinsurance is ceded, the Alternative Methodology must be modified to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties in the determination of the Aggregate Reserve net of reinsurance. In addition, the Alternative Methodology, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of the Guideline to determine the Aggregate Reserve prior to reinsurance.
- D) <u>Standard Scenario Amount</u>. Where reinsurance is ceded, the Standard Scenario Amount shall be calculated as described in Appendix 3 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. If it is necessary, the Standard Scenario Amount shall be calculated prior to reinsurance ceded using the methods described in Appendix 3, but ignoring the effects of the reinsurance ceded.

## A.2.2) Aggregate Reserve to be held in the General Account

The amount of the reserve held in the General Account shall not be less than the excess of the Aggregate Reserve over the sum of the Basic Reserve, as defined in section A3.2), attributable to the variable portion of all such contracts.

## A.2.3) Actuarial Certification and Memorandum

A) <u>Actuarial Certification</u>. Actuarial Certification of the work done to determine the Aggregate Reserve shall be required. The actuary shall certify that the work performed has been done in a way that substantially complies with all applicable Actuarial Standards of Practice. The scope of this certification does not include an opinion on the adequacy of the Aggregate Reserve,<sup>12</sup> the company's surplus or the company's future financial condition. The

<sup>&</sup>lt;sup>12</sup> The adequacy of total company reserves, which includes the Aggregate Reserve, is addressed in the company's Actuarial Opinion as required by the NAIC Model Actuarial Opinion and Memorandum Regulation.

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actuary shall also note any material change in the model or assumptions from that used previously and the estimated impact of such changes.

Appendix 8 contains more information on the contents of the required Actuarial Certification.

B) <u>Required Memorandum</u>. An actuarial memorandum shall be constructed documenting the methodology and assumptions upon which the Aggregate Reserve is determined. The memorandum shall also include sensitivity tests that the actuary feels appropriate, given the composition of the company's block of business (i.e., identifying the key assumptions that, if changed, produce the largest changes in the Aggregate Reserve). This memorandum shall have the same confidential status as the actuarial memorandum supporting the actuarial opinion<sup>13</sup> and shall be available to regulators upon request.

Appendix 8 contains more information on the contents of the required memorandum.

C) <u>Conditional Tail Expectation Amount Determined using the Alternative Methodology</u>. Where the Alternative Methodology is used, there is no need to discuss the underlying assumptions and model in the required memorandum. Certification that expense, revenue, fund mapping, and product parameters have been properly reflected, however, shall be required.

Appendix 8 contains more information on the contents of the required Actuarial Certification and memorandum.

D) <u>Material Changes</u>. If there is a material change in results due to a change in assumptions from the previous year, the memorandum shall include a discussion of such change in assumptions and an estimate of the impact it has on the results.

<sup>&</sup>lt;sup>13</sup> This is consistent with Section 3D(8) of the Standard Valuation Law, which states: "Except as provided in Paragraphs (12), (13) and (14), documents, materials or other information in the possession or control of the Department of Insurance that are a memorandum in support of the opinion, and any other material provided by the company to the commissioner in connection with the memorandum, shall be confidential by law and privileged, shall not be subject to [insert open records, freedom of information, sunshine or other appropriate phrase], shall not be subject to subpoena, and shall not be subject to discovery or admissible in evidence in any private civil action. However, the commissioner is authorized to use the documents, materials or other information in the furtherance of any regulatory or legal action brought as a part of the commissioner's official duties."

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#### **APPENDIX 3 - Standard Scenario Requirements**

#### A3.1) Overview

A) <u>Application to Determine Reserves</u>. A Standard Scenario Reserve shall be determined for each of the contracts falling under the scope of the Guideline by applying section A3.3). This includes those contracts to which the Alternative Methodology is applied.

The Standard Scenario Reserve for a contract with guaranteed living benefits or guaranteed death benefits is based on a projection of the account value based on specified returns for supporting assets equal to the account value. An initial drop is applied to the supporting assets and account value on the valuation date. Subsequently, account values are projected at specified rates earned by the supporting assets less contract and fund charges. The assumptions for the projection of account values and margins are prescribed in section A3.3)C). For any contract with guarantees the Standard Scenario Reserve includes the greatest present value of the benefit payments in excess of account values applied over the present value of revenue produced by the margins.

#### B) <u>The Standard Scenario Amount</u>

- 1) The Standard Scenario Amount is defined in Section IV)C) of this Guideline as the aggregate of the reserves determined by applying the Standard Scenario Method to each of the contracts falling under the scope of the Guideline. Except as provided in subsection A3.3)B)1), the Standard Scenario Amount equals the sum over all contracts of the Standard Scenario Reserve determined for each contract as of the statement date as described in A3.1)B)2).
- 2) The Standard Scenario Method requires the Standard Scenario Amount to not be less than the sum over all contracts of the Standard Scenario Reserve determined for the contract as of the statement date as described in section A3.3), where the Discount Rate is equal to *DR*, which is defined as the valuation interest rate specified by the Standard Valuation Law for annuities valued on an issue year basis, using Plan Type A and a Guarantee Duration greater than 10 years but not more than 20 years. The presence of guarantees of interest on future premiums and/or cash settlement options is to be determined using the terms of the contracts.
- C) <u>Illustrative Application of the Standard Scenario to a Projection or Model Office</u>. If the Conditional Tail Expectation Amount is determined based on a projection of an inforce prior to the statement date and/or by the use of a model office, which is a grouping of contracts into representative cells, then additional determinations of A3.1)B)2) shall be performed on the prior inforce and/or model office. The calculations are for illustrative purposes to assist in validating the reasonableness of the projection and/or the model office.

The following table identifies the illustrative additional determinations required by this section using the Discount Rate, DR, as defined in A3.1)B)2). The additional determinations required are based on how the Conditional Tail Expectation projection or Alternative Methodology is applied. For completeness, the table also includes the determinations required by section A3.1)B)2).

- 1) Run A in the table is required for all companies by section A3.1)B)2). No additional determinations are required if a company's stochastic or alternative methodology result is calculated on individual contracts as of the statement date.
- 2) A company that uses a model office as of the statement date to determine its stochastic or alternative methodology result must provide an additional determination for the model office based on the Discount Rate *DR*, run B.
- 3) A company that uses a contract by contract listing of a prior inforce to determine its stochastic or alternative methodology with result PS and then projects requirements to the statement date with result S must provide an additional determination for the prior inforce based on the Discount Rate *DR*, run C.
- 4) A company that uses a model office of a prior inforce to determine its stochastic or alternative methodology requirements with result PM and then projects requirements to the statement date with result S must provide an additional determination for the prior model office based on the Discount Rate *DR*, run D.

		Validation Measures	
Standard Scenario Run	Guideline Variations	Model Office Projection	Projection of Prior Inforce
A. Valuation on the statement date on inforce contracts with discount rate <i>DR</i>	None	None	None
B. Valuation on the statement date on the model office with discount rate <i>DR</i>	If not material to model office validation	A/B compare to 1.00	None
C. Valuation on a prior inforce date on prior inforce contracts with discount rate <i>DR</i>	If not material to projection validation	None	A/C - S/PS compare to 0
D. Valuation on a prior inforce date on a model office with discount rate <i>DR</i>	If not material to model office or projection validation.	(A/D – S compare	S/PM) e to 0

Modification of the requirements in section A3.3) when applied to a prior inforce or a model office is permitted if such modification facilitates validating the projection of inforce or the model office. All such modifications should be documented.

#### A3.2) Basic and Basic Adjusted Reserve - Application of Actuarial Guideline XXXIII

- A) The Basic Reserve for a given contract shall be determined by applying statutory statement valuation requirements applicable immediately prior to adoption of the Guideline to the contract ignoring any guaranteed death benefits in excess of account values or guaranteed living benefits applying proceeds in excess of account values.
- B) The calculation of the Basic Reserve shall assume a return on separate account assets based on the year of issue statutory valuation rate less appropriate asset based charges, including charges for any guaranteed death benefits or guaranteed living benefits. It shall also assume a return for any fixed separate account and general account options equal to the rates guaranteed under the contract.
- C) The Basic Reserve shall be no less than the Cash Surrender Value on the valuation date, as defined in Section III)B) of the Guideline.
- D) The Basic Adjusted Reserve shall be that determined based on A3.2)A) and A3.2)B) except in A3.2)A) free partial withdrawal provisions shall be disregarded when determining surrender charges in applying the statutory statement valuation requirement prior to adoption of the Guideline. Section A3.2)C) shall not apply to the Basic Adjusted Reserve.

#### A3.3) Standard Scenario Reserve - Application of the Standard Scenario Method

- A) <u>General</u>. Where not inconsistent with the guidance given here, the process and methods used to determine the Standard Scenario Reserve under the Standard Scenario Method shall be the same as required in the calculation of the Conditional Tail Expectation Amount as described in Section IV) of the Guideline. Any additional assumptions needed to determine the Standard Scenario Reserve shall be explicitly documented.
- B) <u>Results for the Standard Scenario Method</u>. For each contract, the Standard Scenario Reserve is the reserve based on 1) or 2) where:
  - 1) For contracts without any guaranteed benefits, as defined in Section III)A) of the Guideline and where not subsequently disapproved by the Domiciliary Commissioner, the Standard Scenario Reserve is the Basic Reserve described in section A3.2)A), A3.2)B) and A3.2)C).
  - 2) For all other contracts the Standard Scenario Reserve is equal to the greater of Cash Surrender Value on the valuation date, as defined in Section III)B) of the Guideline, and the quantity a) + b) c), where:
    - a) Is the Basic Adjusted Reserve calculated for the contract, as described in section A3.2)D);

- b) Is the greater of zero and the greatest present value at the Discount Rate measured as of the end of each projection year of the negative of the Accumulated Net Revenue described below using the assumptions described in A3.3)C). The Accumulated Net Revenue at the end of a projection year is equal to (i) + (ii) (iii), where:
  - (i) Is the Accumulated Net Revenue at the end of the prior projection year accumulated at the Discount Rate to the end of the current projection year; the Accumulated Net Revenue at the beginning of the projection (i.e., time 0) is zero;
  - (ii) Are the margins generated during the projection year on account values accumulated at the Discount Rate to the end of the projection year (the factors and assumptions to be used in calculating the margins and account values are in A3.3)C)); and
  - (iii) Are the contract benefits in excess of account values applied, Individual reinsurance premiums and Individual reinsurance benefits payable or receivable during the projection year accumulated at the Discount Rate to the end of the projection year. Individual reinsurance is defined in A3.3)C)2).
- c) Is the contract's allocation of the value of hedges and Aggregate reinsurance as described in section A3.3)D). Aggregate reinsurance is defined in section A3.3)C)2).

No reinsurance shall be considered in the Standard Scenario Amount if such reinsurance does not meet the statutory requirements that would allow the treaty to be accounted for as reinsurance. The actuary shall determine the projected reinsurance premiums and benefits reflecting all treaty limitations and assuming any options in the treaty to the other party are exercised to decrease the value of reinsurance to the reporting company (e.g., options to increase premiums or terminate coverage). The positive value of any reinsurance treaty that is not guaranteed to the insurer or its successor shall be excluded from the value of reinsurance. The commissioner may require the exclusion of a reinsurance treaty or any portion of a reinsurance treaty if the terms of the reinsurance ) treaty or the portion required to be excluded serves solely to reduce the calculated Standard Scenario Reserve without also reducing risk on scenarios similar to those used to determine the Conditional Tail Expectation Reserve. Any reinsurance reflected in the Standard Scenario Reserve shall be appropriate to the business and not merely constructed to exploit 'foreknowledge' of the components of the Standard Scenario Method.

#### C) Assumptions for use in paragraph A3.3)B)2)b) for Accumulated Net Revenue and Account Values.

Account Value Return Assumptions. The bases for return assumptions on assets supporting the Account Value are shown in Table I. The "Initial" returns shall be applied to the account value supported by each asset class on the valuation date as immediate drops, resulting in the Account Value at time 0. The "Year 1," "Years 2 - 5," and "Year 6+" returns for the equity, bond and balanced classes are gross annual effective rates of return and are used (along with other decrements and/or increases) to produce the Account Value as of the end of each projection interval. For purposes of this section, money market funds supporting Account Value shall be considered part of the Bond class.

The Fixed Fund rate is the greater of the minimum rate guaranteed in the contract or 4% but not greater than the current rates being credited to Fixed Funds on the valuation date.

Account Values shall be projected using the appropriate gross rates from Table I for equity, bond and balanced classes applied to the supporting assets less all fund and contract charges according to the provisions of the funds and contract and applying the Fixed funds rate from Table I as if it were the resulting net rate after deduction for fund or contract charges.

The annual margins on Account Value are defined as follows:

- a) During the Surrender Charge Amortization Period, as determined following the step outlined in section A3.3)E) below:
  - (i) 0.20% of Account Value; plus
  - (ii) Any Net Revenue Sharing Income, as defined in section A1.1)E), that is contractually guaranteed to the insurer and its liquidator, receiver, and statutory successor; plus

- (iii) For all of the guaranteed living benefits of a given contract combined,<sup>14</sup> the greater of:
   0.20% of Account Value; or
  - Explicit and optional contract charges for guaranteed living benefits; plus
- (iv) For all guaranteed death benefits of a given contract combined,<sup>15</sup> the greater of:
  - 0.20% of Account Value; or
  - Explicit and optional contract charges for guaranteed death benefits.
- b) After the Surrender Charge Amortization Period:

The amount determined in a) above; plus 50% of the excess, if any, of all contract charges (excluding Net Revenue Sharing Income) over the sum of a)(i), a)(iii) and a)(iv) above.

However, on fixed funds after the surrender charge period, a margin of up to the amount in a) above plus .4% may be used.

	Initial	Year 1	Years 2 – 5	Year 6+
Equity Class	-13.5%	0%	4.0%	5.50%
Bond Class	0%	0%	4.85%	4.85%
Balanced Class	-8.1%	0%	4.34%	5.24%
Fixed Separate Accounts and General Account (net)	0%	Fixed Fund Rate	Fixed Fund Rate	Fixed Fund Rate

Table I

2) <u>Reinsurance Credit</u>. Individual reinsurance is defined as reinsurance where the total premiums for and benefits of the reinsurance can be determined by applying the terms of the reinsurance to each contract covered without reference to the premiums or benefits of any other contract covered and summing the results over all contracts covered. Reinsurance that is not Individual is Aggregate.

Individual reinsurance premiums projected to be payable on ceded risk and receivable on assumed risk shall be included in the Projected Net Revenue. Similarly, Individual reinsurance benefits projected to be receivable on ceded risk and payable on assumed risk shall be included in the Projected Net Revenue. No Aggregate reinsurance shall be included in Projected Net Revenue.

3) <u>Lapses, Partial Withdrawals, and In-The-Moneyness</u>. Partial withdrawals elected as guaranteed living benefits, see A3.3)C)7), or required contractually (e.g., a contract operating under an automatic withdrawal provision on the valuation date) are to be deducted from the Account Value in each projection interval consistent with the projection frequency used, as described in A3.3)C)6), and according to the terms of the contract. No other partial withdrawals, including free partial withdrawals, are to be deducted from Account Value. All lapse rates should be applied as full contract surrenders.

For purposes of determining the dynamic lapse assumptions shown in Table II below, a guaranteed living benefit is in the money (ITM) for any projection interval if the Account Value at the beginning of the projection interval is less than the Current Value of the guaranteed living benefit (as defined below) also at the beginning of that projection interval.

The Current Value of the guaranteed living benefit at the beginning of any projection interval is either the amount of the current lump sum payment (if exercisable) or the present value of future lump sum or income payments. More specific guidance is provided below. For the purpose of determining the present value, the discount rate shall be equal DR as defined in A3.1)B)2). If future living benefit payments are life

<sup>&</sup>lt;sup>14</sup> This excludes any guaranteed living benefit that is added to the contract simply for the purpose of increasing the revenue allowed under this section.

<sup>&</sup>lt;sup>15</sup> This excludes any guaranteed death benefit that is added to the contract simply for the purpose of increasing the revenue allowed under this section.

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contingent (i.e., either the right of future exercise or the right to future income benefits expires with the death of the annuitant or the owner), then the company shall determine the present value of such payments using the mortality table specified in A3.3)C)5).

If a guaranteed living benefit is exercisable (withdrawal can start or, in the case of a GMWB, has begun) at the beginning of the projection interval, then the Current Value of the guaranteed living benefit shall be determined assuming immediate or continued exercise of that benefit.

If a guaranteed living benefit is not exercisable (e.g., due to minimum age or duration requirements) at the beginning of that projection interval, then the Current Value of the guaranteed living benefit shall be determined assuming exercise of the guaranteed living benefit at the earliest possible future projection interval. If the right to exercise the guaranteed living benefit is contingent on the survival of the annuitant or the owner, then the Current Value of the guaranteed living benefit shall assume survival to the date of exercise using the mortality table specified in A3.3)C)5).

Determination of the Current Value of a guaranteed living benefit that is exercisable or payable at a future projection interval shall take account of any guaranteed growth in the basis for the guarantee (e.g., where the basis grows according to an index or an interest rate).

For a GMWB, the Current Value shall be determined assuming the earliest penalty-free withdrawal of guaranteed benefits after withdrawals begin and by applying the constraints of any applicable maximum or minimum withdrawal provisions. If the GMWB is currently exercisable and the right to future GMWB payments is contingent upon the survival of the annuitant or owner, then the Current Value shall assume survival using the mortality table specified in A3.3)C)5). After a GMWB that has payments that are contingent upon the survival of the annuitant or owner has commenced, then the Current Value shall assume survival using the Annuity 2000 Mortality Table.

For an unexercised GMIB, the Current Value shall be determined assuming the option with a reserve closest to the reserve for a 10 year certain and life option. The reserve values and the value of the GMIB on the assumed date of exercise shall be determined using the discount rate DR specified in A3.1)B)2) and for life contingent payments, the Annuity 2000 Mortality Table. The Current Value of an unexercised GMIB, however, shall be set equal to the Account Value if the contractholder can receive higher income payments on the assumed date of exercise by electing the same option under the normal settlement option provisions of the contract.

For the purpose of applying the lapse assumptions specified in Table II below or contractholder elections rates specified in A3.3)C)7), the contract shall be considered "out of the money" (OTM) for a projection interval if the Current Value of the guaranteed living benefit at the beginning of the projection interval is less than or equal to the Account Value at the beginning of the same projection interval. If the Current Value of the guaranteed living benefit at the beginning interval is greater than the Account Value also at the beginning of the projection interval, the contract shall be considered 'in the money' (ITM) and the percent ITM shall equal:

100 \* ((Current Value of the guaranteed living benefit /Account Value) - 1)

If a contract has multiple living benefit guarantees then the guarantee having the largest Current Value shall be used to determine the percent in the money.

	During Surrender Charge Period	After Surrender Charge Period			
Death Benefit Only Contracts	5%	10%			
All Guaranteed Living Benefits OTM	5%	10%			
		ITM < 10% 10%<=ITM < 20% 20%<=ITM			
Any Guaranteed Minimum Accumulation Benefit ITM	2%	2%	0%	0%	
Any Other Guaranteed Living Benefits ITM	3%	7% 5% 2%			

Table II - Lapse Assumptions

4) <u>Account Transfers and Future Deposits</u>. No transfers between funds shall be assumed in the projection used to the determine the greatest present value amount required under section A3.3)B)2)b) unless required by the contract (e.g., transfers from a dollar cost averaging fund or contractual rights given to the insurer to implement a contractually specified portfolio insurance management strategy or a contract operating under an automatic re-balancing option). When transfers must be modeled, to the extent not inconsistent with contract language, the allocation of transfers to funds must be in proportion to the contract's current allocation to funds.

Margins generated during a projection interval on funds supporting account value are transferred to the Accumulation of Net Revenue and are subsequently accumulated at the Discount Rate. Assets for each class supporting account values are to be reduced in proportion to the amount held in each asset classes at the time of transfer of margins or any portion of Account Value applied to the payment of benefits.

No future deposits to Account Value shall be assumed unless required by the terms of the contract to prevent contract or guaranteed benefit lapse, in which case they must be modeled. When future deposits must be modeled, to the extent not inconsistent with contract language, the allocation of the deposit to funds must be in proportion to the contract's current allocation to such funds.

- 5) <u>Mortality</u>. Mortality at 70% of the 1994 Variable Annuity MGDB Mortality Tables (1994 MGDB tables) through age 85 increasing by 1% each year to 100% of the 1994 MGDB tables at age 115 shall be assumed in the projection used to the determine the greatest present value amount required under section A3.3)B(2)b).
- 6) <u>Projection Frequency</u>. The projection used to determine the greatest present value amount required under section A3.3)B)2)b) shall be calculated using an annual or more frequent time step, such as quarterly. For time steps more frequent than annual, assets supporting Account Values at the start of a year may be retained in such funds until year-end (i.e., margin earned during the year will earn the fund rates instead of the Discount Rate until year end) or removed after each time step. However, the same approach shall be applied for all years. Similarly, projected benefits, lapses, elections and other contractholder activity can be assumed to occur annually or at the end of each time step, but the approach shall be consistent for all years.
- 7) Contractholder Election Rates. Contractholder election rates for exercisable ITM guaranteed living benefits other than GMWBs shall be 5% per annum in every projection interval where the living benefit is less than 10% ITM, 15% per annum in every projection interval where the living benefit is 10% or more ITM and less than 20% ITM, and 25% per annum in every projection interval where the living benefit is more than 20% ITM. In addition, the election rate for an exercisable ITM guaranteed living benefit shall be 100% at the last model duration to elect such benefit. This 100% election rate shall be used when a Guaranteed Minimum Accumulation Benefit is at the earliest date that the benefit is exercisable and in-the-money. However, the contractholder election rate for any exercisable ITM guaranteed living benefit shall be zero if exercise would cause the extinction of a guaranteed living benefit having a larger Current Value. For this purpose, GMDBs are not benefits subject to election.

For guaranteed minimum withdrawal benefits, a partial withdrawal, if allowed by contract provisions, equal to the applicable percentage in Table III applied to the contract's maximum allowable partial withdrawal shall be assumed. However, if the contract's minimum allowable partial withdrawal exceeds the partial withdrawal from applying the rate in Table III to the contract's maximum allowable partial withdrawal, then the contract's minimum allowable partial withdrawal shall be assumed.

Table III - Guaranteed Withdrawal Assumptions							
Attained Age less than 50Attained Age 50 to 59Attained Age 60 or Greater							
Withdrawals do not reduce other elective Guarantees that are in the money	50%	75%	100%				
Withdrawals reduce elective Guarantees that are in the money	25%	50%	75%				

8) <u>Indices</u>. If an interest index is required to determine projected benefits or reinsurance obligations, the index must assume interest rates have not changed since the last reported rates before the valuation date. If an equity index is required the index shall be consistent with the last reported index before the valuation date, the initial drop in equity returns and the subsequent equity returns in the standard scenario projection. The sources of information and how they are used to determine the indexes shall be documented and, to the extent possible, consistent from year to year.

#### D) <u>Assumptions for use in Section A3.3)B)2)c)</u>.

1) <u>The Value of Aggregate Reinsurance</u>. The value of Aggregate reinsurance shall be calculated separately from the Accumulated Net Revenue. The value of Aggregate reinsurance is the discounted value, using the statutory valuation rate described in the following paragraph, of the excess of (a) the projected benefit payments from the reinsurance; over (b) the projected gross reinsurance premiums, where (a) and (b) are determined under the assumptions described in section A3.3)C) for all applicable contracts in aggregate.

In order for the value of the Aggregate reinsurance to be consistent with the underlying Standard Scenario reserve, the discount rate shall be a weighted average of the valuation rates (DR) of the contracts that are supported by the Aggregate reinsurance treaty. The weights used to determine this discount rate shall be reasonably related to the risks that are being covered by the Aggregate reinsurance (e.g., account value or values of guaranteed benefits) and shall be applied consistently from year to year. If an appropriate method to determine this discount rate does not exist, the value of the Aggregate reinsurance shall be determined using the statutory valuation rate in effect on the valuation date for annuities valued on an issue year basis using Plan Type A and a Guarantee Duration greater than 10 years but not more than 20 years, determined assuming there are cash settlement options but no interest guarantees on future premiums.

2) <u>The Value of Approved Hedges</u>. The value of approved hedges shall be calculated separately from the Accumulated Net Revenue. The value of approved hedges is the difference between: a) the discounted value at the 1-year CMT<sup>16</sup> as of the valuation date of the pre-tax cash flows from the approved hedges; less b) their statement values on the valuation date.

<sup>&</sup>lt;sup>16</sup> For purposes of this Appendix, the term CMT refers to the nominal yields on actively traded non-inflation-indexed issues adjusted to constant maturities, as released daily by the Federal Reserve Board. As of this writing, the current and historical one-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y1.txt</u> and the current and historical five-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y1.txt</u> and the turrent and historical five-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y1.txt</u> and the turrent and historical five-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y5.txt</u>.

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To be an approved hedge for purposes of the Standard Scenario Reserve, a derivative or other investment has to be an actual asset held by the company on the valuation date, be used as a hedge supporting the contracts falling under the scope of the Guideline, and comply with any statutes, laws, or regulations (including applicable documentation requirements) of the domiciliary state or jurisdiction related to the use of derivative instruments.

The Domiciliary Commissioner may require the exclusion of any portion of the value of approved hedges upon a finding that the company's documentation, controls, measurement, execution of strategy or historical results are not adequate to support a future expectation of risk reduction commensurate with the value of approved hedges.

The cash flow projection for approved hedges that expire in less than one year from the valuation date should be based on holding the hedges to their expiration. For hedges with an expiration of more than 1 year, the value of hedges should be based on liquidation of the hedges one year from the valuation date. Where applicable, the liquidation value of hedges shall be consistent with the assumed returns in the Standard Scenario from the start of the projection to the date of liquidation, Black-Scholes pricing, a risk free rate equal to the 5-year CMT as of the valuation date and the annual volatility implicit as of the valuation date in the statement value of the hedges when the statement value of hedges are valued with Black-Scholes pricing and a risk-free rate equal to the 5-year CMT as of the valuation date.<sup>17</sup>

There is no credit in the Standard Scenario for dynamic hedging beyond the credit that results from hedges actually held on the valuation date.

- 3) <u>Allocation of the Value of Hedges and the Value of Aggregate Reinsurance</u>. The value of approved hedges and Aggregate reinsurance shall be allocated to the contracts which are supported by the applicable Aggregate reinsurance agreements and approved hedges. A contract's allocation shall be the lesser of the amount in A3.3)B)2)b) for the contract or the product of a) and b) where:
  - a) Is the sum of the value of the applicable approved hedges plus the value of the applicable Aggregate reinsurance for all contracts supported by the same hedges and/or the Aggregate reinsurance agreement; and
  - b) Is the ratio of the amount in A3.3)B)2)b) for the contract to the sum of the amount in A3.3)B)2)b) for all contracts supported by the same hedges and/or the Aggregate reinsurance agreement.
- 4) <u>Retention of components</u>. For the seriatim Standard Scenario Reserve on the statement date under each of Sections A3.1)B)1) and A3.1)B)2), the actuary should have available to the Commissioner the following values for each contract:
  - a) The Standard Scenario Reserve prior to adjustment under paragraph A3.3)D)3)
  - b) The Standard Scenario Reserve net of the adjustment in A3.3)D)3).
- E) Determination of the Surrender Charge Amortization Period to be used in section A3.3)C)1)a) and b).

The purpose of the Surrender Charge Amortization Period is to help determine how much of the surrender charge is amortized in the Basic Adjusted Reserve portion of the Standard Scenario Amount and how much needs to be amortized in the Accumulated Net Revenue portion. Once determined, the Surrender Charge Amortization Period determines the duration over which the lower level of margins, as described in A3.3)C)1)a), is used. After that duration, the higher level of margins, as described in A3.3)C)1)b), is used.

A separate Surrender Charge Amortization Period is determined for each contract and is based on amounts determined in the calculation of the Basic Adjusted Reserve for that contract. A key component of the calculation is the amount of the surrender charge that is not amortized in the Basic Adjusted Reserve calculation for that contract.

<sup>&</sup>lt;sup>17</sup> Conceptually, the item being hedged, the contract guarantees, and the approved hedges are accounted for at the average present value of the worst 30% of all scenarios, the tail scenarios for a CTE (70) measure. However, the statement value of approved hedges is at market. Therefore, the standard scenario value of approved hedges is a proxy of the adjustment needed to move approved hedges from a market value to a tail value.

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This is represented by the difference between the account value and the cash surrender value projected within the Basic Adjusted Reserve calculation for the contract.

The Surrender Charge Amortization Period for a given contract is determined by following the steps:

- Measure the duration of the greatest present value used in the Basic Adjusted Reserve. The Basic Adjusted Reserve is determined for a contract by taking the greatest present value of a stream of projected benefits. The benefit stream that determines the greatest present value typically includes an "ultimate" event (e.g., 100% surrender, 100% annuitization, or maturity). The "BAR Duration" is the length of time between the valuation date and the projected "ultimate" event.
- 2) <u>Determine the amount of the surrender charge not amortized in the Basic Adjusted Reserve</u>. The surrender charge not amortized in the Basic Adjusted Reserve is the difference between the projected account value and the projected cash surrender value at the BAR Duration (i.e., at the time of that projected "ultimate" event). This value for a given contract shall not be less than zero.
- 3) <u>Determine the Surrender Charge Amortization Period before rounding</u>. This equals a) time b) plus c), where:
  - a) Equals the ratio of the amount determined in step 2 to the Account Value on the valuation date;
  - b) Equals 100; and
  - c) Equals the BAR Duration determined in step 1.
- 4) <u>Determine the Surrender Charge Amortization Period for the contract</u>. This is the amount determined in step 3, rounded to the nearest number that represents a projection duration, taking into account the projection frequency described in A3.3)C)6). For example, step 3 produces a value of 2.15 and the projection frequency is quarterly, the Surrender Charge Amortization Period for the contract is 2.25.

#### **APPENDIX 4 - Alternative Methodology**

#### A4.1) General Methodology

A) <u>General Methodology Description</u>. For variable deferred annuity contracts that either contain no guaranteed benefits or only GMDBs<sup>18</sup> (i.e., no VAGLBs), the Conditional Tail Expectation Amount may be determined by using the method outlined below rather than by using the approach described in Section IV)D) (i.e., based on projections), provided the approach described in Section IV)D) has not been used in prior valuations or else approval has been obtained from the Domiciliary Commissioner.

The Conditional Tail Expectation Amount determined using the Alternative Methodology for a group of contracts with GMDBs shall be determined as the sum of amounts obtained by applying factors to each contract inforce as of a valuation date and adding this to the contract's Cash Surrender Value.<sup>19</sup> The resulting Conditional Tail Expectation Amount shall not be less than the Cash Surrender Value in aggregate for the group of contracts to which the Alternative Methodology is applied.

The Conditional Tail Expectation Amount determined using the Alternative Methodology for a group of contracts that contain no guaranteed benefits<sup>20</sup> shall be determined using an application of Actuarial Guideline XXXIII, as described below.

For purposes of performing the Alternative Methodology, materially similar contracts within the group may be combined together into subgroups to facilitate application of the factors. Specifically, all contracts comprising a "subgroup" must display substantially similar characteristics for those attributes expected to affect reserves (e.g., definition of guaranteed benefits, attained age, contract duration, years-to-maturity, market-to-guaranteed value, asset mix, etc.). Grouping shall be the responsibility of the actuary but may not be done in a manner that intentionally understates the resulting reserve.

#### B) <u>Definitions of Terms Used in this Appendix</u>.

- 1) <u>Annualized Account Charge Differential</u>. This term is the charge as percentage account value (revenue for the company) minus the expense as percentage of account value.
- 2) <u>Asset Exposure</u>. Asset Exposure refers to the greatest possible loss to the insurance company from the value of assets underlying general or separate account contracts falling to zero.
- 3) <u>Benchmark</u>. Benchmarks have similar risk characteristics to the entity (e.g., asset class, index, or fund) to be modeled.
- 4) <u>Deterministic Calculations</u>. In a Deterministic Calculation, a given event (e.g., asset returns going up by 7% then down by 5%) is assumed to occur with certainty. In a stochastic calculation, events are assigned probabilities.
- 5) <u>Foreign Securities</u>. Securities issued by entities outside the United States and Canada.
- 6) <u>Grouped Fund Holdings</u>. Grouped Fund Holdings relate to guarantees that apply across multiple deposits or for an entire contract instead of on a deposit-by-deposit basis.
- 7) <u>Guaranteed Value</u>. The Guaranteed Value is the benefit base or a substitute for the account value (if greater than the account value) in the calculation of living benefits or death benefits. The methodology for setting the Guaranteed Value is defined in the variable annuity contract.

<sup>&</sup>lt;sup>18</sup> This includes "earnings enhanced death benefits," as discussed in Section III)A)1).

<sup>&</sup>lt;sup>19</sup> The amount that is added to a contract's Cash Surrender Value may be negative, zero or positive, thus resulting in a reserve for a given contract that could be less than, equal to, or greater than, the Cash Surrender Value.

<sup>&</sup>lt;sup>20</sup> The term "contracts that contain no guaranteed benefits" means that there are no guaranteed benefits at any time during the life of the contract (past, present or future).

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- 8) <u>High-Yield Bonds</u>. High-Yield Bonds are below investment grade, with NAIC ratings (if assigned) of 3, 4, 5, or 6. Compared to investment grade bonds, these bonds have higher risk of loss due to credit events. Funds containing securities predominately containing securities that are not NAIC rated as 1 or 2 (or similar agency ratings) are considered to be High-Yield.
- 9) <u>Investment Grade Fixed Income Securities</u>. Securities with NAIC ratings of 1 or 2 are Investment Grade. Funds containing securities predominately with NAIC ratings of 1 or 2 or with similar agency ratings are considered to be Investment Grade.
- 10) <u>Liquid Securities</u>. These securities can be sold and converted into cash at a price close to its true value in a short period of time.
- 11) <u>Margin Offset</u>. Margin Offset is the portion of charges plus any Revenue Sharing allowed under section A1.1)E) available to fund claims and amortization of the unamortized surrender charges allowance.
- 12) <u>Multi-Point Linear Interpolation</u>. This methodology is documented in mathematical literature and calculates factors based on multiple attributes categorized with discrete values where the attributes' actual values may be between the discrete values.
- 13) <u>Model Office</u>. A Model Office converts many contracts with similar features into one contract with specific features for modeling purposes.
- 14) <u>Pre-Packaged Scenarios</u>. The Pre-Packaged Scenarios are the year-by-year asset returns that may be used (but are not mandated) in projections related to the alternative methodology. These scenarios are available on an American Academy of Actuaries website.
- 15) <u>Quota-Share Reinsurance</u>. In this type of reinsurance treaty, the same proportion is ceded on all cessions. The reinsurer assumes a set percentage of risk for the same percentage of the premium, minus an allowance for the ceding company's expenses.
- 16) <u>Resets</u>. A Reset benefit results in a future minimum guaranteed benefit being set equal to the contract's account value at previous set date(s) after contract inception.
- 17) <u>Risk Mitigation Strategy</u>. A Risk Mitigation Strategy is a device to reduce the probability and/or impact of a risk below an acceptable threshold.
- 18) <u>Risk Profile</u>. Risk Profile in the Guideline relates to the prescribed asset class categorized by the volatility of returns associated with that class.
- 19) <u>Risk Transfer Arrangements</u>. A Risk Transfer Arrangement shifts risk exposures (e.g., the responsibility to pay at least a portion of future contingent claims) away from the original insurer.
- 20) <u>Roll-Up</u>. A Roll-Up benefit results in the guaranteed value associated with a minimum contractual guarantee increasing at a contractually defined interest rate.
- 21) Volatility. Volatility refers to the annualized standard deviation of asset returns.
- C) <u>Contract-by-Contract Application for Contracts that Contain No Guaranteed Living or Death Benefits</u>. The Alternative Methodology reserve for each contract that contains no guaranteed living or death benefits shall be determined by applying Actuarial Guideline XXXIII. The application shall assume a return on separate account assets equal to the year of issue valuation interest rate less appropriate asset based charges. It shall also assume a return for any fixed separate account and general account options equal to the rates guaranteed under the contract.

The reserve for such contracts shall be no less than the Cash Surrender Value on the valuation date, as defined in Section III)B).

- D) <u>Contract-by-Contract Application for Contracts that Contain GMDBs only</u>. For each contract, factors are used to determine a dollar amount, equal to  $R \times (CA + FE) + GC$  (as described below), that is to be added to that contract's Cash Surrender Value as of the valuation date. The dollar amount to be added for any given contract may be negative, zero, or positive. The factors that are applied to each contract shall reflect the following attributes as of the valuation date:
  - 1) The contractual features of the variable annuity product,
  - 2) The actual issue age, period since issue, attained age, years-to-maturity, and gender applicable to the contract,
  - 3) The account value and composition by type of underlying variable or fixed fund,
  - 4) Any surrender charges,
  - 5) The GMDB and the type of adjustment made to the GMDB for partial withdrawals (e.g., proportional or dollar-for-dollar adjustment), and
  - 6) Expenses to be incurred and revenues to be received by the company as estimated on a Prudent Estimate basis as described in Section III)B)8) and complying with the requirements for Revenue Sharing as described in section A1.1)E).
- E) <u>Factor Components</u>. Factors shall be applied to determine each of the following components.<sup>21</sup>
  - *CA* = Provision for amortization of the unamortized surrender charges calculated by the insurer based on each contract's surrender charge schedule, using prescribed assumptions, except that lapse rates shall be based on the insurer's Prudent Estimate, but with no provision for Federal Income Taxes or mortality;
  - FE = Provision for fixed dollar expenses less fixed dollar revenue calculated using prescribed assumptions, the contract's actual expense charges, the insurer's anticipated actual expenses and lapse rates, both estimated on a Prudent Estimate basis, and with no provision for Federal Income Taxes or mortality;
  - GC = Provision for the costs of providing the GMDB less net available spread-based charges determined by the formula  $F \times GV - G \times AV \times R$ , where GV and AV are as defined in section A4.3)A);
  - R = A scaling factor that is a linear function of the ratio of the margin offset to Total Account Charges (W) and takes the form  $R(\beta_0, \beta_1) = \beta_0 + \beta_1 \times W$ . The intercept and slope factors for this linear function vary according to:
    - a) Product type,
    - b) Pro-rata or dollar-for-dollar reductions in guaranteed value following partial withdrawals,
    - c) Fund class,
    - d) Attained age,
    - e) Contract duration,
    - f) Asset-based charges, and
    - g) 90% of the ratio of account value to guaranteed value, determined in the aggregate for all contracts sharing the same product characteristics.

Tables of factors for F, G,  $\beta_0$ , and  $\beta_1$  values, reflecting a 65% confidence level and ignoring Federal Income Tax, are available from the National Association of Insurance Commissioners. In calculating

<sup>&</sup>lt;sup>21</sup> Material to assist in the calculation of the components is available on the American Academy of Actuaries' website, at <u>http://www.actuary.org/life/phase2.asp</u>.

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 $R(\beta_0, \beta_1)$  directly from the linear function provided above, the margin ratio W must be constrained to values greater than or equal to 0.2 and less than or equal to 0.6.

Interpolated values of F, G and R (calculated using the linear function described above) for all contracts having the same product characteristics and asset class shall be derived from the pre-calculated values using multi-point linear interpolation over the following four contract-level attributes:

- 1) Attained age,
- 2) Contract duration,
- 3) Ratio of account value to GMDB, and
- 4) The total of all asset based charges, including any fund management fees or allowances based on the underlying variable annuity funds received by the insurer.

The gross asset-based charges for a product shall equal the sum of all contractual asset-based charges plus fund management fees or allowances based on the underlying variable annuity funds received by the insurer determined by complying with the requirements for Prudent Estimate described in Section III)B)8) and Revenue Sharing described in section A1.1)E). Net asset-based charges equal gross asset-based charges less any company expenses assumed to be incurred expressed as a percentage of account value. All expenses that would be assumed if the Conditional Tail Expectation Amount were being computed as described in section A1.1)A) should be reflected either in the calculation of the net asset based charges or in the expenses reflected in the calculation of the amount *FE*.

No adjustment is made for Federal Income Taxes in any of the components listed above.

For purposes of determining the Conditional Tail Expectation Amount using the Alternative Methodology, any interpretation and application of the requirements of the Guideline shall follow the principles discussed in the Section I) Background.

#### A4.2) Calculation of *CA* and *FE*

A) <u>General Description</u>. Components *CA* and *FE* shall be calculated for each contract, thus reflecting the actual account value and GMDB, as of the valuation date, which is unique to each contract.

Components *CA* and *FE* are defined by deterministic "single-scenario" calculations that account for asset growth, interest and inflation at prescribed rates. Mortality is ignored for these two components. Lapse rates shall be determined on a Prudent Estimate basis as described in Section III)B)8). Lapse rates shall be adjusted by the formula shown below (the Dynamic Lapse Multiplier,  $\lambda$ ), which bases the relationship of the GMDB (denoted as GV in the formula) to the account value (denoted as AV in the formula) on the valuation date. Thus, projected lapse rates are smaller when the GMDB is greater than the account value and larger when the GMDB is less than the account value.

$$\lambda = MIN \left[ U, MAX \left[ L, 1 - M \times \left( \frac{GV}{AV} - D \right) \right] \right],$$

where *U*=1, *L*=0.5, *M*=1.25, and *D*=1.1.

Present values shall be computed over the period from the valuation date to contract maturity at a discount rate of 5.75%.

Projected fund performance underlying the account values is as shown in the table below. Unlike the GC component, which requires the entire account value to be mapped, using the Fund Categorization Rules set forth in section A4.4, to a single "equivalent" asset class (as described in A4.4)C)), the CA and FE calculation separately projects each variable subaccount (as mapped to the 8 prescribed categories shown in section A4.4)) using the net asset returns shown in the following table. If surrender charges are based wholly on deposits or premiums as opposed to account value, use of this table may not be necessary.

Asset Class / Fund	Net Annualized Return
Fixed Account	Guaranteed Rate
Money Market	0%
Fixed Income (Bond)	0%
Balanced	-1%
Diversified Equity	-2%
Diversified International Equity	-3%
Intermediate Risk Equity	-5%
Aggressive or Exotic Equity	-8%

B) <u>Component *CA*</u>. Component *CA* is computed as the present value of the projected change in surrender charges plus the present value of an implied borrowing cost of 25 basis points at the beginning of each future period applied to the surrender charge at such time.

This component can be interpreted as the "amount needed to amortize the unamortized surrender charge allowance for the *persisting* policies plus the implied borrowing cost." By definition, the amortization for non-persisting lives in each time period is exactly offset by the collected surrender charge revenue (ignoring timing differences and any waiver upon death). The unamortized balance must be projected to the end of the surrender charge period using the net asset returns and Dynamic Lapse Multiplier,  $\lambda$ , both as described above and the year-by-year amortization discounted also as described above. For simplicity, mortality is ignored in the calculations. Surrender charges and free partial withdrawal provisions are as specified in the contract. Lapse and withdrawal rates are determined on a Prudent Estimate basis, and may vary according to the attributes of the business being valued, including, but not limited to, attained age, contract duration, etc.

C) <u>Component FE</u>. Component FE establishes a provision for fixed dollar expenses (e.g., allocated costs, including overhead expressed as "per contract" and those expenses defined on a "per contract" basis) less any fixed dollar revenue (e.g., annual administrative charges or contract fees) through the earlier of contract maturity or 30 years. FE is computed as the present value of the company's assumed fixed expenses projected at an assumed annual rate of inflation starting in the second projection year. This rate grades uniformly from the current inflation rate ("CIR") into an ultimate inflation rate of 3% per annum in the 8th year after the valuation date. The CIR is the greater of 3% and the inflation rate assumed for expenses in the company's most recent asset adequacy analysis for similar business.

#### A4.3) Calculation of the GC Component

- A) <u>*GC* Factors.</u> *GC* is calculated as  $F \times GV G \times AV \times R$ , where *GV* is the amount of GMDB and *AV* is the contract account value, both as of the valuation date. *F*, *G* and the slope and intercept for the linear function used to determine *R* (identified symbolically as  $\beta_0$  and  $\beta_1$ ) are pre-calculated factors available from the National Association of Insurance Commissioners and known herein as the "Pre-Calculated Factors." These factors shall be interpolated as described in subsection F), below, and modified as necessary as described in sections A4.3)G) and A4.3)H).
- B) <u>Five Steps</u>. There are five major steps in determining the *GC* component for a given contract:
  - 1) Classifying the asset exposure (as specified in subparagraph C), below);
  - 2) Determining the risk attributes (as specified in subparagraphs D) and E), below);
  - 3) Retrieving the appropriate nodal factors from the factor grid (as described in subparagraph F) below;

- 4) Interpolating the nodal factors, where applicable (optional) also as described in subparagraph F), below; and
- 5) Applying the factors to the contract values.
- C) <u>Classifying Asset Exposure</u>. For purposes of calculating *GC* (unlike what is done for components *CA* and *FE*), the entire account value for each contract must be assigned to one of the eight prescribed fund classes shown in section A4.4), using the Fund Categorization rules in section A4.4).
- D) <u>Product Designs</u>. Factors F, G and  $R(\beta_1, \beta_2)$  are available within the Pre-Calculated Factors for the following GMDB product designs:
  - 1) Return of Premium ("ROP"),
  - 2) Premiums less withdrawals accumulated at 3% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 ("ROLL3"),
  - 3) Premiums less withdrawals accumulated at 5% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 ("ROLL5"),
  - 4) An annual ratchet design (maximum anniversary value), for which the guaranteed benefit never decreases and is increased to equal the previous contract anniversary account value, if larger, with no further increases beyond age 80 ("MAV"),
  - 5) A design having a guaranteed benefit equal to the larger of the benefits in designs 3 and 4, above ("HIGH"),
  - 6) An enhanced death benefit ("EDB") equal to 40% of the net earnings on the account (i.e., 40% of account value less total premiums paid plus withdrawals made) with this latter benefit capped at 40% of premiums less withdrawals ("EDB"),
- E) <u>Other Attributes</u>. Factors *F*, *G* and  $R(\beta_1, \beta_2)$  are available within the Pre-Calculated Factors for the following set of attributes:
  - 1) Two Partial Withdrawal Rules one for contracts having a pro-rata reduction in the GMDB and another for contracts having a dollar-for-dollar reduction,
  - 2) The eight asset classes described in section A4.4)B),
  - 3) Eight attained ages, with a 5-year age setback for females,
  - 4) Five contract durations,
  - 5) Seven values of GV/AV, and
  - 6) Three levels of asset-based income.
- F) Interpolation of F, G and  $R(\beta_1, \beta_2)$ .
  - 1) Values of *F*, *G* and  $R(\beta_1, \beta_2)$  apply to a contract having the product characteristics listed in section A4.5)A) and shall be determined by selecting values for the appropriate partial withdrawal rule and asset class and then using multi-point linear interpolation among published values for the last four attributes shown in section A4.3)E).
  - 2) Interpolation over all four dimensions is not required, but if not performed over one or more dimensions, the factor used must result in a conservative (higher) value of *GC*. However, simple linear interpolation

using the  $AV \div GV$  ratio is mandatory. In this case, the company must choose nodes for the other three dimensions according to the following rules: next highest attained age, nearest duration, and nearest Annualized Account Charge Differential, as listed in A4.5)C) (i.e., capped at +100 and floored at -100 bps).

- 3) For  $R(\beta_1, \beta_2)$ , the interpolation should be performed on the Scaling Factors *R* calculated using  $\beta_1$ ,  $\beta_2$ , using the ratio of Margin Offset to Total Asset Charges (*W*), not on the factors  $\beta_1$  and  $\beta_2$  themselves.
- 4) An Excel<sup>®</sup> workbook, Excel<sup>®</sup> add-in and companion dynamic link library (.dll) program is available from the National Association of Insurance Commissioners that can be used to determine the correct values and perform the multi-point linear interpolation.
- 5) Alternatively, published documentation can be referenced on performing multi-point linear interpolation and the required sixteen values determined using a key that is documented in the table "*Components of Key Used for GC Factor Look-Up*" located in section A4.5)C).
- G) <u>Adjustments to GC for Product Variations & Risk Mitigation/Transfer</u>. In some cases, it may be necessary to make adjustments to the published factors due to:
  - 1) A variation in product form wherein the definition of the guaranteed benefit is materially different from those for which factors are available (see section A4.3)H); and/or
  - 2) A risk mitigation or other management strategy, other than a hedging strategy, that cannot be accommodated through a straightforward and direct adjustment to the published values.

Adjustments may not be made to GC for hedging strategies.

Any adjustments to the published factors must be fully documented and supported through stochastic analysis. Such analysis may require stochastic simulations, but would not ordinarily be based on full inforce projections. Instead, a representative "model office" should be sufficient. Use of these adjusted factors must be supported by a periodic review of the appropriateness of the assumptions and methods used to perform the adjustments, with changes made to the adjustments when deemed necessary by such review.

Note that minor variations in product design do not necessarily require additional effort. In some cases, it may be reasonable to use the factors/formulas for a different product form (e.g., for a roll-up GMDB near or beyond the maximum reset age or amount, the ROP GMDB factors/formulas shall be used, possibly adjusting the guaranteed value to reflect further resets, if any). In other cases, the reserves may be based on two different guarantee definitions and the results interpolated to obtain an appropriate value for the given contract/cell. Likewise, it may be possible to adjust the Alternative Methodology results for certain risk transfer arrangements without significant additional work (e.g., quota-share reinsurance without caps, floors or sliding scales would normally be reflected by a simple pro-rata adjustment to the "gross" *GC* results).

However, if the contract design is sufficiently different from those provided and/or the risk mitigation strategy is non-linear in its impact on the Conditional Tail Expectation Amount, and there is no practical or obvious way to obtain a good result from the prescribed factors/formulas, any adjustments or approximations must be supported using stochastic modeling. Notably this modeling need not be performed on the whole portfolio, but can be undertaken on an appropriate set of representative policies.

- H) <u>Adjusting F and G for Product Design Variations</u>. This subsection describes the typical process for adjusting F and G factors due to a variation in product design. Note that R (as determined by the slope and intercept terms in the factor table) would not be adjusted.
  - 1) Select a contract design among those described in section A4.3)D) that is similar to the product being valued. Execute cash flow projections using the documented assumptions (see table of *Liability Modeling Assumptions & Product Characteristics* in section A4.5)A) and table of *Asset Based Fund Charges* in section A4.5)B)) and the pre-packaged scenarios for a set of representative cells (combinations of attained

age, contract duration, asset class, AV/GMDB ratio and asset-based charges). These cells should correspond to nodes in the table of pre-calculated factors. Rank (order) the sample distribution of results for the present value of net cost.<sup>22</sup> Determine those scenarios that comprise CTE (65).

- 2) Using the results from step 1, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the  $J^{th}$  cell, denote this value by  $F_J$ . Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For the  $J^{th}$  cell, denote this value by account value. For the  $J^{th}$  cell, denote this value by account value.
- 3) Extract the corresponding pre-calculated factors. For each cell, calibrate to the published tables by defining a "model adjustment factor" (denoted by asterisk) separately for the "cost" and "margin offset" components:

$$F_J^* = \frac{f(\widetilde{\Theta})}{F_J}$$
 and  $G_J^* = \frac{\hat{g}(\widetilde{\Theta})}{G_J}$ 

- 4) Execute "product specific" cash flow projections using the documented assumptions and pre-packaged scenarios for the same set of representative cells. Here, the company should model the actual product design. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios that comprise CTE (65).
- 5) Using the results from step 4, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the  $J^{th}$  cell, denote this value by  $\overline{F}_J$ . Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For the  $J^{th}$  cell, denote this value by  $\overline{G}_J$ .
- 6) To calculate the Conditional Tail Expectation Amount for the specific product in question, the company should implement the Alternative Methodology as documented, but use  $\overline{F}_J \times F_J^*$  in place of *F* and  $\overline{G}_J \times G_J^*$  instead of *G*. The same *R* factors as appropriate for the product evaluated in step 1 shall be used for this step (i.e., the product used to calibrate the cash flow model).
- Adjusting GC for Mortality Experience. The factors that have been developed for use in determining GC assume male mortality at 100% of the 1994 Variable Annuity MGDB ALB Mortality Table. Companies electing to use the Alternative Methodology that have not conducted an evaluation of their mortality experience shall use these factors. Other companies should use the procedure described below to adjust for the actuary's Prudent Estimate of mortality. The development of Prudent Estimate mortality shall follow the requirements and guidance of Appendix 10. Once a company uses the modified method for a block of business, the option to use the unadjusted factors is no longer available for that part of its business. In applying the factors to actual inforce business, a 5-year age setback should be used for female annuitants.
  - 1) Develop a set of mortality assumptions based on Prudent Estimate. In setting these assumptions, the actuary shall be guided by the definition of Prudent Estimate and the principles discussed in Appendices 9 and 10 of the Guideline.
  - 2) Calculate two sets of net single premiums (NSP) at each attained age: one valued using 100% of the 1994 Variable Annuity MGDB ALB Mortality Table (with the aforementioned 5-year age setback for females) and the other using Prudent Estimate mortality. These calculations shall assume an interest rate of 3.75% and a lapse rate of 7% per year.

<sup>&</sup>lt;sup>22</sup> Present value of net cost = PV[ guaranteed benefit claims in excess of account value ] - PV[ margin offset ]. The discounting includes cash flows in all future years (i.e., to the earlier of contract maturity and the end of the horizon).

3) The *GC* factor is multiplied by the ratio, for the specific attained age being valued, of the NSP calculated using the Prudent Estimate mortality to the NSP calculated using the 1994 Variable Annuity MGDB ALB Mortality Table (with the aforementioned 5-year age setback for females).

#### A4.4) Fund Categorization

A) <u>Criteria</u>. The following criteria should be used to select the appropriate factors, parameters and formulas for the exposure represented by a specified guaranteed benefit. When available, the volatility of the long-term annualized total return for the fund(s) – or an appropriate benchmark – should conform to the limits presented. For this purpose, "long-term" is defined as twice the average projection period that would be applied to test the product in a stochastic model (generally, at least 30 years).

Where data for the fund or benchmark are too sparse or unreliable, the fund exposure should be moved to the next higher volatility class than otherwise indicated. In reviewing the asset classifications, care should be taken to reflect any additional volatility of returns added by the presence of currency risk, liquidity (bid-ask) effects, short selling and speculative positions.

- B) <u>Asset Classes</u>. Variable subaccounts must be categorized into one of the following eight (8) asset classes. For purposes of calculating *CA* or *FE*, each contract will have one or more of the following asset classes represented, whereas for component *GC*, all subaccounts will be mapped into a single asset class.
  - 1) <u>Fixed Account</u>. This class is credited interest at guaranteed rates for a specified term or according to a 'portfolio rate' or 'benchmark' index. This class offers a minimum positive guaranteed rate that is periodically adjusted according to company policy and market conditions.
  - 2) <u>Money Market/Short-Term</u>. This class is invested in money market instruments with an average remaining term-to-maturity of less than 365 days.
  - 3) <u>Fixed Income</u>. This class is invested primarily in investment grade fixed income securities. Up to 25% of the funds within this class may be invested in diversified equities or high-yield bonds. The expected volatility of the returns for this class will be lower than the Balanced fund class.
  - 4) <u>Balanced</u>. This class is a combination of fixed income securities with a larger equity component. The fixed income component should exceed 25% of the portfolio. Additionally, any aggressive or 'specialized' equity component should not exceed one-third (33.3%) of the total equities held. Should the fund violate either of these constraints, it should be categorized as an equity fund. This class usually has a long-term volatility in the range of 8% 13%.
  - 5) <u>Diversified Equity</u>. This class is invested in a broad-based mix of U.S. and foreign equities. The foreign equity component (maximum 25% of total holdings) must be comprised of liquid securities in well-developed markets. Funds in this class would exhibit long-term volatility comparable to that of the S&P500. These funds should usually have a long-term volatility in the range of 13% 18%.
  - 6) <u>Diversified International Equity</u>. This class is similar to the Diversified Equity class, except that the majority of fund holdings are in foreign securities. This class should usually have a long-term volatility in the range of 14% 19%.
  - 7) <u>Intermediate Risk Equity</u>. This class has a mix of characteristics from both the Diversified and Aggressive Equity Classes. This class has a long-term volatility in the range of 19% 25%.
  - 8) <u>Aggressive or Exotic Equity</u>. This class comprises more volatile funds where risk can arise from: underdeveloped markets, uncertain markets, high volatility of returns, narrow focus (e.g., specific market sector), etc. This class (or market benchmark) either does not have sufficient history to allow for the calculation of a long-term expected volatility, or the volatility is very high. This class would be used whenever the long-term expected annualized volatility is indeterminable or exceeds 25%.

C) <u>Selecting Appropriate Investment Classes</u>. The selection of an appropriate investment type should be done at the level for which the guarantee applies. For guarantees applying on a deposit-by-deposit basis, the fund selection is straightforward. However, where the guarantee applies across deposits or for an entire contract, the approach can be more complicated. In such instances, the approach is to identify for each contract where the "grouped holdings" fit within the categories listed and to classify the associated assets on this basis.

A seriatim process is used to identify the "grouped" fund holdings, to assess the risk profile of the current fund holdings (possibly calculating the expected long-term volatility of the funds held with reference to the indicated market proxies), and to classify the entire 'asset exposure' into one of the specified choices. Here, 'asset exposure' refers to the underlying assets (separate and/or general account investment options) on which the guarantee will be determined. For example, if the guarantee applies separately for each deposit year within the contract, then the classification process would be applied separately for the exposure of each deposit year.

In summary, mapping the benefit exposure (i.e., the asset exposure that applies to the calculation of the guaranteed minimum death benefits) to one of the prescribed asset classes is a multi-step process:

- 1) Map each separate and/or general account investment option to one of the prescribed asset classes. For some funds, this mapping will be obvious, but for others it will involve a review of the fund's investment policy, performance benchmarks, composition and expected long-term volatility.
- 2) Combine the mapped exposure to determine the expected long-term "volatility of current fund holdings." This will require a calculation based on the expected long-term volatility for each fund and the correlations between the prescribed asset classes as given in the table "*Correlation Matrix for Prescribed Asset Classes*," in section A4.4)D).
- 3) Evaluate the asset composition and expected volatility (as calculated in step 2) of current holdings to determine the single asset class that best represents the exposure, with due consideration to the constraints and guidelines presented earlier in this section.

In step 1, the company should use the fund's actual experience (i.e., historical performance, inclusive of reinvestment) only as a guide in determining the expected long-term volatility. Due to limited data and changes in investment objectives, style and/or management (e.g., fund mergers, revised investment policy, different fund managers, etc.); the company may need to give more weight to the expected long-term volatility of the fund's benchmarks. In general, the company should exercise caution and not be overly optimistic in assuming that future returns will consistently be less volatile than the underlying markets.

In step 2, the company should calculate the "volatility of current fund holdings" (for the exposure being categorized) by the following formula

$$\boldsymbol{\sigma} = \sqrt{\sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \rho_{ij} \boldsymbol{\sigma}_i \boldsymbol{\sigma}_j}$$

using the volatilities and correlations in the following table where  $w_i = \frac{AV_i}{\sum_k AV_k}$  is the relative value of fund i

expressed as a proportion of total contract value,  $\rho_{ij}$  is the correlation between asset classes i and j and  $\sigma_i$  is the volatility of asset class i. An example is provided after the table.

ANNUAL VOLATILITY		FIXED ACCOUNT	MONEY MARKET	FIXED INCOME	BALANCE D	DIVERSE EQUITY	INTL EQUITY	INTERM EQUITY	AGGR EQUITY
1.0%	FIXED ACCOUNT	1	0.50	0.15	0	0	0	0	0
1.5%	MONEY MARKET	0.50	1	0.20	0	0	0	0	0
5.0%	FIXED INCOME	0.15	0.20	1	0.30	0.10	0.10	0.10	0.05
10.0%	BALANCED	0	0	0.30	1	0.95	0.60	0.75	0.60
15.5%	DIVERSE EQUITY	0	0	0.10	0.95	1	0.60	0.80	0.70
17.5%	INTL EQUITY	0	0	0.10	0.60	0.60	1	0.50	0.60
21.5%	INTERM EQUITY	0	0	0.10	0.75	0.80	0.50	1	0.70
26.0%	AGGR EQUITY	0	0	0.05	0.60	0.70	0.60	0.70	1

# D) <u>Correlation Matrix for Prescribed Asset Classes</u>.

E) <u>Fund Categorization Example</u>. As an example, suppose three funds (Fixed Income, diversified U.S. Equity and Aggressive Equity) are offered to clients on a product with a contract level guarantee (i.e., across all funds held within the contract). The current fund holdings (in dollars) for five sample contracts are shown in the following table.

	1	2	3	4	5
MV Fund X (Fixed Income):	5,000	4,000	8,000	-	5,000
MV Fund Y (Diversified Equity):	9,000	7,000	2,000	6,000	-
MV Fund Z (Aggressive Equity):	1,000	4,000	-	4,000	5,000
Total Market Value:	15,000	15,000	10,000	10,000	10,000
Total Equity Market Value:	10,000	11,000	2,000	10,000	5,000
Fixed Income % (A):	33%	27%	80%	0%	50%
Fixed Income Test (A>75%):	No	No	Yes	No	No
Aggressive % of Equity (B):	10%	36%	n/a	40%	100%
Balanced Test ( <i>A</i> >25% & <i>B</i> <33.3%):	Yes	No	n/a	No	No
Volatility of Current Fund Holdings:	10.9%	13.2%	5.3%	19.2%	13.4%
Fund Classification:	Balanced	Diversified* <sup>23</sup>	<b>Fixed Income</b>	Intermediate	Diversified

As an example, the "Volatility of Current Fund Holdings" for contract #1 is calculated as  $\sqrt{A+B}$  where:

<sup>&</sup>lt;sup>23</sup> Although the volatility suggests "Balanced Fund," the Balanced Fund criteria were not met. Therefore, this 'exposure' is moved "up" to Diversified Equity. For those funds classified as Diversified Equity, additional analysis would be required to assess whether they should be instead designated as "Diversified International Equity."

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$$A = \left(\frac{5}{15} \times 0.05\right)^2 + \left(\frac{9}{15} \times 0.155\right)^2 + \left(\frac{1}{15} \times 0.26\right)^2$$
$$B = 2 \cdot \left(\frac{5}{1515}\right) \left(0.1 \times 0.05 \times 0.155\right) + 2 \cdot \left(\frac{5}{1515}\right) \left(0.05 \times 0.05 \times 0.26\right) + 2 \cdot \left(\frac{9}{1515}\right) \left(0.7 \times 0.155 \times 0.26\right)$$

So the volatility for contract  $\#1 = \sqrt{0.0092 + 0.0026} = 0.109$  or 10.9%.

# A4.5) Tables

# A) Liability Modeling Assumptions & Product Characteristics used for GC Factors.

Asset Based Charges (MER)	Vary by fund class. See section A4.5)B).					
Base Margin Offset	100 basis points per annum.					
GMDB Description	<ol> <li>ROP = return of premium ROP.</li> <li>ROLL3 = 3% roll-up, capped at 2.5 × premium, frozen at age 80.</li> <li>ROLL5 = 5% roll-up, capped at 2.5 × premium, frozen at age 80.</li> <li>MAV = annual ratchet (maximum anniversary value), frozen at age 80.</li> <li>HIGH = Higher of 5% roll-up and annual ratchet.</li> <li>EDB = 40% Enhanced Death Benefit (capped at 40% of deposit). Note that the Pre-Calculated Factors were originally calculated with a combined ROP benefit, but they have been adjusted to remove the effect of the ROP. Thus, the factors for this benefit 5 are solely for the Enhanced Death Benefit</li> </ol>					
Adjustment to GMDB Upon Partial Withdrawal	Separate factors for "Pro-Rata by Market Value" and "Dollar-for-Dollar."					
Surrender Charges	Ignored (i.e., zero). Included in the CA component.					
Single Premium / Deposit	\$100,000. No future deposits; no intra-contract fund rebalancing.					
Base Contract Lapse Rate (Total Surrenders)	<ul> <li>Pro-rata by MV: 10% p.a. at all contact durations (before dynamics)</li> <li>Dollar-for-dollar: 2% p.a. at all contract durations (no dynamics)</li> </ul>					
Partial Withdrawals	<ul> <li>Pro-rata by MV: None (i.e., zero)</li> <li>Dollar-for-dollar: Flat 8% p.a. at all contract durations (as a % of AV). No dynamics or anti-selective behavior.</li> </ul>					
Mortality	100% of the 1994 Variable Annuity MGDB Mortality Table (MGDB 94 ALB). For reference, $1000 \times q_x$ rates at ages 65 and 70 for 100% of MGDB 94 ALB Male are 18.191 and 29.363 respectively. Note that section A4.3)I) allows modification to this assumption.					
Gender /Age Distribution	100% male. Methodology accommodates different attained ages. A 5-year age setback will be used for female annuitants.					
Max. Annuitization Age	All policies terminate at age 95.					
Fixed Expenses	Ignored (i.e., zero). Included in the FE component.					
Annual Fee and Waiver	Ignored (i.e., zero). Included in the FE component.					
Discount Rate	5.75% pre-tax.					
Dynamic Lapse Multiplier (Applies only to policies where GMDB is adjusted "pro-rata by MV" upon withdrawal)	$\lambda = MIN \left[ U, MAX \left[ L, 1 - M \times \left( \frac{GV}{AV} - D \right) \right] \right]$ U=1, L=0.5, M=1.25, D=1.1 • Applied to the 'Base Contract Lapse Rate' • Does not apply to partial withdrawals.					

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### B) <u>Asset-Based Fund Charges (bps per annum)</u>.

Asset Class / Fund	Account Value Charge
Fixed Account	0
Money Market	110
Fixed Income (Bond)	200
Balanced	250
Diversified Equity	250
Diversified International Equity	250
Intermediate Risk Equity	265
Aggressive or Exotic Equity	275

# C) <u>Components of Key Used for GC Factor Look-Up</u>.

	(First Digit Alwa	ays "1")
Contract Attribute	Key : Possible V	alues & Description
Product Definition, P	0:0	Return-of-premium.
	1:1	Roll-up (3% per annum).
	2:2	Roll-up (5% per annum).
	3:3	Maximum Anniversary Value (MAV).
	4:4	High of MAV and 5% Roll-up.
	5:5	Enhanced Death Benefit (excludes the ROP GMDB,
		which would have to be added separately if the
		contract in question has an ROP benefit.)
GV Adjustment Upon Partial	0:0	Pro-rata by market value.
Withdrawal, A	1:1	Dollar-for-dollar.
Fund Class, F	0:0	Fixed Account.
	1:1	Money Market.
	2:2	Fixed Income (Bond).
	3:3	Balanced Asset Allocation.
	4:4	Diversified Equity.
	5:5	International Equity.
	6:6	Intermediate Risk Equity.
	7:7	Aggressive / Exotic Equity.
Attained Age (Last Birthday), X	0:35	4:65
	1:45	5:70
	2:55	6 : 75
	3:60	7:80
Contract Duration (years-since-issue),	0:0.5	1:3.5
D	2:6.5	3:9.5
	4:12.5	
Account Value-to-Guaranteed Value	0:0.25	4 : 1.25
Ratio, ø	1:0.50	5 : 1.50
	2:0.75	6:2.00
	3:1.00	
Annualized Account Charge	0 : -100 bps	
Differential from A4.5)B)	1:+0	
Assumptions	2:+100	

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#### **APPENDIX 5 - Scenario Calibration Criteria**

#### A5.1) General

This Appendix outlines the requirements for the stochastic models used to simulate fund performance.<sup>24</sup> Specifically, it sets certain standards that must be satisfied and offers guidance to the actuary in the development and validation of the scenario models. Background material and analysis are presented to support the recommendation. The Appendix focuses on the S&P 500 as a proxy for returns on a broadly diversified U.S. equity fund, but there is also advice on how the techniques and requirements would apply to other types of funds. General modeling considerations such as the number of scenarios and projection frequency are also discussed.

The calibration points given in this Appendix are applicable to gross returns (before the deduction of any fees or charges). To determine the net returns appropriate for the projections required by the Guideline, the actuary shall reflect applicable fees and contractholder charges in the development of projected account values. The projections shall also include the costs of managing the investments and converting the assets into cash when necessary.

As a general rule, funds with higher expected returns should have higher expected volatilities and in the absence of welldocumented mitigating factors (e.g., a highly reliable and favorable correlation to other fund returns), should lead to higher reserve requirements.<sup>25</sup>

State or path dependent models are not prohibited, but must be justified by the historic data and meet the calibration criteria. To the degree that the model uses mean-reversion or path-dependent dynamics, this must be well supported by research and clearly documented in the Memorandum supporting the required actuarial certification.

The equity scenarios used to determine reserves must be available in an electronic format to facilitate any regulatory review.

#### A5.2) Gross Wealth Ratios

Gross Wealth Ratios derived from the stochastic return scenarios for use with a Separate Account variable fund category for diversified U.S. equities must satisfy calibration criteria consistent with that for the S&P 500 shown in the following table. Under these calibration criteria, Gross Wealth Ratios for quantiles less than 50 percent may not exceed the value from the table corresponding to the quantile, while at quantiles greater than 50 percent; Gross Wealth Ratios may not be less than the corresponding value for the quantile from the table. Gross Wealth Ratios must be tested for holding period 1, 5, 10 and 20 years throughout the projections, except as noted in section A5.3).

The "wealth factors" are defined as gross accumulated values (i.e., before the deduction of fees and charges) with complete reinvestment of income and maturities, starting with a unit investment. These can be less than 1, with "1" meaning a zero return over the holding period.

<sup>&</sup>lt;sup>24</sup> For more details on the development of these requirements, including the development of the calibration points, see the American Academy of Actuaries recommendation on C-3 Phase II risk-based capital.

<sup>&</sup>lt;sup>25</sup> While the model need not strictly adhere to 'mean-variance efficiency,' prudence dictates some form of consistent risk/return relationship between the proxy investment funds. In general, it would be inappropriate to assume consistently 'superior' expected returns (i.e., risk/return point above the frontier).

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<b>Calibration Point</b>	One Year	Five Year	Ten Year	Twenty Year
2.5%	0.78	0.72	0.79	
5.0%	0.84	0.81	0.94	1.51
10.0%	0.90	0.94	1.16	2.10
90.0%	1.28	2.17	3.63	9.02
95.0%	1.35	2.45	4.36	11.70
97.5%	1.42	2.72	5.12	

S&P 500 Total Return Gross Wealth Ratios at the Calibration Points

The scenarios need not strictly satisfy all calibration points, but the actuary should be satisfied that any differences do not materially reduce the resulting reserves.<sup>26</sup> In particular, the actuary should be mindful of which tail most affects the business being valued. If reserves are less dependent on the right (left) tail for all products under consideration (e.g., a return of premium guarantee would primarily depend on the left tail, an enhanced death benefit equal to a percentage of the gain would be most sensitive to the right tail, etc.), it is not necessary to meet the right (left) calibration points.

For models that require starting values for certain state variables,<sup>27</sup> long-term ('average' or 'neutral') values should be used for calibration. The same values should normally be used to initialize the models for generating the actual projection scenarios unless an alternative assumption can be clearly justified.<sup>28</sup> It should be noted that a different set of initialization parameters might produce scenarios that do not satisfy all the calibration points shown in the above table. However, the S&P 500 scenarios used to determine reserves must meet the calibration criteria.

# A5.3) Calibration Requirements Beyond Twenty Years

It is possible to parameterize some path and/or state dependent models to produce higher volatility (and/or lower expected returns) in the first 20 years in order to meet the calibration criteria, but with lower volatility (and/or higher expected returns) for other periods during the forecast horizon. While this property may occur for certain scenarios (e.g., the state variables would evolve over the course of the projection and thereby affect future returns), it would be inappropriate and unacceptable for a company to alter the model parameters and/or its characteristics for periods beyond year 20 in a fashion not contemplated at the start of the projection and primarily for the purpose(s) of reducing the volatility and/or severity of ultimate returns.<sup>29</sup>

# A5.4) Other Funds

Calibration of other markets (funds) is left to the judgment of the actuary, but the scenarios so generated must be consistent with the calibration points in the table in section A5.2). This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

The actuary shall document the actual 1-, 5-, 10- and 20-year wealth factors of the scenarios at the same frequencies as in the "S&P 500 Total Return Gross Wealth Ratios at the Calibration Points" table in section A5.2). The annualized mean and standard deviation of the wealth factors for the 1-, 5-, 10- and 20-year holding periods must also be provided. For equity funds, the actuary shall explain the reasonableness of any significant differences from the S&P500 calibration points.

<sup>&</sup>lt;sup>26</sup> See the Preamble to the Accounting Practices and Procedures Manual for an explanation of materiality.

<sup>&</sup>lt;sup>27</sup> For example, a stochastic log volatility ("SLV") model requires the starting volatility. Also, the regime-switching lognormal model requires an assumption about the starting regime.

<sup>&</sup>lt;sup>28</sup> A clear justification exists when state variables are observable or "known" to a high degree of certainty and not merely estimated or inferred based on a "balance of probabilities."

<sup>&</sup>lt;sup>29</sup> Such adjustments must be clearly documented and justified by the historic data.

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When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing 'consistent' parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk.<sup>30</sup>

Specifically, two return distributions *X* and *Y* would satisfy the following relationship:

Market Price of Risk = 
$$\left(\frac{E[R_X] - r}{\sigma_X}\right) = \left(\frac{E[R_Y] - r}{\sigma_Y}\right)$$

where E[R] and  $\sigma$  are respectively the (unconditional) expected returns and volatilities and *r* is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

A closely related method would assume some form of 'mean-variance' efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, 'drift-volatility') frontier could be a constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form,<sup>31</sup> with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a 'corridor' could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Clearly, there are many other techniques that could be used to establishing consistency between the scenarios. While appealing, the above approaches do have drawbacks<sup>32</sup> and the actuary should not be overly optimistic in constructing the model parameters or the scenarios.

Funds can be grouped and projected as a single fund if such grouping is not anticipated to materially reduce reserves. However, care should be taken to avoid exaggerating the benefits of diversification. The actuary must document the development of the investment return scenarios and be able to justify the mapping of the company's variable accounts to the proxy funds used in the modeling.

#### A5.5) Correlation of Fund Returns

In constructing the scenarios for the proxy funds, the company may require parameter estimates for a number of different market indices. When more than one index is projected, it is generally necessary to allow for correlations in the simulations. It is not necessary to assume that all markets are perfectly positively correlated, but an assumption of independence (zero correlation) between the equity markets would inappropriately exaggerate the benefits of diversification. An examination of the historic data suggests that correlations are not stationary and that they tend to increase during times of high volatility or negative returns. As such, the actuary should take care not to underestimate the correlations in those scenarios used for the reserve calculations.

If the projections include the simulation of interest rates (other than for discounting surplus strain) as well as equity returns, the processes may be independent provided that the actuary can demonstrate that this assumption (i.e., zero correlation) does not materially underestimate the resulting reserves.

#### A5.6) Number of Scenarios and Efficiency in Estimation

For straight Monte Carlo simulation (with equally probable "paths" of fund returns), the number of scenarios should typically equal or exceed 1000. The appropriate number will depend on how the scenarios will be used and the materiality of the results. The actuary should use a number of scenarios that will provide an acceptable level of precision.

<sup>&</sup>lt;sup>30</sup> As an example, the standard deviation of log returns is often used as a measure of risk.

<sup>&</sup>lt;sup>31</sup> Quadratic polynomials and logarithmic functions tend to work well.

<sup>&</sup>lt;sup>32</sup> For example, mean-variance measures ignore the asymmetric and fat-tailed profile of most equity market returns.

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Fewer than 1000 scenarios may be used provided that the actuary has determined through prior testing (perhaps on a subset of the portfolio) that the CTE values so obtained materially reproduce the results from running a larger scenario set.

Variance reduction and other sampling techniques are intended to improve the accuracy of an estimate more efficiently than simply increasing the number of simulations. Such methods can be used provided the actuary can demonstrate that they do not lead to a material understatement of results. Many of the techniques are specifically designed for estimating means, not tail measures, and could in fact reduce accuracy (and efficiency) relative to straight Monte Carlo simulation.<sup>33</sup>

The above requirements and warnings are not meant to preclude or discourage the use of valid and appropriate sampling methods, such as Quasi Random Monte Carlo (QRMC), importance sampling or other techniques designed to improve the efficiency of the simulations (relative to pseudo-random Monte Carlo methods). However, the actuary should maintain documentation that adequately describes any such techniques used in the projections. Specifically, the documentation should include the reasons why such methods can be expected not to result in systematic or material under-statement of the resulting reserves compared to using pseudo-random Monte Carlo numbers.

#### A5.7) Frequency of Projection and Time Horizon

Use of an annual cashflow frequency ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the actuary should determine that the use of a more frequent (i.e., shorter) time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.<sup>34</sup>

#### A5.8) Pre-Packaged Scenarios

The American Academy of Actuaries has provided 10,000 scenarios on its website  $^{35}$  for the following nineteen asset classes.  $^{36}$ 

- 1) 3-month U.S. Treasury yields
- 2) 6-month U.S. Treasury yields
- 3) 1-year U.S. Treasury yields
- 4) 2-year U.S. Treasury yields
- 5) 3-year U.S. Treasury yields
- 6) 5-year U.S. Treasury yields

<sup>&</sup>lt;sup>33</sup> However, with careful implementation, many variance reduction techniques can work well for CTE estimators. For example, see Manistre, B.J. and Hancock, G. (2003), "Variance of the CTE Estimator," 2003 Stochastic Modeling Symposium, Toronto, ON, September 2003.

<sup>&</sup>lt;sup>34</sup> As a general guide, the forecast horizon should not be less than 20 years.

<sup>&</sup>lt;sup>35</sup> The pre-packaged scenarios can be found at <u>http://www.actuary.org/life/phase2.asp</u> and are fully documented at <u>http://www.actuary.org/pdf/life/c3supp\_march05.pdf</u>.

<sup>&</sup>lt;sup>36</sup> Because the reserves calculated using projections involve cash flow projections, the pre-packaged scenarios were developed under the "real world" probability measure (as opposed to a "risk-neutral" basis). Therefore, the pre-packaged scenarios may not be appropriate for purposes of projecting the market value of future hedge instruments within a projection (to the extent such instruments are used in the projections). For this purpose, it may be more appropriate to use risk neutral scenarios to determine the market value of hedge instruments in the cash flow projections that are based on real world scenarios.

- 7) 7-year U.S. Treasury yields
- 8) 10-year U.S. Treasury yields
- 9) 20-year U.S. Treasury yields
- 10) 30-year U.S. Treasury yields
- 11) Money Market / Short-Term
- 12) U.S. Intermediate Term Government Bonds
- 13) U.S. Long Term Corporate Bonds
- 14) Diversified Fixed Income
- 15) Diversified Balanced Allocation
- 16) Diversified Large Capitalized U.S. Equity
- 17) Diversified International Equity
- 18) Intermediate Risk Equity
- 19) Aggressive or Specialized Equity

The scenarios are available as gross monthly accumulation factors (or U.S. Treasury yields) over a 30-year horizon in comma-separated value format (\*.*csv*). These scenarios have been appropriately correlated so that the  $K^{\text{th}}$  scenario for each asset class must be used together and considered one 'future investment return scenario.'<sup>37</sup> Hence, the scenarios can be combined (by blending the accumulation factors<sup>38</sup>) to create additional 'proxy' scenarios for the company's funds.

For example, suppose the actuary wanted to construct scenarios for a 'balanced fund' that targets a 60/40 allocation between bonds and U.S. equities. If we denote  $[AF^X]$  as the matrix of accumulation factors for asset class X, then the balanced scenarios would be defined by  $[AF^{BAL}] = 0.60 \times [AF^{BOND}] + 0.40 \times [AF^{S\&PS00}]$ . Care should be taken to avoid exaggerating the benefits of diversification. The actuary shall document the development of the investment return scenarios and be able to justify the mapping of the company's variable accounts to the proxy funds used in the modeling.

The U.S. Treasury yields are expressed as nominal semi-annual bond equivalent yields in decimal format. All other returns are expressed as periodic (not cumulative) market accumulation factors (i.e., monthly "gross wealth ratios"). Interest rates are assumed to change at the start of each month, hence the value in column T applies for month T-1. The market accumulation factor in column T represents the growth in month T-1.

If all or a portion of these scenarios are used, then the actuary shall verify that the scenario calibration criteria are met.

<sup>&</sup>lt;sup>37</sup> It is inappropriate to misalign the ordering of scenarios (e.g., scenario J for "Diversified U.S. Equity" cannot be combined with scenario K for "Diversified International Equity," where  $J \neq K$ ).

<sup>&</sup>lt;sup>38</sup> It is important to blend the accumulation factors (not the returns) in order to achieve the desired asset mix.

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### **APPENDIX 6 - Allocation of the Aggregate Reserves to the Contract Level**

Section IV states that the Aggregate Reserve shall be allocated to the contracts falling within the scope of the Guideline. When the Conditional Tail Expectation Amount is greater that the Standard Scenario Amount, this allocation requires that the excess be allocated to the contracts falling within the scope of the Guideline.

#### A6.1) Allocation when the Aggregate Reserve equals the Conditional Tail Expectation Amount

- A) <u>Single sub-grouping</u>. When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount and the Conditional Tail Expectation Amount is determined in aggregate for all contracts falling within the scope of the Guideline (i.e., a single grouping), as described in Section IV)D), the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount shall be allocated to each contract on the basis of the difference between the Standard Scenario Reserve and the Cash Surrender Value<sup>39</sup> on the valuation date for the contract. If the cash surrender value is not defined or not available, the Standard Scenario Amount will be the basis of allocation.
- B) <u>Multiple sub-groupings</u>. When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount and the Conditional Tail Expectation Amount is determined using more than one sub-grouping, as described in Section IV)D), the allocation of the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount and shall reflect that sub-grouping of contracts used to determine the Conditional Tail Expectation Amount, as described in Section IV)D).

For example, when the Conditional Tail Expectation Amount is determined using sub-grouping, the excess of the aggregate (i.e., the total for all contracts within the scope of the Guideline) Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contribution to the Standard Scenario Amount.

In the case of such sub-groupings, the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated to each sub-grouping in proportion to the difference between the Conditional Tail Expectation and the Standard Scenario Reserve for each sub-grouping for which that excess is positive.

Once the allocation to each sub-grouping is determined, the excess of the reserve allocated to such sub-grouping over the Standard Scenario Amount determined for that sub-grouping shall be allocated to each contract within that sub-grouping on the basis of the difference between the Standard Scenario Reserve and the Cash Surrender Value on the valuation date for the contracts. If the cash surrender value is not defined or not available, the Standard Scenario Amount will be the basis of allocation.

Sub-grouping	А	В	С	Total
Conditional Tail Expectation Amount	28	40	52	120
Standard Scenario Amount	20	45	30	95
Aggregate Reserve				120
(1) – (2)	8	-5	22	25
Allocation	6.67	0	18.33	25

As an example, consider a company with the results of the following three sub-groupings:

<sup>&</sup>lt;sup>39</sup> Note that since the Standard Scenario Reserve for a contract is, by definition, greater than or equal to the Cash Surrender Value, it is understood that the difference between the Standard Scenario Reserve and the Cash Surrender Value for each contract will never be less than zero.

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In this example, the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount, in aggregate, equals 25 (i.e., the "Total" column of row 1 less row 2, or 120 - 95). This excess of 25 would be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contributions to the Standard Scenario Amount. In this example, that would be contracts in sub-groupings A and C (since in sub-grouping B, the contribution to the Standard Scenario Amount exceeds the contribution to the Conditional Tail Expectation Amount). Therefore, the excess of 25 would be allocated to the contracts in sub-groupings A and C in proportion to the difference between the Conditional Tail Expectation Amount and the Standard Scenario Reserve for those sub-groupings (i.e. row 4). In this example, the total difference between the Conditional Tail Expectation Amount and the Standard Scenario Reserve for the contracts in sub-groupings A and C equals 8 + 22, or 30. This would result in 8/30 of the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount (or 6.67) to be allocated to the contracts in sub-groupings A and 22/30 of the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount (or 18.33) to be allocated to the contracts in sub-groupings C as shown on line (5) above.

In this example, the allocation of the Aggregate Reserve to contracts within sub-grouping B would equal the Standard Scenario Reserve for those contracts (as described in section A6.2) below). For sub-groupings A and C, the difference between the allocation of the Aggregate Reserve to each of those sub-grouping and the Standard Scenario Amount determined for each of those sub-grouping would be allocated to each contract within each of those sub-groupings based on the difference between the Standard Scenario Reserve and the Cash Surrender Value for each of the contracts within the relevant sub-group. The result would be an allocated Aggregate Reserve for a given contract that would be equal to the Standard Scenario Reserve for that contract plus the amount of the difference between 1) and 2) below that is allocated to that contract, where:

- 1) Equals the allocation of the Aggregate Reserve to that contract's sub-grouping; and
- 2) Equals the Standard Scenario Amount determined for that contract's sub-grouping.

#### A6.2) Allocation when the Aggregate Reserve equals the Standard Scenario Amount

The Standard Scenario Amount, as required by Section IV)C), is calculated on a contract-by-contract basis, as described in Appendix 3. Therefore, when the Aggregate Reserve is equal to the Standard Scenario Amount, the reserve allocated to each contract shall be the reserve calculated for each contract under the Standard Scenario method.

#### **APPENDIX 7 – Modeling of Hedges**

#### A7.1) Initial Considerations

The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of the Guideline (excluding those that involve the offsetting of the risks associated with variable annuity guarantees with other products outside of the scope of the Guideline, such as equity-indexed annuities) shall be included in the calculation of the Conditional Tail Expectation Amount, determined in accordance with Section IV)D) and section A1.4) of the Guideline (i.e., Conditional Tail Expectation Amount using projections). If the company is following a Clearly Defined Hedging Strategy ("hedging strategy"), as defined in Section III, in accordance with an investment policy adopted by the Board of Directors, or a committee of Board members, the company is eligible to reduce the amount of the Conditional Tail Expectation Amount using projections. This specification could include maximum tolerable values for investment losses, earnings, volatility, exposure, etc. in either absolute or relative terms over one or more investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

For this purpose, the investment assets refer to all the assets including derivatives supporting covered products and guarantees. This is also referred to as the investment portfolio. The investment strategy is the set of all asset holdings at all points in time in all scenarios. The hedging portfolio, which is also referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this Appendix. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this Appendix, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

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

The cost and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of the Guideline shall be included in the stochastic cash flow model used to calculate the Conditional Tail Expectation Amount in accordance with Section IV)D) (the "model"). If the company is following a Clearly Defined Hedging Strategy, the model shall take into account the cost and benefits of hedge positions expected to be held by the company in the future based on the operation of the hedging strategy.

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

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

#### A7.2) Background

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

The fundamental characteristic of the first method is that all hedging positions, both the currently held positions and those expected to be held in the future, are included in the stochastic cash flow model used to determine the Scenario Greatest Present Value, as discussed in Section IV)D), for each scenario.

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

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

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

### A7.3) Calculation of CTE Amount(reported)

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

Because most models will include at least some approximations or idealistic assumptions, CTE Amount(best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the company shall recalculate the Conditional Tail Expectation Amount assuming the company has no dynamic hedging strategy (i.e., reflect only hedge positions held by the company on the valuation date. The result so obtained is called "CTE Amount(adjusted)." In some situations the determination of CTE Amount(adjusted) may include both direct and indirect techniques.

Finally, the reported value for the Conditional Tail Expectation Amount is given by:

- CTE Amount(reported) = E x CTE Amount(best efforts) +
  - $(1 E) \times CTE$  Amount(adjusted)

The value for E (an "effectiveness factor") reflects the actuary's view as to the level of sophistication of the stochastic cash flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the "Greeks" being covered by the strategy) as well as the associated costs, risks, and benefits E will be no greater than 0.70. As the sophistication of the stochastic cash flow model increases, the value for E increases (i.e., the greater the ability of the CTE Amount(best efforts) model to capture all risks and uncertainties, the higher the value of E). If the model used to determine the "CTE Amount(best efforts)" effectively reflects all of the parameters used in the hedging strategy, the value of E may be up to 0.70. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, E must be in the lower end of the range. If hedge cash flows are not modeled directly, E will be no greater than 0.30. Simplistic hedge cash flow models will have a value of E in the low range between 0.00 and 0.70.

Additionally, the company shall demonstrate that, based on an analysis of at least the most recent 12 months, the model is able to replicate the hedging strategy in a way that justifies the value used for E. A company that does not have 12 months of experience to date shall set E to a value no greater than 0.30.

#### A7.4) Specific Considerations and Requirements

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

A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the variable annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the Conditional Tail Expectation Amount, the actuary must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

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

The combination of elements of the stochastic cash flow model, including the initial actual market asset prices, prices for trading at future dates, transaction costs, and other assumptions should be analyzed by the actuary as to whether the stochastic cash flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

- A) Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money; or
- B) Hedging strategies that with a given amount of initial money never make less than accumulation at the one-period risk free rates in any scenario but make more than this in one or more scenarios.

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

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

#### A7.5) Certification and Documentation

The actuary must provide a certification that the values for E, CTE Amount(adjusted) and CTE Amount(best efforts) were calculated using the process discussed above and the assumptions used in the calculations were reasonable for the purpose of determining the Conditional Tail Expectation Amount. The actuary shall document the method(s) and assumptions (including data) used to determine CTE Amount(adjusted) and CTE Amount(best efforts) and maintain adequate documentation as to the methods, procedures and assumptions used to determine the value of E.

The actuary must provide a certification as to whether the Clearly Defined Hedging Strategy is fully incorporated into the stochastic cash flow model and any supplementary analysis of the impact of the hedging strategy on the Conditional Tail Expectation Amount. The actuary must document the extent to which elements of the hedging strategy (e.g., time between portfolio rebalancing) are not fully incorporated into the stochastic cash flow model and any supplementary analysis to determine the impact, if any. In addition, the actuary must provide a certification and maintain documentation to support the certification that the hedging strategy designated as the Clearly Defined Hedging Strategy meets the requirements of a Clearly Defined Hedging Strategy including that the implementation of the hedging strategy in the stochastic cash flow model and any supplementary analysis does not include knowledge of events that occur after any action dictated by the hedging strategy (i.e. the model cannot use information about the future that would not be known in actual practice).

A financial officer of the company (e.g., Chief Financial Officer, Treasurer or Chief Investment Officer) or a person designated by them who has direct or indirect supervisory authority over the actual trading of assets and derivatives must certify that the hedging strategy meets the definition of a Clearly Defined Hedging Strategy and that the Clearly Defined Hedging Strategy is the hedging strategy being used by the company in its actual day to day risk mitigation efforts.

### **APPENDIX 8 – Certification Requirements**

#### A8.1) Management Certification

A6.1) Management must provide signed and dated written representations as part of the valuation documentation that the valuation appropriately reflects management's intent and ability to carry out specific courses of actions on behalf of the entity where such is relevant to the valuation. <u>This certification will be submitted no later than March 1. Upon written request by the company, the commissioner may grant an extension of the date for submission of the certification.</u>

#### A8.2) Actuarial Certification

- A) <u>General Description</u>. The certification shall be provided by a qualified actuary and consist of at least the following:
  - 1) A paragraph identifying the actuary and his or her qualifications;
  - 2) A scope paragraph identifying the reserves as of the valuation date for contracts included in the certification categorized by the approaches used to determine the reserves (e.g., Alternative Methodology, Projections, Standard Scenario);
  - 3) A reliance paragraph describing those areas, if any, where the certifying actuary has relied on other experts;
    - a) A reliance statement from each of those relied on should accompany the certification.
    - b) The reliance statements should note the information being provided and a statement as to the accuracy, completeness or reasonableness, as applicable, of the information.
  - 4) A paragraph certifying that the reserve was calculated in accordance with the principles and requirements of the Guideline;
  - 5) A paragraph certifying that the assumptions used for these calculations are Prudent Estimate assumptions for the products, scenarios, and purpose being tested; and
  - 6) A paragraph stating that the qualified actuary is not opining on the adequacy of the company's surplus or its future financial condition.
  - 7) <u>This certification will be submitted no later than March 1. Upon written request by the company, the commissioner may grant an extension of the date for submission of the certification.</u>

#### A8.3) Supporting Memorandum

a)

- A) <u>General Description</u>. A supporting memorandum shall be created to document the methodology and assumptions used to determine the Aggregate Reserve. The information shall include the comparison of the Standard Scenario Amount to the Conditional Tail Expectation Amount required by Section IV)A) in the determination of the Aggregate Reserve.
- B) <u>Alternative Methodology using Published Factors</u>.
  - 1) If a seriatim approach was not used, disclose how contracts were grouped.
  - 2) Disclosure of assumptions to include:
    - Component CA
      - (i) Mapping to prescribed asset categories
      - (ii) Lapse and withdrawal rates
    - b) Component FE
      - (i) Determination of fixed dollar costs and revenues
        - (ii) Lapse and withdrawal rates

- (iii) Inflation rates
- c) Component GC
  - (i) Disclosure of contract features and how the company mapped the contract form to those forms covered by the Alternative Methodology factors
    - Product Definition If not conservatively assigned to a published factor, company specific factors or stochastic modeling is required.
    - Partial Withdrawal Provision
    - Fund Class Disclose the process used to determine the single asset class that best represents the exposure for a contract. If individual funds are mapped into prescribed categories, the process used to map the individual funds should be disclosed.
    - Attained Age
    - **Contract Duration**
    - Ratio of Account Value to Guaranteed Value
    - Annualized Account Charge Differential from Base Assumption
  - Derivation of Equivalent Account Charges (ii)
  - (iii) Derivation of margin offset
  - (iv) Disclosure of interpolation procedures and confirmation of node determination
- Disclosure, if applicable, of reinsurance that exists and how it was handled in applying published factors 3) (For some reinsurance, creation of company-specific factors or stochastic modeling may be required.). a)
  - Discuss how reserves before reinsurance were determined.

#### C) Alternative Factors based on Company-Specific Factors.

- 1) Disclosure of requirements consistent with Published Factors, as noted in subsection B) above.
- Stochastic analysis supporting adjustments to published factors should be fully documented. This analysis 2) needs to be submitted when initially used and be available upon request in subsequent years. Adjustments may include:
  - a) Contract design;
  - b) Risk mitigation strategy (excluding hedging); and
  - Reinsurance. c)

#### D) Stochastic Modeling.

- 1) Assets
  - Description including type and quality a)
  - Investment & disinvestment assumptions b)
  - Describe assets used at the start of the projection c)
  - d) Source of asset data
  - e) Asset valuation basis
  - f) Documentation of assumptions
    - Default costs (i)
    - Prepayment functions (ii)
    - (iii) Market value determination
    - (iv) Yield on assets acquired
    - (v) Mapping and grouping of funds to modeled asset classes
  - Hedging Strategy g)
    - Documentation of strategy (i)
    - Identification of current positions (ii)
    - Description on how strategy was incorporated into modeling (iii)
      - Basis risk, gap risk, price risk, assumption risk
      - Document the methods and criterion used to estimate the a priori effectiveness of the hedging strategy
    - Documentation required for specific consideration raised in section A7.4). (iv)
    - Documentation and certification required by section A7.5). (v)
### 2) Liabilities

- a) Product descriptions
- b) Source of Liabilities
- c) Grouping of contracts
- d) Reserve method and modeling (e.g., Working Reserves were set to CSV)
- e) Investment Reserves
- f) Describe how reinsurance was handled in the models, including how reserves gross of reinsurance were modeled.
- g) Documentation of assumptions (i.e., list assumptions, discuss the sources and the rationale for using the assumptions).
  - (i) Premiums and subsequent deposits
  - (ii) Withdrawal, Lapse and Termination Rates
    - Partial Withdrawal (including treatment of dollar-for-dollar offsets on GMDBs and VAGLBs, and Required Minimum Distributions
    - Lapses / Surrenders
  - (iii) Crediting Strategy
  - (iv) Mortality
  - (v) Annuitization rates
  - (vi) Income Purchase rates
  - (vii) GMIB and GMWB Utilization rates
  - (viii) Commissions
  - (ix) Expenses
  - (x) Persistency Bonuses
  - (xi) Investment / Fund Choice
  - (xii) Revenue Sharing
  - (xiii) Asset Allocation, Rebalancing and Transfer Assumptions
    - Dollar Cost Averaging
- h) The section showing the assumptions used for lapse and utilization assumptions for contracts with guaranteed living benefits in the development of the Conditional Tail Expectation Amount, as described in section A9.7).
- 3) Scenarios a) E
  - Description of scenario generation for interest rates and equity returns
    - (i) Disclose the number "n" of scenarios used and the methods used to determine the sampling error of the CTE(70) statistic when using "n" scenarios.
    - (ii) Time step of model (e.g., monthly, quarterly, annual)
    - (iii) Correlation of fund returns
  - b) Calibration
    - (i) Gross Wealth Ratios for equity funds
      - Disclosure of adjustments to model parameters, if any.
      - Disclosure of 1-year, 5-year and 10-year wealth factors, as well as mean and standard deviation.
    - (ii) Consistency of other funds to equity funds
    - (iii) Correlation between all funds
    - (iv) Estimate of market return volatility assumptions underlying the generated scenarios compared to actual observed volatility underlying market values.
  - c) Extent of use of pre-packaged scenarios and support for mapping variable accounts to proxy funds
- 4) Description and results of sensitivity tests performed. At the request of the domiciliary commissioner, the company shall provide a sensitivity test showing an estimate of the impact of the market return volatility assumption when market volatility is materially higher than assumed in the generated scenarios.
- 5) Documentation of all material changes in the model or assumptions from that used previously and the estimated impact of such changes. This documentation, or a summary of this documentation, shall be included in an executive summary or some other prominent place in the memorandum.

6) A description of the methods used to validate the model and a summary of the results of the validation testing.

### E) <u>Standard Scenario</u>.

- 1) For the amounts in 2), 3) and 4) below report the Basic Reserve in A3.3)B)2)a), the projection requirements in A3.3)B)2)b), the value of Aggregate reinsurance in A3.3)D)1), the value of hedges in A3.3)D)2), the total allocation of the value of hedges and Aggregate reinsurance in A3.3)B)2)c) and the Standard Scenario Reserve.
- 2) Report the Standard Scenario Amount as of the valuation date.
- 3) If applicable, report the Standard Scenario Amount on the inforce prior to the valuation date that was used to project the reserve requirements to the valuation date.
- 4) If applicable, report the Standard Scenario Amount on the model office used to represent the inforce.
- 5) Discuss modifications, if any, in the application of the standard scenario requirements to produce the amounts in 2), 3) and 4) above.
- 6) Document any assumptions, judgments or procedures not prescribed in the Standard Scenario Method or in the Guideline that are used to produce the Standard Scenario Amount.
- 7) If applicable, documentation of approval by the commissioner to use the Basic Reserve as the Standard Scenario Amount.
- 8) Document the company's calculation of *DR*.
- 9) Document the allocation of funds to Equity, Bond, Balanced and Fixed classes.
- 10) A statement by the actuary that none of the reinsurance treaties included in the Standard Scenario serve solely to reduce the calculated Standard Scenario Reserve without also reducing risk on scenarios similar to those used to determine the Conditional Tail Expectation Reserve. This should be accompanied by a description of any reinsurance treaties that have been excluded from the Standard Scenario along with an explanation of why the treaty was excluded.
- F) The memorandum shall be made available for examination by the commissioner upon his or her request but shall be returned to the company after such examination and shall not be considered a record of the insurance department or subject to automatic filing with the commissioner.

### **APPENDIX 9 – Contractholder Behavior**

### A9.1) General

Contractholder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contractholder behavior is difficult to predict and behavior assumptions can significantly impact the results. In the absence of relevant and fully credible empirical data, the actuary should set behavior assumptions on the conservative end of the plausible spectrum (consistent with the definition of Prudent Estimate).

In setting behavior assumptions, the actuary should examine, but not be limited by, the following considerations:

- 1) Behavior can vary by product, market, distribution channel, fund performance, time/product duration, etc.
- 2) Options embedded in the product may impact behavior.
- 3) Options may be elective or non-elective in nature. Living benefits are often elective and death benefit options are generally non-elective.
- 4) Elective contractholder options may be more driven by economic conditions than non-elective options.
- 5) As the value of a product option increases, there is an increased likelihood that contractholders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
- 6) Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contractholders may not always act in their best financial interest). The rational component should be dynamic but the concept of rationality need not be interpreted in strict financial terms and might change over time in response to observed trends in contractholder behavior based on increased or decreased financial efficiency in exercising their contractual options.
- 7) Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things such as:
  - a) For what purpose was the product purchased?
  - b) Is the option elective or non-elective?
  - c) Is the value of the option well known?
- 8) External influences, including emergence of viatical / life settlement companies, may impact behavior.

### A9.2) Aggregate vs. Individual Margins

As noted in Section III)B)8), Prudent Estimate assumptions are developed by applying a margin for uncertainty to the Anticipated Experience assumption. The issue of whether the level of the margin applied to the Anticipated Experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section II) of this Guideline, which states:

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 Conditional Tail Expectation Amount 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 Conditional Tail Expectation Amount, the actuary should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

Although this Principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

Therefore, the actuary shall determine Prudent Estimate assumptions independently for each behavior (e.g., mortality lapses, and benefit utilization), using the requirements and guidance in this Appendix and throughout the guideline, unless the actuary can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more behaviors.

### A9.3) Sensitivity Testing

The impact of behavior can vary by product, time period, etc. Sensitivity testing of assumptions is required and shall be more complex than e.g., base lapse assumption minus 1% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually utilizing the guarantee. The actuary should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the actuary shall use higher margins when the underlying experience is less than fully relevant and credible.

### A9.4) Specific Considerations and Requirements

Within materiality considerations, the actuary should consider all relevant forms of contractholder behavior and persistency, including but not limited to the following:

- 1) Mortality (additional guidance and requirements regarding mortality is contained in Appendix 10)
- 2) Surrenders
- 3) Partial Withdrawals (Systematic and Elective)
- 4) Fund Transfers (Switching/Exchanges)
- 5) Resets/Ratchets of the Guaranteed Amounts (Automatic and Elective)
- 6) Future Deposits

It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:

- 1) The impact of fund transfers (intra-contract fund "switching") might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, dollar cost averaging accounts, etc.)
- 2) Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).

However, the actuary should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contractholder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

- 1) Gender
- 2) Attained age
- 3) Issue age
- 4) Contract duration

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- 5) Time to maturity
- 6) Tax status
- 7) Fund value
- 8) Investment option
- 9) Guaranteed benefit amounts
- 10) Surrender charges, transaction fees or other contract charges
- 11) Distribution channel

Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contractholder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contractholders' efficiency will increase over time.

In determining contractholder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that are similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment. The actuary shall document any significant similarities or differences between the two business segments, the data quality of the similar business segment and the adjustments and the margins applied.

Where relevant and fully credible empirical data do not exist for a given contractholder behavior assumption, the actuary shall set the contractholder behavior assumption to reflect the increased uncertainty such that the contractholder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the Aggregate Reserve. If there are no relevant data, the actuary shall set the contractholder behavior assumption to reflect the increased uncertainty such that the contractholder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of Prudent Estimate, with the Principles described in Section I, and with the guidance and requirements in this Appendix.

Ideally, contractholder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contractholder behavior should neither assume that all contractholders act with 100% efficiency in a financially rational manner nor assume that contractholders will always act irrationally.

### A9.5) Dynamic Assumptions

Consistent with the concept of Prudent Estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors which are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contractholder.

The actuary should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of dynamic models is encouraged, but not mandatory. Risk factors which are not scenario tested, but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The actuary shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

### A9.6) Consistency with the CTE Level

All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the approximately top 1/3 of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the actuary should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use Prudent Estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For variable annuities, these "valuation" scenarios would typically display one or more of the following attributes:

- 1) Declining and/or volatile separate account asset values;
- 2) Market index volatility, price gaps and/or liquidity constraints;
- 3) Rapidly changing interest rates.

The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the actuary should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

- 1) Remain logically and internally consistent across the scenarios tested;
- 2) Represent plausible outcomes; and
- 3) Lead to appropriate, but not excessive, asset requirements.

The actuary should remember that the continuum of "plausibility" should not be confined or constrained to the outcomes and events exhibited by historic experience.

Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contractholder behavior.

### A9.7) Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business and is accompanied by documentation that clearly demonstrates the relevance of the experience, as discussed in the following paragraph.

The supporting memorandum required by Appendix 8 of this Guideline, shall include a separately identifiable section showing the assumptions used for lapse and utilization assumptions for contracts with guaranteed living benefits in the development of the Conditional Tail Expectation Amount. This section shall be considered part of the supporting memorandum and shall show the formulas used to set the assumptions and describe the key parameters affecting the level of the assumption (e.g., age, duration, in-the-moneyness, during and after the surrender charge period). The section shall include a summary that shows the lapse and utilization rates that result from various combinations of the key parameters. The section shall show any experience data used to develop the assumptions and describe the source, relevance and credibility of that data. If relevant and credible data were not available, the section should discuss how the assumption is to be on the conservative end of the plausible range of expected experience. The section shall also discuss the sensitivity tests performed to support the assumption. This separately identifiable section shall be made available on a standalone basis if requested by the Domiciliary Commissioner. If it is requested, the section shall have the same confidential status as the supporting memorandum and the actuarial memorandum supporting the actuarial opinion, as discussed in section A2.3)B).

Regarding lapse assumptions for contracts with guaranteed living benefits, the section shall include, at a minimum, the following:

- 1) Actual to expected lapses on two bases, where "expected" equals one of the following:
  - a) Prudent estimate assumptions used in the development of the Conditional Tail Expectation Amount;
  - b) The assumptions used in the Standard Scenario;
- 2) The lapse assumptions used in the development of Conditional Tail Expectation Amount and corresponding actual experience separated by:
  - a) Logical blocks of business (based on company's assessment);
  - b) Duration (at a minimum this should show during the surrender charge period vs. after the surrender charge period);
  - c) In-the-moneyness (consistent with how dynamic assumptions are determined); and
  - d) Age (to the extent age impacts the election of benefits lapse).

This data shall be separated by experience incurred in the following periods:

- a) In the past year;
- b) In the past three years; and
- c) All years.

### **APPENDIX 10 – Specific Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions**

### A10.1) Overview

- A) <u>Intent</u>. The guidance and requirements in this Appendix apply for setting Prudent Estimate mortality assumptions when determining the Conditional Tail Expectation Amount (whether using projections or the Alternative Methodology). The intent is for Prudent Estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice (where more than one approach to appropriate actuarial practice exists, the actuary should select the practice that the actuary deems most appropriate under the circumstances) with only a limited role for unsupported actuarial judgment.
- B) <u>Description</u>. Prudent Estimate mortality assumptions are determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins are applied to the experience to reflect data uncertainty. The expected mortality curves are then adjusted based on the credibility of the experience used to determine the expected mortality curve. Section A10.2) addresses guidance and requirements for determining expected mortality curves and section A10.3) addresses guidance and requirements for adjusting the expected mortality curves to determine Prudent Estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in section A10.4).

- C) <u>Business Segments</u>. For purposes of setting Prudent Estimate mortality assumptions, the products falling under the scope of the Guideline shall be grouped into business segments with different mortality assumptions. The grouping should generally follow the pricing, marketing, management and/or reinsurance programs of the company. Where less refined segments are used for setting the mortality assumption than is used in business management the documentation should address the impact, if material, of the less refined segmentation on the resulting reserves.
- D) <u>Margin for Data Uncertainty</u>. The expected mortality curves that are determined in section A10.2) may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the 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.

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.

### A10.2) Determination of Expected Mortality Curves

- A) <u>Experience Data</u>. In determining expected mortality curves the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See 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.
- B) <u>Data Other than Direct Experience</u>. If expected mortality curves for a segment are being determined using data from a similar business segment (whether or not directly written by the company), the actuary shall document any similarities or differences between the two business segments (e.g., type of underwriting, marketing channel, average policy size, etc.). The actuary shall also document the data quality of the mortality experience of the similar business. Adjustments shall be applied to the data to reflect differences between the business segments and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment. The actuary shall document the adjustments and the margins applied.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company's own pricing and applicable to a substantial portion of the mortality risk may also be a reasonable starting point for the determination of the company's expected mortality curves. The actuary shall document the application of such reinsurance charges and how they were used to set the company's expected mortality curves for the segment.

- C) <u>No Data Requirements</u>. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than using 100% of the 1994 Variable Annuity MGDB mortality table for a plus segment and expected deaths no greater than 100% of the Annuity 2000 table for a minus segment. 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) <u>Additional Considerations Involving Data</u>. 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).
  - 1) <u>Underreporting of deaths</u>. Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.
  - 2) <u>Experience by contract duration</u>. Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the actuary shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the actuary determines that mortality is impacted by selection, the actuary could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.
  - 3) <u>Modification and Relevance of data</u>. 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).

- 4) <u>Other considerations</u>. In determining expected mortality curves, consideration should be given to factors that include, but are not limited to, trends in mortality experience, trends in exposure, volatility in year-to-year A/E mortality ratios, mortality by lives relative to mortality by amounts, changes in the mix of business and product features that could lead to mortality selection.
- E) <u>Documentation Requirements</u>.
  - 1) <u>All Segments</u>. 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) Discuss any assumptions made on mortality improvements, the support for such assumptions and how such assumptions adjusted the modeled mortality.
- g) Describe how the expected mortality curves compare to recent historic experience and comment on any differences.
- h) 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 #3 and Appendix 9.

If the study was done on a similar business segment, identify the differences in the business segment on which the data were gathered and the business segment on which the data were used to determine mortality assumptions for the statutory valuation. Describe how these differences were reflected in the mortality used in modeling.

If mortality assumptions for the statutory valuation were based in part on reinsurance rates, document how the rates were used to set expected mortality (e.g., assumptions made on loadings in the rates and/or whether the assuming company provided their expected mortality and the rationale for their assumptions).

- 2) <u>Plus Segments</u>. 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) <u>Minus Segments</u>. 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.

### A10.3) Adjustment for Credibility to Determine Prudent Estimate Mortality

- A) <u>Adjustment for Credibility</u>. The expected mortality curves determined in section A10.2) shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at Prudent Estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with a mortality table consistent with a statutory valuation mortality table. For a plus segment, the table shall be consistent with 100% of the 1994 Variable Annuity MGDB table (or a more recent mortality table adopted by the NAIC to replace this table). For a minus segment, the table shall be consistent with 100% of the 2000 Annuity table (or a more recent mortality table adopted by the NAIC to replace that table). The approach used to adjust the curves shall suitably account for credibility.<sup>40</sup>
- B) <u>Adjustment of Statutory Valuation Mortality for Improvement</u>. For purposes of the adjustment for credibility, the statutory valuation mortality table for a plus segment may be and the statutory valuation 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 statutory valuation mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves (discussed in section A10.2)).

<sup>&</sup>lt;sup>40</sup> For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the statutory valuation mortality table used in the blending.

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- C) <u>Credibility Procedure</u>. 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) <u>Further Adjustment of the Credibility-adjusted Table for Mortality Improvement</u>. 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.

Any adjustment for mortality improvement beyond the valuation date is discussed in section A10.4).

### A10.4) Future Mortality Improvement

The mortality assumption resulting from the requirements of section A10.3) shall be adjusted for mortality improvements beyond the valuation date if such an adjustment would serve to increase the resulting Conditional Tail Expectation Amount. If such an adjustment would reduce the Conditional Tail Expectation Amount, such assumptions are permitted, but not required. In either case, the assumption must be based on current relevant data with a margin for uncertainty (increasing assumed rates of improvement if that results in a higher reserve, reducing them otherwise).

Age	1000q <sub>x</sub>								
1	0.519	24	0.344	47	1.371	70	16.957	93	192.270
2	0.358	25	0.346	48	1.488	71	18.597	94	210.032
3	0.268	26	0.352	49	1.619	72	20.599	95	228.712
4	0.218	27	0.364	50	1.772	73	22.888	96	248.306
5	0.201	28	0.382	51	1.952	74	25.453	97	268.892
6	0.188	29	0.403	52	2.153	75	28.372	98	290.564
7	0.172	30	0.428	53	2.360	76	31.725	99	313.211
8	0.158	31	0.455	54	2.589	77	35.505	100	336.569
9	0.154	32	0.484	55	2.871	78	39.635	101	360.379
10	0.159	33	0.514	56	3.241	79	44.161	102	385.051
11	0.169	34	0.547	57	3.713	80	49.227	103	411.515
12	0.185	35	0.585	58	4.270	81	54.980	104	439.065
13	0.209	36	0.628	59	4.909	82	61.410	105	465.584
14	0.239	37	0.679	60	5.636	83	68.384	106	488.958
15	0.271	38	0.739	61	6.460	84	75.973	107	507.867
16	0.298	39	0.805	62	7.396	85	84.432	108	522.924
17	0.315	40	0.874	63	8.453	86	94.012	109	534.964
18	0.326	41	0.943	64	9.611	87	104.874	110	543.622
19	0.333	42	1.007	65	10.837	88	116.968	111	548.526
20	0.337	43	1.064	66	12.094	89	130.161	112	550.000
21	0.340	44	1.121	67	13.318	90	144.357	113	550.000
22	0.343	45	1.186	68	14.469	91	159.461	114	550.000
23	0.344	46	1.269	69	15.631	92	175.424	115	1000.000

### FEMALE Age Last Birthday

Age	1000q <sub>x</sub>								
1	0.587	24	0.760	47	2.366	70	29.363	93	243.533
2	0.433	25	0.803	48	2.618	71	32.169	94	264.171
3	0.350	26	0.842	49	2.900	72	35.268	95	285.199
4	0.293	27	0.876	50	3.223	73	38.558	96	305.931
5	0.274	28	0.907	51	3.598	74	42.106	97	325.849
6	0.263	29	0.935	52	4.019	75	46.121	98	344.977
7	0.248	30	0.959	53	4.472	76	50.813	99	363.757
8	0.234	31	0.981	54	4.969	77	56.327	100	382.606
9	0.231	32	0.997	55	5.543	78	62.629	101	401.942
10	0.239	33	1.003	56	6.226	79	69.595	102	422.569
11	0.256	34	1.005	57	7.025	80	77.114	103	445.282
12	0.284	35	1.013	58	7.916	81	85.075	104	469.115
13	0.327	36	1.037	59	8.907	82	93.273	105	491.923
14	0.380	37	1.082	60	10.029	83	101.578	106	511.560
15	0.435	38	1.146	61	11.312	84	110.252	107	526.441
16	0.486	39	1.225	62	12.781	85	119.764	108	536.732
17	0.526	40	1.317	63	14.431	86	130.583	109	543.602
18	0.558	41	1.424	64	16.241	87	143.012	110	547.664
19	0.586	42	1.540	65	18.191	88	156.969	111	549.540
20	0.613	43	1.662	66	20.259	89	172.199	112	550.000
21	0.642	44	1.796	67	22.398	90	188.517	113	550.000
22	0.677	45	1.952	68	24.581	91	205.742	114	550.000
23	0.717	46	2.141	69	26.869	92	223.978	115	1000.000

### MALE Age Last Birthday

Age	1000q <sub>x</sub>								
1	0.628	24	0.344	47	1.316	70	16.239	93	184.435
2	0.409	25	0.344	48	1.427	71	17.687	94	201.876
3	0.306	26	0.348	49	1.549	72	19.523	95	220.252
4	0.229	27	0.356	50	1.690	73	21.696	96	239.561
5	0.207	28	0.372	51	1.855	74	24.107	97	259.807
6	0.194	29	0.392	52	2.050	75	26.832	98	281.166
7	0.181	30	0.415	53	2.256	76	29.954	99	303.639
8	0.162	31	0.441	54	2.465	77	33.551	100	326.956
9	0.154	32	0.470	55	2.713	78	37.527	101	350.852
10	0.155	33	0.499	56	3.030	79	41.826	102	375.056
11	0.163	34	0.530	57	3.453	80	46.597	103	401.045
12	0.175	35	0.565	58	3.973	81	51.986	104	428.996
13	0.195	36	0.605	59	4.569	82	58.138	105	456.698
14	0.223	37	0.652	60	5.250	83	64.885	106	481.939
15	0.256	38	0.707	61	6.024	84	72.126	107	502.506
16	0.287	39	0.771	62	6.898	85	80.120	108	518.642
17	0.309	40	0.839	63	7.897	86	89.120	109	531.820
18	0.322	41	0.909	64	9.013	87	99.383	110	541.680
19	0.331	42	0.977	65	10.215	88	110.970	111	547.859
20	0.335	43	1.037	66	11.465	89	123.714	112	550.000
21	0.339	44	1.091	67	12.731	90	137.518	113	550.000
22	0.342	45	1.151	68	13.913	91	152.286	114	550.000
23	0.344	46	1.222	69	15.032	92	167.926	115	1000.000

### FEMALE Age Nearest Birthday

Age	1000q <sub>x</sub>								
1	0.701	24	0.738	47	2.246	70	28.068	93	234.658
2	0.473	25	0.782	48	2.486	71	30.696	94	255.130
3	0.393	26	0.824	49	2.751	72	33.688	95	276.308
4	0.306	27	0.860	50	3.050	73	36.904	96	297.485
5	0.280	28	0.892	51	3.397	74	40.275	97	317.953
6	0.268	29	0.922	52	3.800	75	44.013	98	337.425
7	0.257	30	0.948	53	4.239	76	48.326	99	356.374
8	0.238	31	0.971	54	4.706	77	53.427	100	375.228
9	0.230	32	0.992	55	5.234	78	59.390	101	394.416
10	0.233	33	1.003	56	5.854	79	66.073	102	414.369
11	0.245	34	1.004	57	6.601	80	73.366	103	436.572
12	0.267	35	1.006	58	7.451	81	81.158	104	460.741
13	0.302	36	1.020	59	8.385	82	89.339	105	484.644
14	0.352	37	1.054	60	9.434	83	97.593	106	506.047
15	0.408	38	1.111	61	10.629	84	105.994	107	522.720
16	0.463	39	1.182	62	12.002	85	115.015	108	534.237
17	0.509	40	1.268	63	13.569	86	125.131	109	542.088
18	0.544	41	1.367	64	15.305	87	136.815	110	546.908
19	0.573	42	1.481	65	17.192	88	150.191	111	549.333
20	0.599	43	1.599	66	19.208	89	164.944	112	550.000
21	0.627	44	1.725	67	21.330	90	180.886	113	550.000
22	0.658	45	1.867	68	23.489	91	197.834	114	550.000
23	0.696	46	2.037	69	25.700	92	215.601	115	1000.000

### MALE Age Nearest Birthday

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### Project History ACTUARIAL GUIDELINE XLIII CARVM FOR VARIABLE ANNUITIES

### **Project Description**

Actuarial Guideline XLIII was adopted at the 2008 Winter National Meeting to be effective as of December 31, 2009.

The following charge was formally given to the Task Force for 2009: "Work with other NAIC committees to recommend any changes required to implement the new reserve requirements for variable annuities. Consider a practice note or white paper for guidance on the credit for hedging in these new requirements." The Task Force found several issues during the review of the implementation process that required modification of the original Actuarial Guideline.

### Group Responsible for Drafting Model and States Participating

The 2009 members of the Task Force are: Kansas (Chair), South Carolina (Vice-Chair), Alabama, Alaska, Arkansas, California, Connecticut, Florida, Hawaii, Minnesota, Missouri, Nebraska, New York, Ohio, Oklahoma, Texas, and Utah.

### **General Description of Drafting Process**

The efforts of the Task Force were closely coordinated with all industry interested parties. In addition to open sessions at the quarterly meetings of the NAIC, there were conference calls on Oct. 20, 2009 and Nov. 13, 2009 to discuss the implementation changes. Notice of those conference calls was posted on the NAIC's home page on the Internet and e-mailed to approximately 300 interested parties, including representatives of the American Council of Life Insurers and the National Alliance of Life Companies.

### Significant Issues Raised

The following are the most controversial aspects of the project:

a) Compliance with Statement of Statutory Accounting Principle No. 51—Life Contracts, paragraph 32.

This SSAP requires that a change in reserve method requires a calculation on the new basis of the reserve as of the beginning of the year. This would require extensive extra calculations for the companies using this Guideline. The Task Force decided to define the reserve as of January 1, 2009 as the sum of the reserves calculated as of December 31, 2008, under the separate asset adequacy analysis requirements in Actuarial Guideline XXXIV and Actuarial Guideline XXXIX. This reserve calculation is a close proxy to a reserve calculated under Actuarial Guideline XLIII because both calculations would yield the same level of reserves. This allows a company to comply with the SSAP without the extensive calculations.

b) Other changes

The Guideline was modified to specify the date of submission of the two certifications and one actuarial memorandum required by the Guideline. In addition, the method of grading in the reserve during the first three years was clarified

### Implications of this Project for Accreditation and Codification

Actuarial Guidelines are part of the Codification standards promulgated by the NAIC. They are included in Appendix C of the NAIC *Accounting Practices and Procedures Manual*.

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Draft: 12/16/09

### Accident and Health Working Group San Francisco, CA December 4, 2009

The Accident and Health Working Group of the Life and Health Actuarial Task Force met in San Francisco, CA, Dec. 4, 2009. The following Working Group members participated: Steve Ostlund, Chair (AL); Katie Campbell (AK); Perry Kupferman (CA); Richard Marcks (CT); Dalora Schafer (FL); Larry Bruning (KS); Julia Philips (MN); John Rink (NE); Fred Andersen (NY); Alan Furan (OH); Leslie Jones (SC); Mike Boerner (TX); and Tomasz Serbinowski (UT).

### 1. <u>Medicare Supplement Compliance Manual</u>

Ms. Schafer proposed specifying in the *Medicare Supplement Compliance Manual* that the 1990 standard plans be pooled with the 2010 standard plans of the same letter for rating purposes.

Ms. Philips said when a regulator reviews a Medicare supplement rate filing, that regulator is evaluating it to see if there is actuarial support for the plan meeting the target loss ratio. The only reason pooling would not make sense is if the pooling would cause an injustice to one of the groups being pooled. Pooling prevents the 1990 plans from being closed blocks. She said she would support the proposal.

Mr. Rink said he opposed the proposal, because he wanted the flexibility to determine when pooling is necessary. For example, he said, plan C and plan F should stand alone.

Bill Weller (Omega Squared, representing America's Health Insurance Plans—AHIP) said that federal law requires each policy form must meet the target loss ratio, and this is reflected in the compliance manual. If pooling of 1990 plans with 2010 plans is required, the 2010 plans might subsidize the older business. It is hard to argue there is significant difference in the value of benefits between the comparable 1990 plans and the 2010 plans. The relationship of various benefits might change over time, depending on what the federal government wants to consider the benefit being paid. For example, he said, the 20% of outpatient coverage on Medicare supplement plans became a much larger percentage. The value of a benefit is not determined solely by the company or the regulator, but it might change dramatically over time. Therefore, to put in the requirement to pool benefits that may change over time is not appropriate. Pooling should be used when the experience is not credible.

Mr. Weller said there have been closed blocks of Medicare supplement business since 1992 in the prestandardized products. There is not a significant difference in the rate increases between the prestandardized and standardized product. The individual medical market is different from the Medicare supplement market. A healthy person with an individual policy might get a job that has benefits and drop the individual policy. The individual market is selected against by the group market, not by companies replacing business. If there is a request for a rate decrease of 5% on a 2010 plan and a rate increase of 20% on the 1990 plan, the regulator has a right to ask for additional justification.

Mr. Rink said the overall increases on prestandardized plans have not been different from the increases on the standardized plans.

Ms. Schafer moved and Ms. Jones seconded to modify the *Medicare Supplement Compliance Manual* to specify like-lettered plans be pooled for all rating purposes. Mr. Furan clarified that the motion did not include pooling across state lines. The motion passed, with Nebraska and Ohio voting against the motion.

A subgroup — consisting of Florida (chair), Alaska, Minnesota and Nebraska — was appointed to draft the changes to the *Medicare Supplement Compliance Manual*.

### 2. <u>Health Actuarial Opinion</u>

Mr. Furan discussed items H (other loss reserves and actuarial items) and I (actuarial items presented as assets) in Section 5 of the draft of the Actuarial Opinion section of the health annual statement instructions. Mr. Weller said the issue is asking for a variable list of assets or liabilities under the concept of prescribed wording. Ms. Campbell said a bracketed item could follow the phrase "as follows" in item H and item I.

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Mr. Furan moved and Ms. Philips seconded to adopt the proposed actuarial opinion section with the drafting note at the end of Section 5 deleted and the phrase "as follows" deleted from items H and I. The motion passed unanimously.

Mr. Weller discussed his Nov. 13 letter regarding the actuarial opinion (Attachment Six-A). Because the descriptions of items H and I are broad, it could be interpreted that some assets and liabilities not related to the company's insurance contracts could be included, such as pension assets and liabilities. Therefore, he recommended the following paragraph in Section 5.

Items H and I are not intended to include the liabilities and assets associated with benefits provided to employees of the organization, or the organization's directors or trustees, except to the extent that such benefits are provided through insurance or annuity contracts of a type that the organization is authorized to issue in the ordinary course of its business. For example, liabilities for employee pensions generally would not be within the scope of the Actuarial Opinion. However, if the organization is licensed to issue life insurance, then liabilities arising from life insurance policies or certificates issued by the organization to its employees would be within the scope of the Actuarial Opinion just as would the comparable liabilities arising from policies or contracts issued to unrelated parties.

Ms. Jones moved and Mr. Furan seconded to include the paragraph in the actuarial opinion instructions.

Mr. Weller expressed concern with the discussion in the drafting note in Section 5 that relate to including assets in the actuarial opinion. There is a question whether the opinion is on the net of liabilities less assets or whether there are essentially two opinions — one for liabilities and one for assets. In addition, the opinion is made with respect to gross assets, which might include non-admitted assets. It is possible the net of the liabilities net of assets is not sufficient for the actuary to make an unqualified opinion, but if the net is adjusted for non-admitted assets, the opinion could be unqualified.

Ms. Philips said the guidance for these issues needs more discussion and suggested the Working Group delay any changes and gather feedback from actuaries preparing the opinions. The Working Group agreed to retain items H and I of Section 5, but not put in explicit guidance.

Shari Westerfield (Blue Cross and Blue Shield Association—BCBSA) said the Health Practice Council of the American Academy of Actuaries (AAA) would like to wait until the work on the 2009 annual statements is completed before considering any changes to the table of key indicators in Section 3.

Mr. Furan moved and Mr. Rink seconded to adopt the revised actuarial opinion instructions (Attachment Six-B) and send them to the Blanks (E) Working Group.

### 3. Accident and Health Policy Experience Exhibit

John Engelhardt (NAIC) presented proposed instructions for a state-by-state version of the Accident and Health Policy Experience Exhibit (Attachment Six-C) and a proposal submitted to the Blanks (E) Working Group requesting a threshold level for the Accident and Health Policy Experience Exhibit. Ms. Jones moved and Ms. Philips seconded to refer the two items to a subgroup. The motion passed unanimously. A subgroup — consisting of Utah (chair), California and Minnesota — was appointed to review the proposals.

### 4. <u>PBR Health (VM-25)</u>

Mr. Weller pointed out a discrepancy between the *Health Insurance Reserves Model Regulation* (#10) in Section 1B shown below and the current version of VM-25 in Section H1 regarding adequacy of reserves.

<u>Section 1B of Model #10:</u> Adequacy of an insurer's health insurance reserves is to be determined on the basis of all three categories combined. However, these standards emphasize the importance of determining appropriate reserves for each of the three categories separately.

<u>Section H1 of VM-25:</u> Appropriate reserves, not less than minimum reserves, must be determined for claim reserves, unearned premium reserves and contract reserves, with recognition of waiver of premium benefits, separately in accordance with Sections C, D, E and F.

Mr. Weller said the first sentence of the model #10 section was not carried over to VM-25. This removes the ability of the actuary to consider the adequacy of the total reserves. Companies currently establish reserves that are at least equal to the required minimum reserves in each of the three categories (claim reserves, unearned premium reserves and contract reserves). If the actuary determines the minimum reserve in one of the categories is inadequate, the excess reserves, if any, in the other categories can be taken into account when determining the extra reserve to establish. This interpretation would not be allowed under the current wording of VM-25, which might require a higher reserve in that category.

Ms. Philips said one solution would be to put a caveat into VM-25 stating the document is not intended to change the minimum reserve standards. She added the second sentence of Section 1B is internally inconsistent with the first sentence. The section of VM-25 is consistent with the second sentence of Section 1B, but is totally inconsistent with the first sentence.

Mr. Andersen said the reserve in each category should stand on its own, but the first priority is to not change the health reserve standards. Other members of the Working Group said the current wording of VM-25 is a change in the health reserve standards, and the concept of overall adequacy of the total reserve should be considered.

Ms. Philips said the group will continue discussion on a future conference call.

### 5. <u>Other Matters</u>

Mr. Ostlund reported the Society of Actuaries (SOA) is prepared to work on a long-term care morbidity table. Mr. Ostlund suggested the Working Group request a recommendation from committees of the SOA and AAA as to the structure of the study. Mr. Rink moved and Mr. Furan seconded to authorize the chair of the Working Group to issue the request if there is no objection from the Long-Term Care (EX) Task Force. The motion passed unanimously.

Mr. Furan reported an excellent presentation on the Pension Protection Act was provided to the Working Group Nov. 4, and recommended that the Pension Protection Act Subgroup be disbanded.

### 6. <u>Adopt Minutes</u>

Mr. Furan moved and Mr. Rink seconded to adopt the Nov. 4 minutes (Attachment Six-D). The motion passed unanimously.

Having no further business, the Accident and Health Working Group adjourned.

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### America's Health Insurance Plans

601 Pennsylvania Avenue, NW South Building Suite Five Hundred Washington, DC 20004

202.778.3200 www.ahip.org

### Memorandum

November 13, 2009

To: Alan Furan, Chair HAOI Subgroup of the Accident & Health Working Group

Re: Proposed Changes to HAOI Draft Dated 10/13/09

America's Health Insurance Plans (AHIP) appreciates the opportunity to provide these comments as our response to the issues raised in the drafting note to Section 5 of the 10/13/09 exposure draft of 2010 changes to the Health Actuarial Opinion Instructions. In addition, we note another issue that should be resolved with changes to the wording to Section 5. We appreciate the changes made based on our comments to the prior draft.

AHIP is the nation's trade association representing nearly 1,300 member companies providing health, long-term care, dental, disability and supplemental coverage to more than 200 million Americans.

### Issues Raised in Section 5 Drafting Note

With regard to the questions raised in the drafting note, we feel it is very important that the instructions give clear guidance on this matter. First, it is important that the regulatory community agree in a very explicit way as to what they intend to accomplish by including assets in the Actuarial Opinion. Second, it is important that this intent be documented in a clear and authoritative manner, so that both the Appointed Actuary and the users of the Actuarial Opinion understand what is being certified.

As to what interpretation should prevail, we believe that the instructions should clarify that the Appointed Actuary is opining that the net liability (reserves and liabilities less assets) is not understated. We feel this is most consistent with the historical purpose of the Actuarial Opinion, which we think is still relevant. The Actuarial Opinion was intended to assure, as far as practical, that the actuarial liabilities are adequate in the aggregate. While the Actuarial Opinion may now evolve to include selected items on both sides of the balance sheet, it should reflect that same philosophy: the actuarially determined liabilities should be adequate to meet the company's obligations, taking into account that those liabilities may in part be supported by actuarially determined assets. This seems like a more reasonable standard than having to certify that the reserves and liabilities are adequate, and then separately that assets are not overstated.

This interpretation of the Actuarial Opinion can be summarized as follows.

- There is some set of liabilities that is the "actuarial reserves and liabilities," and some set of assets that is the "actuarial assets." These two sets include the items prescribed by the Actuarial Opinion instructions, plus other items that the Appointed Actuary has determined are within the scope of the Actuarial Opinion.
- The actuarial reserves and liabilities and the actuarial assets, taken together, constitute an "actuarial balance sheet." Typically, the two sides of the balance sheet will net out to a credit balance (a net liability), although it is conceivable that they could net out to a debit balance (a net asset).
- The Appointed Actuary is opining that this net balance sheet item, whether a liability or (less commonly) an asset, reflects a reasonable degree of conservatism. An Actuarial Opinion on this point is required because the actuarial

balance sheet represents a primary source of conservatism in the Annual Statement. (Non-actuarial sources of significant conservatism include the non-admitted asset rules and the investment valuation rules.)

This interpretation has the following desirable characteristics.

- It addresses the main consideration, that the statutory balance sheet should be reasonably conservative.
- It avoids having to carve up the actuarial balance sheet into subcomponents, the boundaries of which are arguable.
- It provides for a consistent approach to actuarial assets and actuarial contra-liabilities (such as ceded reserves).
- It does not require an adverse or qualified Actuarial Opinion where the reserves and liabilities are conservative but the assets are not, as long as in the net an appropriate degree of conservatism is maintained.

We believe that this clarification (or any other clarification on this point) requires a modification to Sections 7 and 9 of the Actuarial Opinion.

### Section 5 (re the "Scope" section of the Actuarial Opinion).

We note one further concern about the "Scope" section. The descriptions of items H and I are very broad in their terms, given that they are intended to cover items that cannot be specified in advance. However, it should be understood that items H and I are not intended to include liabilities and assets that are actuarial in nature but are not related to the organization's insurance contracts, such as pension liabilities. Such liabilities have historically been outside the scope of the Actuarial Opinion, and the Appointed Actuary will not necessarily be professionally qualified to assess pension liabilities or other actuarial liabilities not related to the organization" scuttors, cutomers. (Items B and D in the "Opinion" section do refer to "contracts" and "agreements," but someone might conclude that only those two items are so restricted, and that the rest of the Actuarial Opinion, including the rest of the "Opinion" section, should be construed more broadly.) Therefore, we propose that the following paragraph be added to the instructions (not the prescribed wording) immediately following item I (and immediately preceding the instructions paragraph that begins, "If there are any items included in items H or I, ...").

Items H and I are not intended to include the liabilities and assets associated with benefits provided to employees of the organization, or the organization's directors or trustees, except to the extent that such benefits are provided through insurance or annuity contracts of a type that the organization is authorized to issue in the ordinary course of its business. For example, liabilities for employee pensions generally would not be within the scope of the Actuarial Opinion. However, if the organization is licensed to issue life insurance, then liabilities arising from life insurance policies or certificates issued by the organization to its employees would be within the scope of the Actuarial Opinion just as would the comparable liabilities arising from policies or contracts issued to unrelated parties.

### Section 7 (re the "Opinion" section of the Actuarial Opinion).

As explained in our comments above, we believe that certain changes are needed to Section 7 to clarify the intent of the expanded Actuarial Opinion. Note that the "Opinion" section addresses "the amounts carried in the balance sheet on account of the items identified above," which may now include assets as well as liabilities. The inclusion of assets calls into question how to interpret item D within the prescribed language. Therefore, we suggest that item D within the prescribed language be modified to read as follows when the opinion includes actuarial assets.

D. Make good and sufficient provision for all unpaid claims and other actuarial liabilities of the organization under the terms of its contracts and agreements, when the amounts carried for the actuarial reserves and liabilities are considered in light of the amounts carried for the actuarial assets,

The existing prescribed language would be used when there are no actuarial assets.

### Section 9 (re the types of Actuarial Opinions that may be issued).

We believe, for reasons that we have previously stated, that the asset amounts addressed by the Actuarial Opinion should be gross amounts, rather than the net admitted amounts. However, we can conceive of situations when the net actuarial balance sheet (as described in our comments above on the drafting note) would not be adequately conservative, but the reduction for the non-admitted portion of the actuarial assets appears to provide the needed conservatism. In such instances, we believe that it would be appropriate for the Appointed Actuary to issue an unqualified Actuarial Opinion, rather than an adverse Actuarial

Opinion. We suggest that the following paragraph be added to the instructions in Section 9, after the paragraph that begins, "When in the actuary's opinion ...," and before the paragraph that begins, "The actuary's ability to give an opinion ...."

As indicated in Section 5, the actuary is opining on the gross amount of the actuarial assets (if any such exist), rather than the net admitted amounts. In some circumstances, the actuary may conclude that the gross value of the assets is overstated to the extent that an unqualified opinion cannot be issued without the recognition of the reduction in actuarial assets from the reported gross amount to the net admitted amount. If after the actuarial assets have been reduced to their net admitted amounts, the actuarial reserves and liabilities when considered in light of the (admitted) assets do make good and sufficient provision for the actuarially-valued obligations of the organization, the actuary is allowed to provide an unqualified opinion. The actuary should comments on the use of the net admitted value of actuarial assets in the RELEVANT COMMENTS section.

Sincerely,

William C. Weller Consultant to AHIP

c/c: John Engelhardt, NAIC staff to AHWG Randi Reichel, AHIP Consultant Shari Westerfield, BCBSA

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Adopted by the Accident and Health Working Group: 12/4/09 Proposed for the 2010 Health Annual Statement Instructions

### ACTUARIAL OPINION

1. There is to be included on or attached to Page 1 of the annual statement, the statement of the appointed actuary setting forth his or her opinion relating to claim reserves and any other actuarial items. The appointed actuary must be a qualified health actuary appointed by the board of directors, or its equivalent, or by a committee of the board, by December 31 of the calendar year for which the opinion is rendered. Within five (5) business days of the appointment, the company shall notify the domiciliary commissioner of the name, title (and, in the case of a consulting actuary, the name of the firm) and manner of appointment or retention of each person appointed or retained by the company as an appointed actuary and shall state in the notice that the person meets the requirements of a qualified health actuary. Once these notices are furnished, no further notice is required with respect to this person unless the actuary ceases to be appointed or retained or ceases to meet the requirements of a qualified health actuary," as used herein means a member of the American Academy of Actuaries, or a person recognized by the American Academy of Actuaries as qualified for such actuarial valuation.

If an actuary who was the appointed actuary is replaced, the insurer shall within five (5) business days notify the insurance department of the state of domicile of this event. The insurer shall also furnish the domiciliary commissioner with a separate letter within ten (10) business days of the above notification stating whether in the twenty-four (24) months preceding such event there were any disagreements with the former appointed actuary regarding the content of the opinion on matters of the risk of material adverse deviation, required disclosures, scopes, procedure, or data quality. The disagreements required to be reported in response to this paragraph include both those resolved to the former actuary's satisfaction and those not resolved to the former actuary's satisfaction. The insurer shall also in writing request such former actuary to furnish a letter addressed to the insurer stating whether the actuary agrees with the statements contained in the insurer's letter and, if not, stating the reasons for which he does not agree; and the insurer shall furnish such responsive letter from the former actuary to the domiciliary commissioner together with its own.

The Appointed Actuary must report to the Board of Directors or the Audit Committee each year on the items within the scope of the Actuarial Opinion. The Actuarial Opinion and the Actuarial Memorandum must be made available to the Board of Directors. The minutes of the Board of Directors should indicate that the Appointed Actuary has presented such information to the Board of Directors or the Audit Committee and that the Actuarial Opinion and the Actuarial Memorandum were made available. A separate Actuarial Opinion is required for each company filing an Annual Statement.

The Actuarial Opinion and the supporting Actuarial Memorandum and work papers must conform to the appropriate Actuarial Standards of Practice (ASOPs), as promulgated by the Actuarial Standards Board.

1A. Definitions

"Insurer" means an entity authorized to write accident and health contracts under the laws of any state and which files on the Health Blank.

"Actuarial Memorandum" means a document or other presentation, prepared as a formal means of conveying the appointed actuary's professional conclusions and recommendations, of recording and communicating the methods and procedures, of assuring that the parties addressed are aware of the significance of the appointed actuary's opinion or findings and that documents the analysis underlying the opinion. The expected content of the memorandum is further described in Section 1B.

1B. Exemptions

An insurer who intends to file for one of the exemptions under this Section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemption is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if he or she deems the exemption inappropriate.

A copy of the approved exemption must be provided in lieu of the Actuarial Opinion with the Annual Statement in all jurisdictions in which the company is authorized.

Exemption For Small Companies

An insurer that has less than \$1,000,000 total direct plus assumed written premiums during a calendar year, and less than \$1,000,000 total direct plus assumed loss and loss adjustment expense reserves at year-end, in lieu of the Actuarial Opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies the amounts of direct plus assumed written premiums and direct plus assumed loss adjustment reserves.

Exemption for Insurers under Supervision or Conservatorship

<u>Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to</u> <u>statutory provision is exempt from the filing requirements contained herein.</u>

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written.

Financial Hardship Exemption

An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption. Financial hardship is presumed to exist if the projected reasonable cost of the Actuarial Opinion would exceed the lesser of:

- (i) One percent of the insurer's capital and surplus reflected in the insurer's latest quarterly statement for the calendar year for that the exemption is sought; or
- (ii) Three percent of the insurer's direct plus assumed premiums written during the calendar year for which the exemption is sought as projected from the insurer's latest quarterly statements filed with its domiciliary commissioner.
- 1BC. The Actuarial Memorandum and underlying actuarial work papers supporting the Actuarial Opinion will be available for regulatory examination for seven (7) years.

The Actuarial Memorandum contains significant proprietary information. It is expected that the Memorandum will be held confidential and is not intended for public inspection. The Memorandum must be available by May 1 of the year following the year-end for which the opinion was rendered or within two weeks after a request from an individual state commissioner.

The Actuarial Memorandum should conform to the documentation and disclosure requirements of the Standards of Practice as promulgated from time to time by the Actuarial Standards Board. The Actuarial Memorandum should contain both narrative and technical components. The narrative component should provide sufficient detail to clearly explain to company management, the regulator, or other authority the findings, recommendations and conclusions, as well as their significance. The technical component should provide sufficient documentation and disclosure for another actuary practicing in the same field to evaluate the work. This technical component must show the analysis from the basic data, e.g., claim lags, to the conclusions.

The Memorandum must also include:

- An exhibit which ties to the Annual Statement and compares the actuary's conclusions to the carried amounts;
- Documentation of the required reconciliation from the data used for analysis to the Underwriting and Investment Exhibit Part 2B;

- Any other follow-up studies documenting the prior year's claim liability and claim reserve run-off as considered necessary by the actuary; and
- Documentation of the assumptions used for contract reserves and any material changes to those assumptions from the assumptions used in the previous memorandum. Such documentation should address any studies which support the adequacy of any margin in such reserves.
- 2. The Actuarial Opinion must consist of the following sections:
  - A TABLE of KEY INDICATORS to alert the reader to the type of opinion and any changes from the prescribed language;
  - IDENTIFICATION section identifies the appointed actuary;
  - SCOPE section identifies the subjects on which an opinion is to be expressed and describes the scope of the appointed actuary's work;
  - RELIANCE section identifies anyone that the actuary has relied upon for the underlying records and/or summaries;
  - OPINION section expresses the appointed actuary's opinion with respect to the subjects identified in the Scope section; and
  - RELEVANT COMMENTS section.

Each section must be clearly designated. For each section there is prescribed wording for that section. If the appointed actuary changes this wording or adds additional wording to clarify the prescribed wording, the appropriate box in the TABLE of KEY INDICATORS must be appropriately checked. The prescribed wording should be modified only if needed to meet the circumstances of a particular case, and the actuary should in any case, use language that clearly expresses his or her professional judgment.

3. The TABLE of KEY INDICATORS is to be at the top of the Opinion and the appropriate boxes are to be checked consistent with the remainder of the opinion. The only options are those presented below:

This Opinion is: $\Box$ Unqualified		Adverse		
IDENTIFICATION SECTION	D 1 1 117	· · · · · · · · · · · · · · ·	1.557 1	D 1 1 1 1
Prescribed Wording Only	Prescribed Wol	rding with Additi	onal wording	Revised Wording
SCOPE SECTION				
Prescribed Wording Only	Prescribed Wor	rding with Additi	onal Wording	Revised Wording
RELIANCE SECTION				
Prescribed Wording Only	Prescribed Wor	rding with Additi	onal Wording	Revised Wording
OPINION SECTION				
Prescribed Wording Only	Prescribed Wor	rding with Additi	onal Wording	Revised Wording
RELEVANT COMMENTS				
Revised Wording				

The Actuarial Memorandum includes "Deviation from Standard" wording regarding conformity with an Actuarial Standard of Practice

4. The IDENTIFICATION section should specifically indicate the appointed actuary's relationship to the company, qualifications for acting as appointed actuary, date of appointment, and specify that the appointment was made by the Board of Directors, or its equivalent, or by a committee of the Board.

A person who is not a Member of the American Academy of Actuaries but is recognized by the Academy as qualified must attach, each year, a copy of the approval letter from the Academy.

This section should contain only one of the following:

For a Member of the American Academy of Actuaries who is an employee of the organization the opening paragraph of the opinion should contain all the following sentences if the appointed actuary is using the prescribed wording:

"I, (name and title of actuary), am an employee of (named organization) and a member of the American Academy of Actuaries. I was appointed on [date of appointment] in accordance with the requirements of the annual statement instructions. I meet the Academy qualification standards for rendering the opinion."

For a consultant who is a Member of the American Academy of Actuaries, the opening paragraph of the opinion should contain all the following sentences if the appointed actuary is using the prescribed wording:

"I, (name and title of consultant), am associated with the firm of (name of firm). I am a member of the American Academy of Actuaries and have been retained by the (name of organization) to render an opinion with regard to loss reserves, actuarial liabilities and related items. I was appointed on [date of appointment] in accordance with the requirements of the annual statement instructions. I meet the Academy qualification standards for rendering the opinion."

For an employee other than a member of the American Academy of Actuaries, the opening paragraph of the opinion should contain both the following sentences if the appointed actuary is using the prescribed wording:

"I, (name and title), am an employee of (name of organization) and am recognized by the American Academy of Actuaries as qualified to perform actuarial valuations for organizations of this kind. I was appointed on [date of appointment] in accordance with the requirements of the annual statement instructions."

For a consultant other than a member of the American Academy of Actuaries, the opening paragraph of the opinion should contain both the following sentences if the appointed actuary is using the prescribed wording:

"I, (name and title of consultant), am associated with the firm of (name of firm). I am recognized by the American Academy of Actuaries as qualified to perform actuarial valuations for organizations of this kind and have been retained by the (name of organization) with regard to such valuation. I was appointed on [date of appointment] in accordance with the requirements of the annual statement instructions."

5. The SCOPE section should contain only the following statement (including all specified lines even if the value is zero) if the appointed actuary is using the prescribed wording:

"I have examined the assumptions and methods used in determining loss reserves, actuarial liabilities and related items listed below, as shown in the annual statement of the organization as prepared for filing with state regulatory officials, as of December 31, 20\_\_.

- A. Claims unpaid (Page 3, Line 1);
- B. Accrued medical incentive pool and bonus payments (Page 3, Line 2);
- C. Unpaid claims adjustment expenses (Page 3, Line 3);
- D. Aggregate health policy reserves (Page 3, Line 4) including unearned premium reserves, premium deficiency reserves, and additional policy reserves from the Underwriting and Investment Exhibit Part 2D;

- E. Aggregate life policy reserves (Page 3, Line 5);
- F. Property/casualty unearned premium reserves (Page 3, Line 6);
- G. Aggregate health claim reserves (Page 3, Line 7);
- H. Any other loss reserves, actuarial liabilities, or related items presented as liabilities in the annual statement:
- I. Specified actuarial items presented as assets in the annual statement"

Items H and I are not intended to include the liabilities and assets associated with benefits provided to employees of the organization, or the organization's directors or trustees, except to the extent that such benefits are provided through insurance or annuity contracts of a type that the organization is authorized to issue in the ordinary course of its business. For example, liabilities for employee pensions generally would not be within the scope of the Actuarial Opinion. However, if the organization is licensed to issue life insurance, then liabilities arising from life insurance policies or certificates issued by the organization to its employees would be within the scope of the Actuarial Opinion just as would the comparable liabilities arising from policies or contracts issued to unrelated parties.

If there are any items included in items H or I, they should be listed using appropriate annual statement captions and line references. The phrase "Not Applicable" should be placed under the item description for either item H or I if there is nothing to be listed. Any listings under items H and I do not constitute either "additional wording" or "revised wording" for purposes of the Table of Key Indicators.

If for either item H or item I there is more than one line item to be listed, the line items under the general H or I heading should be numbered sequentially.

The amounts of any assets listed under item I should be the gross amount of the asset (Page 2, Column 1 of the Annual Statement), not the net admitted amount (Page 2, Column 3).

For items A through G listed in the SCOPE section and each subline for items H and I, the item label should be followed by the amount of that item as reported in the annual statement. These stated amounts do not constitute either "additional wording" or "revised wording" for purposes of the Table of Key Indicators. Where the phrase "Not Applicable" is used in item H or item I, it means that there are no such items to be included in the Opinion, so there should be no value shown as a stated amount.

For example:

- 1. Accrued retrospective premiums (Page 2, line 13.3, column 1)
- 6. The RELIANCE section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has examined the liability records, the reliance section should include only the following statement:

"My examination included such review of the actuarial assumptions and actuarial methods and of the underlying basic liability records and such tests of the actuarial calculations as I considered necessary. I also reconciled the underlying basic liability records to the Underwriting and Investment Exhibit Part - 2B of the company's current annual statement."

If the appointed actuary has not examined the underlying records, but has relied upon data (e.g. asset or liability records) prepared by the company, the reliance section should include only the following statement:

I. Specified actuarial items presented as assets in the annual statement, as follows:

"In forming my opinion on [specify types of reserves] I relied upon data prepared by [name and title of company officer certifying liability records or other data] as certified in the attached statements. I evaluated that data for reasonableness and consistency. I also reconciled that data to the Underwriting and Investment Exhibit - Part 2B of the company's current annual statement. In other respects, my examination included review of the actuarial assumptions and actuarial methods used and tests of the calculations I considered necessary."

Attached to the appointed actuary's opinion should be a statement by each person relied upon and a precise identification of the items subject to reliance. In addition, the persons on whom the appointed actuary relies shall each provide a certification that precisely identifies the items on which the person is providing information and a statement as to the accuracy, completeness or reasonableness, as applicable, of the items. This certification shall include the signature, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.

7. The OPINION section should include only the following statement if the appointed actuary is using the prescribed wording:

"In my opinion, the amounts carried in the balance sheet on account of the items identified above:

- A. Are in accordance with accepted actuarial standards consistently applied and are fairly stated in accordance with sound actuarial principles,
- B. Are based on actuarial assumptions relevant to contract provisions and appropriate to the purpose for which the statement was prepared,
- C. Meet the requirements of the laws of (state of domicile), and are at least as great as the minimum aggregate amounts required by the state in which this statement is filed, Meet the requirements of the Insurance Laws and regulations of the state of [state of domicile]; and

(Use of one the following phrases, as appropriate, is considered prescribed wording. Replacing "[list states]" with an actual list of states in parenthesis is also considered prescribed wording)

are at least as great as the minimum aggregate amounts required by any state,

or

are at least as great as the minimum aggregate amounts required by any state with the exception of the following states [list states]. For each listed state a separate statement of actuarial opinion was submitted to that state that complies with the requirements of that state.

- D. Make good and sufficient provision for all unpaid claims and other actuarial liabilities of the organization under the terms of its contracts and agreements,
- E. Are computed on the basis of assumptions and methods consistent with those used in computing the corresponding items in the annual statement of the preceding year-end,
- F. Include appropriate provision for all actuarial items that ought to be established.

The Underwriting and Investment Exhibit – Part 2B was reviewed for reasonableness and consistency with the applicable Actuarial Standards of Practice.

Actuarial methods, considerations, and analyses used in forming my opinion conform to the relevant Standards of Practice as promulgated from time to time by the Actuarial Standards Board, which standards form the basis of this statement of opinion."

8. The opinion may include a RELEVANT COMMENTS section if the actuary so desires. For example, if there has been any material change in the assumptions and/or methods from those previously employed, a portion of this section can describe that change in the statement of opinion by including a description of the changes such as:

"A material change in assumptions (and/or methods) was made during the past year but such change accords with accepted actuarial standards." A brief description of the change should follow. A more detailed analysis should be contained in the Actuarial Memorandum.

The adoption of new coverages requiring underlying assumptions that differ from assumptions used for prior coverages is not a change in assumption within the meaning of this paragraph.

One or more additional paragraphs may be needed in individual cases to:

- Address topics of regulatory importance, or
- State a qualification of his or her opinion, if the actuary considers it necessary, or
- Explain some aspect of the annual statement that is not already sufficiently explained in the annual statement.
- 9. If the appointed actuary is able to form an opinion that is not qualified, adverse or inconclusive as those terms are defined below, he or she should issue a statement of unqualified opinion. If the opinion is adverse, qualified or inconclusive, the appointed actuary should issue an adverse, qualified or inconclusive opinion explicitly stating the reason(s) for such opinion. In all circumstances the category of opinion should be explicitly identified in the TABLE of KEY INDICATORS section of the Actuarial Opinion.

An adverse opinion is an actuarial opinion in which the appointed actuary determines that the reserves and liabilities are not good and sufficient. (An adverse opinion does not meet item D of Section 7).

When in the actuary's opinion the reserves for a certain item or items are in question because they cannot be reasonably estimated or the actuary is unable to render an opinion on those items, the actuary should issue a qualified opinion. Such a qualified opinion should state whether the stated reserve amount makes a good and sufficient provision for the liabilities associated with the specified reserves, except for the item or items to which the qualification relates. The actuary is not required to issue a qualified opinion if the actuary reasonably believes that the item or items in question are not likely to be material. (A qualified opinion does not meet one or more of the items A, B, C or F of Section 7).

The actuary's ability to give an opinion is dependent upon data, analyses, assumptions and related information that are sufficient to support a conclusion. If the actuary cannot reach a conclusion due to deficiencies or limitations in the data, analyses, assumptions or related information, then the actuary should issue an inconclusive opinion. An inconclusive opinion shall include a description of the reasons why a conclusion could not be reached.

10. The Actuarial Opinion should conclude with the signature of the appointed actuary responsible for providing the Actuarial Opinion and the date when the opinion was rendered. The signature and date should appear in the following format:

Signature of Actuary

Printed Name of Actuary

Address of Actuary

Telephone number of Actuary

Date Opinion was Rendered

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### John Engelhardt, NAIC 11/23/09

### **Blanks Agenda Item Submission Form**

		FOR NAIC USE ONLY
	DATE:	Agenda Item #
CONTACT PERSON:		Year <u>2010</u>
		Changes to Existing Reporting [ ]
ON BEHALF OF:		New Reporting Requirement [ ]
NAME:		REVIEWED FOR ACCOUNTING PRACTICES AND PROCEDURES IMPACT
TITLE:		No Impact [X]
AFFILIATION.		Modifies Required Disclosure [ ]
		<u>DISPOSITION</u>
ADDRESS:		[       ]       Rejected For Public Comment         [       ]       Referred To Another NAIC Group         [       ]       Received For Public Comment         [       ]       Adopted         [       ]       Rejected         [       ]       Deferred         [       ]       Other (Specify)

### **BLANK(S) TO WHICH PROPOSAL APPLIES**

### [X] ANNUAL STATEMENT

1

1

QUARTERLY STATEMENT

### [X] INSTRUCTIONS

ſ

- Life and Accident & Health [X]
- - Property/Casualty
- Health [X]

Separate Accounts Other Specify

[X] [X] Fraternal

Title 1

Anticipated Effective Date: Annual 2010

### **IDENTIFICATION OF ITEM(S) TO CHANGE**

Add a Medicare Part D – stand alone line to the exhibit. Add requirement that the exhibit be reported by state.

[ ]

### **REASON, JUSTIFICATION FOR AND/OR BENEFIT OF CHANGE\*\***

This will allow regulators the ability to better evaluate the business written on a group and individual basis by line of business.

### NAIC STAFF COMMENTS

Comment on Effective Reporting Date:

Other Comments:

\*\* This section must be completed on all forms.

### Annual instructions – LIFE, HEALTH, PROPERTY and FRATERNAL

### ACCIDENT AND HEALTH POLICY EXPERIENCE EXHIBIT

This exhibit is required to be filed no later than April 1. This exhibit is to be completed for each state in which the entity has business written.

╏	Detail Eliminated To Conserve Space
The Accident and Health	Policy Experience Exhibit must be prepared for each jurisdiction in which the company has written
husiness In addition an	exhibit must be prepared that contains the grand total (GT) for the company. These exhibits by
iurisdiction requires the	Illocation of earned premiums incurred claims contract reserves number of policies or certificates
number of covered lives	The following are definitions for the allocations by State/Jurisdiction
<u>Resident –</u>	A member who occupies a dwelling within a state with indications that the state is their primary domicile by payment of taxes, voting registration, and other indicators.
<u>Residence</u> –	The domicile location of a member as shown by his or her determination as a resident. In the context of Schedule T, the residence of the policyowner or group member would equate to the location that the member uses for official documents; information maintained by an employer as the home address of the employee would be accepted as a member's residence for allocation purposes.
Situs of the Contract –	The jurisdiction in which the contract is issued or delivered as stated in the contract.
<u>Rule of 500 –</u>	<ul> <li>For individual and group health insurance shall be defined as an allocation method for group policies which 1) permits a reporting entity to allocate amounts from a non-employer group policy covering fewer than 500 members to the jurisdiction in which the majority of covered members reside or to the situs of the contract; 2) permits a reporting entity to allocate amounts from an employer group policy covering fewer than 500 members to the jurisdiction in which the majority of covered members reside or are employed or to the situs of the contract; 3) requires a reporting entity to allocate amounts from a non-employer group policy covering 500 or more members to the jurisdiction where each member resides, and 4) requires a reporting entity to allocate amounts from an employer group policy covering 500 or more members to the jurisdiction where each member resides, and 4) requires a reporting entity to allocate amounts from an employer group policy covering 500 or more members to the jurisdiction where each member resides or is employed.</li> <li>For individual and group life insurance shall be defined as an allocation method for group policies which 1) permits a reporting entity to allocate amounts from a group policy covering fewer than 500 members to the state or territory in which the majority of covered members reside or to the situs of the contract; 2) requires a reporting entity to allocate amounts from a non-employer group policy covering 500 or more members reside or to the situs of the contract; 2) requires a reporting entity to allocate amounts from a non-employer group policy covering 500 or more members reside or to the situs of the contract; 2) requires a reporting entity to allocate amounts from a non-employer group policy covering 500 or more members to the state or territory where each member resides, and 3) requires a reporting entity to allocate amounts from a non-employer group policy covering 500 or more members to the state or territory where each member resides, or is employe</li></ul>
<u>Members –</u>	A person, employee, retiree, etc., that qualifies for and is covered under a group insurance policy. No consideration should be given to a member's dependents for counting the number of members in a group or in allocating amounts to the various states and territories.
The instructions are mini	mum allocation standards. More detailed methods of allocation are acceptable as long as they still
encompass the minimum	allocation instructions. Methods of allocation that better reflect the actual risk location by jurisdiction
are encouraged. The met	nod should be established by company policy and must be consistently applied to all policies within

each type and for all reporting periods.

For individual policies, allocate and report amounts to the jurisdiction based on the residence of the policyowner, insured or payer or on the situs of the contract.

For group policies not provided by an employer, allocate and report amounts to the jurisdiction based on the Rule of 500, or on the situs of the contract.

For group policies provided by an employer, allocate and report amounts to the jurisdiction based on the Rule of 500, location of employer or on the situs of the contract.

If using the Rule of 500 for group insurance sold through an association or trust, the following instructions apply:

Apply the Rule of 500 to the association or trust policy first. If the association or trust policy has more than 500 covered members, apply the Rule of 500 at the level of each group or employer in determining the allocation of the amounts. The determination of jurisdiction allocation by group or employer should be added to the determination of jurisdiction allocation of each group or employer should be added to the determination of amounts. Do not report all association or trust business in one state unless all covered members of the association or trust reside in one state, in fact or by operation of the Rule of 500. If the group is a collection of employers, do not report all amounts in one jurisdiction unless all of the covered employees reside or work in one state, in fact or by operation of the Rule of 500.

Example of an association policy that covers a group of employers: If the association policy covers more than 500 members, each employer would be reviewed to determine if coverage is provided through the association policy for more than 500 members. If an employer has less than 500 covered members, the amounts for that employer may be reported in one state based on the Rule of 500. If an employer covers more than 500 members through the association policy, the amounts would be reported based on the residence or employment location of each member. The determination for each employer would be added to the determinations for all the other employers that provide coverage to employees through the association policy.

Where applicable, reporting entities must have procedures to capture and maintain changes in allocation when notified through renewals or other procedures and must use the changes to adjust the allocation of amounts in subsequent financial statements. It is not necessary to anticipate unreported changes in allocation at any specific reporting date.

If allocating amounts to multiple jurisdictions under group policies, the amounts associated with a member should be the basis of determining the amount of amounts to report in a jurisdiction. If information is not available to associate a specific amount to each member, an allocation can be made based on the number of covered persons in a jurisdiction compared to the total number of the group's covered members and apply that ratio to the total group amounts.

**Detail Eliminated To Conserve Space** 

Attachment Six-C Life and Health Actuarial Task Force 12/3-4/09

Affix Bar Code Above

# ACCIDENT AND HEALTH POLICY EXPERIENCE EXHIBIT FOR YEAR United States Policy Forms Direct Business Only For The Year Ended December 31, 2009 (To Be Filed by April 1)

NAIC Group Code	BUSI	<b>NESS IN THE STATE</b>	OF	~	IAIC Company Code		
	1	2	3	4	5	9	7
	Premiums	Incurred	Change in	Loss Ratio	Number of Policies	Number of	Member
	Earned	Claims Amount	Contract Reserves	(2+3)/1	or Certificates as of Dec 31	Covered Lives as of Dec. 31	Months
A. INDIVIDUAL BUSINESS							
1. Comprehensive Major Medical							
1.1 With Contract Reserves							
1.2 Without Contract Reserves							
1.3 Subtotal							
2. Short-Term Medical							
2.1 With Contract Reserves							
2.2 Without Contract Reserves							
2.3 Subtotal							
3. Other Medical (Non-Comprehensive)							
3.1 With Contract Reserves							
3.2 Without Contract Reserves							
3.3 Subtotal							
4. Specified/Named Disease							
4.1 With Contract Reserves							
4.2 Without Contract Reserves							
4.3 Subtotal							
5. Limited Benefit							
5.1 With Contract Reserves							
5.2 Without Contract Reserves							
5.3 Subtotal							
6. Student							
6.1 With Contract Reserves							
6.2 Without Contract Reserves							
6.3 Subtotal							
7. Accident Only or AD&D							
7.1 With Contract Reserves							
7.2 Without Contract Reserves							
7.3 Subtotal							
8. Disability Income – Short–Term							
8.1 With Contract Reserves							
8.2 Without Contract Reserves							
8.3 Subtotal							
			1			1	

							LITE and Health A	ctuarial lask Force 12/3-4/09
		ACCIDEN	IT AND HEALTH	POLICY EXPE	<b>RIENCE EXHIBI</b>	T FOR YEAR		
		1	2	б	4	S	6	7
						Number of Policies	Number of	
		Premiums Earned	Incurred Claims Amount	Change in Contract Reserves	Loss Ratio (2+3)/1	or Certificates as of Dec. 31	Covered Lives as of Dec. 31	Member Months
A.	INDIVIDUAL BUSINESS (Continued)							
9.	Disability Income - Long-Term							
	9.1 With Contract Reserves     9.2 Without Contract Reserves     9.3 Subtotal							
10.	Long-Term Care							
	10.1 With Contract Reserves							
	<ul><li>10.2 Without Contract Reserves</li><li>10.3 Subtotal</li></ul>							
11.	Medicare Supplement (Medigap)							
	11.1 With Contract Reserves							
	11.2 Without Contract Reserves							
ç	11.3 Subtotal							
12.	Dental							
	12.1 With Contract Reserves							
	12.2 Without Contract Reserves							
13.	State Children's Health Insurance Program							
	13.1 With Contract Reserves							
	13.2 Without Contract Reserves							
	13.3 Subtotal							
14.	Medicare							
	14.1 With Contract Reserves							
	14.2 Without Contract Reserves							
15.	Medicaid							
	15.1 With Contract Reserves							
	15.2 Without Contract Reserves							
16.	Medicare Part D – Stand-alone							
	15.1 With Contract Reserves							
	<ul><li>15.2 Without Contract Reserves</li><li>15.3 Subtotal</li></ul>							
17.	Other Individual Business							
1	16.1 With Contract Reserves							
	16.2 Without Contract Reserves							
18.	Total Individual Business							
	17.1 With Contract Reserves							
19.	17.2 Without Contract Reserves							
	_							T

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### Attachment Six-C Life and Health Actuarial Task Force 12/3-4/09

	1	2	3	4	\$	9	7
	Construction of the second sec	Tanana		T and Datio	Number of Policies	Number of	Mandane
	Earned	Claims Amount	Contract Reserves	(2+3)/1	as of Dec. 31	as of Dec. 31	Months
B. GROUP BUSINESS	-						
Comprehensive Major Medical							
1. Single Employer							
1.1 Small Employer							
1.2 Other Employer							
1.3 Single Employer Subtotal							
2. Multiple Employer Assns and Trusts							
3. Other Associations and Discretionary Trusts							
4. Other Comprehensive Major Medical							
5. Comprehensive/Major Medical Subtotal							
Other Medical (Non-Comprehensive)							
6. Specified/Named Disease							
7. Limited Benefit.							
8. Student							
9. Accident Only or AD&D							
10. Disability Income - Short-term							
11. Disability Income – Long-term							
12. Long-Term Care							
13. Medicare Supplement (Medigap)							
14. Federal Employees Health Benefit Plans							
15. Tricare							
16. Dental							
17. Medicare							
<ol> <li>Medicare Part D – Stand-alone</li> </ol>							
19 Other Group Care							
20. Grand Total Group Business							
C. OTHER BUSINESS							
1. Credit (Individual and Group)							
<ol><li>Stop Loss/Excess Loss</li></ol>							
3. Administrative Services Only		XXX	XXX	XXX			
4. Administrative Services Contracts		XXX	XXX	XXX			
5. Grand Total Other Business							
D. TOTAL BUSINESS							
1. Total Non U.S. Policy Forms							
2. Grand Total Individual, Group and Other							
Business							

# ACCIDENT AND HEALTH POLICY EXPERIENCE EXHIBIT FOR YEAR

### Attachment Six-C Life and Health Actuarial Task Force 12/3-4/09

Attachment Six-C Life and Health Actuarial Task Force 12/3-4/09

## ACCIDENT AND HEALTH POLICY EXPERIENCE EXHIBIT FOR YEAR PART 1 - INDIVIDUAL POLICIES SUMMARY PAGE

		1	2	3	4	
					Loss Ratio	
	Description	Premiums Earned	Incurred Claims Amount	Change in Contract Reserves	(2+3)/1	
	U.S. Forms Direct Business					
ų	Other Forms Direct Business					
3.	Total Direct Business.					
4	Reinsurance Assumed					
5.	Less Reinsurance Ceded					
9.	Total					

## PART 2 – GROUP POLICIES SUMMARY

			2	3	4	
					Loss Ratio	
	Description	Premiums Earned	Incurred Claims Amount	Change in Contract Reserves	(2+3)/1	
Ι.	U.S. Forms Direct Business					
¢i	Other Forms Direct Business					
3.	Total Direct Business					
4	Reinsurance Assumed					
5.	Less Reinsurance Ceded					
9.	Total					

## PART 3 – CREDIT POLICIES (Individual and Group) SUMMARY

-	Description Lts Farmer Director	l Premiums Eamed	2 Incurred Claims Amount	3 Change in Contract Reserves	4 Loss Ratio (2+3/1
	Other Forms Direct Business				
3.	Total Direct Business				
4	Reinsurance Assumed				
5.	Less Reinsurance Ceded				
9.	Total				

# PART 4 – ALL INDIVIDUAL, GROUP AND CREDIT POLICIES SUMMARY

		1	2	3	4
					Loss Ratio
	Description	Premiums Earned	Incurred Claims Amount	Change in Contract Reserves	(2+3)/1
	U.S. Forms Direct Business				
сi	Other Forms Direct Business				
ć	Total Direct Business				
4	Reinsurance Assumed				
5.	Less Reinsurance Ceded				
.9	Total				

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Draft: 12/15/09

#### Accident and Health Working Group Conference Call November 4, 2009

The Accident and Health Working Group of the Life and Health Actuarial Task Force met via conference call Nov. 4, 2009. The following Working Group members participated: Steven Ostlund, Chair (AL); Katie Campbell (AK); Ali Zaker-Shahrak (CA); Mary Ellen Breault (CT); Dan Keating (FL); Cindy Hermes (KS); Julia Philips (MN); John Rink (NE); Amanda Fenwick (NY); Alan Furan (OH); Andrew Dvorine (SC); Jan Graeber (TX); and Tomasz Serbinowski (UT).

#### 1. <u>Pension Protection Act</u>

Michael Oleske (New York Life) and Elizabeth Oyen (MetLife) presented a report (Attachment Six-D1) on the federal Pension Protection Act of 2006 (PPA). The PPA arose from the desire to develop a product that would cover the risks a person would face during his/her lifetime by allowing annuities, long-term care insurance and life insurance to be combined starting in 2010.

A stand-alone long-term care contract is qualified if 1) payments are made only for qualified long-term care services; 2) the contract is guaranteed renewable; 3) the contract does not provide a cash surrender value; and 4) the contract contains the consumer protection provisions in the *Long-Term Care Insurance Model Act* (#640) and the *Long-Term Care Insurance Model Regulation* (#641). Benefits are tax free to the extent that they reimburse for qualified long-term care expenses or to the extent they are per diem payments within limits set by the Internal Revenue Service.

Currently, long-term care coverage can be included with a life insurance policy either as stand-alone coverage or as an acceleration of the death benefit. There is no final guidance on the tax effects when benefits are accelerated under Section 7702 of the Internal Revenue Code (IRC). The acceleration might be considered a reduction in benefits.

An annuity and long-term care combination has been limited because there are no specific provisions in Section 7702B of the IRC for the combination. In addition, the provisions that a qualified long-term care policy can only provide long-term benefits, plus cannot provide a cash value, is a hurdle to using the combination. Finally, there is no provision in the IRC for exchanging long-term care insurance.

The PPA allows the combination of an annuity and long-term care insurance in a single contract. The long-term care insurance can be provided by a rider or as part of the base policy, but it must be qualified long-term care coverage. For tax purposes, the long-term care insurance would be treated as if it were a separate contract. Charges for the long-term care insurance are paid from the annuity's cash value and are not included in the contract holder's income. Exchanges of qualified long-term care contracts are now allowed.

Guidance is needed from the Internal Revenue Service on the tax treatment of various items. One question is whether all premiums paid into a combination contract are included in the investment in the contract. Another question is whether the investment in a contract is reduced by the long-term care charges actually imposed. The PPA provides that the long-term care insurance charges reduce the basis in the contract and the charges are not included in gross income. Finally, if long-term care benefits are paid under a combination contract, it is wondered how those benefits would be treated by the contract owner. A private letter ruling states that the benefits are not taxable to the contract owner, to the extent they do not exceed the per diem limitation. There is also a question regarding whether the basis on a combination contract is adjusted if long-term care benefits are paid.

Having no further business, the Accident and Health Working Group adjourned.

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# Pension Protection Act of 2006: Implications for the Long-Term Care Insurance Market in 2010

Elizabeth A. Oyen Assistant General Counsel, Legal Affairs Department, MetLife

Michael M. Oleske SVP & Chief Tax Counsel, New York Life Insurance Company

November 4, 2009

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Characteristics	Life Insurance	Annuity	QLTC Insurance
Risks Covered	Death of insured(s)	Longevity of Owner(s)	Chronic Illness of insured
Investment Element?	Yes - Cash Surrender Value (CSV)	Yes - Cash Surrender Value (CSV)	No - but can pay a premium refund at death or surrender
Benefits? How Are They Taxed?	Death Benefit Generally, Tax Free	Annuity payments are taxed via "exclusion ratio" formula Withdrawals are taxed as income-first	Reimbursements for LTC costs or Per Diem amounts Benefits are tax-free if (a) not in excess of IRS per diem limits or (b) they reimburse actual costs
Benefit Triggers	Death	Certain date, Age of Annuitant or Death	Insured becomes "chronically ill
Underwriting	Minimal to Full	Minimal	Minimal to Full
Inflation Protection	Possible, but not required	Possible, but not required	Offer Required
HIPAA- Consumer Protection	None	None	All

	Life (§7702, §7702A)	Annuity (§72(s),(u))	LTC (§7702B)
Premiums	Premiums are limited to those required to fund future benefits (Guideline Premium Test, 7-Pay Test)	There are no limits on the amounts that may be contributed to nonqualified annuities	Premiums must be Guaranteed Renewable
Cash Values	Cash values cannot exceed prescribed limits (CVAT or cash value corridor)	There are no limits on the amounts that may be accumulated in nonqualified annuities	Contracts may not have a cash value
Coverages	Besides life insurance, can also include AD&D, disability waiver of premium, guaranteed insurability and long-term care	There are no tax rules that expressly prohibit annuities from providing other coverages	The only coverage allowed is qualified long term care insurance
Ownership	There are no restrictions on policy ownership	Contract must be owned by a "natural person"	There are no restrictions on policy ownership























Bac	skground
•	At present, there are limited opportunities to combine LTC and annuity
•	IRC§7702B(b)(1)(A) requires that the only coverage provided under the contract be qualified long-term care insurance; and
•	<i>IRC§7702B(b)(1)(D) requires that the contract not provide for any cash value (other than a premium refund upon death or surrender).</i>
	As a result, the LIC coverage must be treated as provided under a separate contract for tax purposes
•	Charges for LTC coverage are treated as distributions from the annuity contract, taxable under IRC §72(e) and reported on form 1099-R.
•	Life and annuity contracts cannot be exchanged tax- free for LTC insurance
nerica docu	n Council of Life Insurers <u>www.acli.com</u> ment reproduced by the NAIC with permission from ACLI. production or distribution is prohibited without express conself from ACLI.









	ins a combination annuity/ L	TC contract with the following features on 1/1/2012:
	Cash Value:	\$60,000
	Investment in the Contract:	\$50,000
	LTC Rider:	\$200 per day benefits for chronic illness (LTC
		benefits do not affect annuity cash value)
	Gain if surrendered:	\$10,000
Prop	osed answer: B will recogni	ze a gain of \$10,000 on surrender (\$60,000 - \$50,000).
NOT the g	E: If the investment in the c gain on surrender would be ne payments under the cont	ontract were reduced by the \$10,000 of LTC benefits, the \$20,000 (\$60,000 - \$40,000). The effect would be to tax ract. (Total payments were \$70,000 (\$10,000 of LTC

Cash Value:	\$60,000
Investment in the Contrac	t: \$50,000
LTC Rider:	\$200 per day benefits for chronic illness. (Payments of LTC benefits reduce annuity cash value on a 50% co-pay basis)
Gain if surrendered:	\$10,000
Prodused answer in will recover	175 8 88111 11 3.1 1 1 1 3.1 1 5.1 1 5.1 1 5.1 1 5.1 1 1 1 1 5 3.1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
NOTE: If the investment in the surrender would be \$15,000 (\$ the contract. (Total payments v \$55,000) and the investment v	contract were reduced by the \$10,000 of LTC benefits, then the gain o \$55,000 - \$40,000). The effect would be to tax <u>all</u> the payments under vere \$65,000 (\$10,000 of LTC benefits and surrender proceeds of (as \$50,000).







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#### **Update Regarding a General Revision** Of Life and Annuity Standard Nonforfeiture Laws From the American Academy of Actuaries' Nonforfeiture Improvement Work Group

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

#### San Francisco, CA – December 2009

The American Academy of Actuaries is a 16,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Nonforfeiture Improvement Work Group

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Since the National Association of Insurance Commissioners' Fall 2009 National Meeting in September, the American Academy of Actuaries' Nonforfeiture Improvement Work Group (NFIWG) has continued to hold regular conference calls. The charge from the Life and Health Actuarial Task Force (LHATF) to the NFIWG is to:

"Study the feasibility of a new nonforfeiture law for life insurance and annuities to replace the existing nonforfeiture standards. Provide quarterly status reports on this project."

This report constitutes the requested quarterly status report on the progress of the NFIWG's activities.

The NFIWG is continuing to prepare its documentation of the details of the approach to life and annuity product nonforfeiture reform it believes will accomplish the elements contained in its previously-articulated framework for reform.

Once the NFIWG completes its review of the current version of its draft report, it will forward that draft to certain other Academy work groups for their input prior to finalizing the report.

The NFIWG appreciates the opportunity to keep LHATF apprised of its activities with regard to the charge assigned.

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## AMERICAN ACADEMY of ACTUARIES

### Report of the American Academy of Actuaries' Life Reserves Work Group Asset Subgroup On Existing Asset Default Costs: A Prescribed Methodology for VM-20

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

November 2009

The American Academy of Actuaries is a 16,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Life Reserves Work Group Asset Subgroup

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# I. Introduction

# **Executive Summary**

The purpose of this document is to explain in detail the LRWG's proposed methodology for calculating VM-20 prescribed existing asset default costs. The LRWG has undertaken this effort at the request of the NAIC Life and Health Actuarial Task Force (LHATF), which decided at the 2008 Winter National Meeting that VM-20 asset default costs should be prescribed. This approach would replace the prudent estimate methodology that appears in the June 12, 2009 Exposure Draft of VM-20, which was based on the LRWG's original proposal. The methodology herein is consistent with the LRWG methodology presented to LHATF on September 21, 2009. Many of the details of the proposed methodology are currently in illustrative form and subject to change following further LRWG research.

The main LHATF / Life PBR Subgroup objectives of this methodology are:

- Default costs for the same or similar asset should be the same across all companies. They should be prescribed.
- In the short run, default costs should reflect the current economic environment and can grade into long-term conditions.
- The prescribed method should be relatively simple.
- The method should produce reasonable results as market conditions vary over time.
- In most economic environments the method should not reward companies for choosing a long-term strategic asset allocation for which the overall portfolio is riskier than some threshold or "line in the sand."

For a methodology that includes the above objectives the LRWG believes that the following additional objectives are warranted:

- Risk-based elements should be incorporated into the methodology to the extent possible, while still keeping it a prescribed method. For example:
  - Default risk should be measured as of valuation date rather than as of original asset purchase date.
  - Projected defaults should ultimately be based on key drivers of default risk for the most common industry asset types. Relevant indicators such as credit rating and/or market spread may be appropriate as proxies until more direct measurement methods are broadly available.
- The methodology should be internally consistent regarding:
  - Default costs on existing assets
  - Gross spreads and default costs on reinvestment assets
  - Market values on assets sold in the model

An executive summary explanation of the methodology is as follows:

- The methodology defines a structure with parameters that can be set by regulators.
- It is primarily an asset-by-asset approach. Each asset is associated with a benchmark asset of the same quality rating and weighted average life.
- Projected default costs are the sum of four components:

1- Annual historical default cost for the benchmark asset based on long-term statistics, set at a conservative level, such as CTE 70, based on the historical sample distribution.

2- Temporary adjustment for an N year period (currently N=3) to reflect either somewhat higher or lower default costs in the short run based on the level of current market spread (of the specific asset) relative to historical mean spreads (of the benchmark).

3- Additional temporary adjustment for N years to ensure that each asset has a default cost that is not lower than a prescribed minimum.

4- Additional temporary adjustment for N years if the portfolio current market spread is > a defined threshold (currently A3/A-).

Most of the default cost and spread values that appear in this document are rounded to the nearest  $1/10^{\text{th}}$  of a basis point. After drafting this document the LRWG decided that accuracy would not be compromised if such rounding were instead to the nearest basis point.

# II. Methodology to Calculate Prescribed Annual Default Costs

# **Prescribed Parameters**

LHATF will prescribe certain parameters that are used in the methodology and explained further below. The examples below assume that:

N=3 years, T=the equivalent of A3/A-, X=25%, Z=50%

#### **Bullet, Callable, Put-able or Sinking Fund Bonds**

On the valuation date the actuary will determine for each asset a vector of Prescribed Annual Default Costs by projection year that will equal the sum of 4 components:

#### Baseline Default Cost Spread Related Component Minimum Default Cost Adjustment Maximum Net Spread Adjustment

Below is an example (in basis points) that will be developed further in this document:

	Year:	1	2	3	4	5
Baseline Default Cost		18.0	18.0	18.0	18.0	18.0
Spread Related Component		16.3	10.9	5.4	0.0	0.0
Minimum Default Cost Adjustment		0.0	0.0	0.0	0.0	0.0
Maximum Net Spread Adjustment		66.4	49.3	27.1	0.0	0.0
Annual Default Cost Vector		100.7	78.2	50.5	18.0	18.0

In order to perform such calculations, on the valuation date the actuary will need four data fields for each asset that can be provided by the company's asset manager or calculated from information provided by such asset manager:

Weighted Average Life ("WAL"): "WAL" is the weighted average number of years until 100% of the outstanding principal is repaid. For a bullet bond WAL is the remaining number of years until maturity. WAL is determined to the nearest year.

**Option Adjusted Spread ("OAS")**: "OAS" is a metric used for callable corporate bonds and other bonds with optionality (e.g., residential mortgage backed securities) that measures the average spread (in basis points) over zero coupon Treasury bonds that equates the bond's market price with its modeled cash flows across an arbitrage free set of stochastic interest rate scenarios. OAS is determined to the nearest  $1/10^{\text{th}}$  of a basis point.

**Investment Expenses ("Expenses")**: "Expenses" is the average annual asset management expenses for the asset expressed in basis points. Expenses is determined to the nearest  $1/10^{\text{th}}$  of a basis point

**PBR Credit Rating ("Rating")**: If the asset has at least one Nationally Recognized Statistical Rating Organization ("NRSRO") rating, then "Rating" is the average of the Numeric Ratings (using a scale from 1 to 21) corresponding to the NRSRO ratings rounded to 0 decimal places. For example, if an asset has a Moody's/S&P/Fitch/DBRS/AM Best Ratings of A1/A/A-/BBB high/bbb, then the corresponding Numeric Ratings are 5/6/7/8/9 and the average of these is 7. If the asset has no NRSRO rating, then Rating is the second worst Numeric Rating that maps to the NAIC Designation assigned by the SVO (i.e. 6, 9, 12, 15, 18 or 20). Each Numeric Rating from 1 to 20 is a lookup from the tables below for an NRSRO rating equal to or stronger than Ca, CC or cc, and is 21 for an NRSRO rating of C, c, DDD, DD, D or d.

1

Moody's Rating	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3
S&P Rating	AAA	AA+	AA	AA-	A+	А	A-	BBB+	BBB	BBB-
Fitch Rating	AAA	AA+	AA	AA-	A+	А	A-	BBB+	BBB	BBB-
DBRS Rating	AAA	AA high	AA	AA low	A high	А	A low	BBB high	BBB	BBB low
AM Best Rating	aaa	aa+	aa	aa-	a+	а	a-	bbb+	bbb	bbb-
NAIC Designation	1	1	1	1	1	1	1	2	2	2
Numeric Rating	1	2	3	4	5	6	7	8	9	10
Moody's Rating	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Са
S&P Rating	BB+	BB	BB-	B+	В	B-	CCC+	CCC	CCC-	CC
Fitch Rating	BB+	BB	BB-	B+	В	B-	CCC+	CCC	CCC-	CC
DBRS Rating	BB high	BB	BB low	B high	В	B low	CCC high	CCC	CCC low	CC
AM Best Rating	bb+	bb	bb-	b+	b	b-	ccc+	ccc	CCC-	СС
NAIC Designation	3	3	3	4	4	4	5	5	5	6
Numeric Rating	11	12	13	14	15	16	17	18	19	20

The four components of the Prescribed Annual Default Cost vector are determined as follows:

- 1. Baseline Default Cost: Every element of this vector is equal to the Prescribed Baseline Default Cost, as described in Section III, for the benchmark asset with the same WAL and Rating. The Prescribed Baseline Default Cost for an asset is the result of a table lookup. In our example we have assumed that WAL = round(7.25, 0) = 7 years and Rating = 7 (A3/A-), and the table lookup result (from Table A) is 18.0 bps.
- 2. Spread Related Component: This is a vector based on two prescribed parameters N (e.g., 3 years) and X% (e.g., 25%) that adjusts default costs up or down based on market spreads on the valuation date for the first N years of the projection.
  - a. For a projection with an annual time-step, the year 1 element of the vector shall equal X% multiplied by [the asset's current OAS less the interpolated Mean Benchmark Spread for an asset with the same WAL and Rating]. The Mean Benchmark Spread is a historical average determined from prescribed bond data as described in Section IV. The year N+1 element of the vector shall be zero, and all elements from year 2 through year N should be interpolated.
  - b. For a projection with a monthly or quarterly time-step, either the same annual interpolation approach will be used or the actuary will interpolate monthly or quarterly to achieve equivalent results.
  - c. In our example the Mean Benchmark Spread is 135.3 bps (a lookup from Table H) and we have assumed that the valuation date OAS for the asset is 200.5 bps. The Spread Related Component in projection year 1 is thus 25% x (200.5 bps 135.3 bps) = 16.3 bps.
- 3. Minimum Default Cost Adjustment: This is a vector based on a prescribed parameter Z% (e.g., 50%). Each element of the vector shall be the larger of (0, Z% x Baseline Default Cost [Baseline Default Cost + Spread Related Component]). This Adjustment will generally be a vector of zeros for an asset for which the valuation date OAS is higher than or slightly lower than the Mean Benchmark Spread, and will be greater than zero for the first 1 to N years for an asset for which the valuation date OAS is substantially lower than the Mean Benchmark Spread.
- 4. Maximum Net Spread Adjustment: This is a vector of portfolio adjustments based on the prescribed parameter T (e.g., 7, which is equivalent to A3/A-), which is a portfolio ratings Threshold. The vector of adjustments will be calculated on a portfolio basis and then be applied to each asset. The methodology to determine the vector involves five steps:
  - a. For each bond in the portfolio calculate a preliminary net spread vector representing the OAS less the sum of components 1+2+3 less Expenses. For our example the first five years of this vector is:

1	2	3	4	5
156.2	161.6	167.1	172.5	172.5

b. For the entire portfolio in aggregate calculate a vector which is the weighted average of the result in item a, where the weight for each asset varies by projection year and reflects the WAL and statement value on the valuation date. In our example (for which we have assumed that all bonds have a WAL of 7) the weights by projection year would be the valuation date statement value for projection years 1 to 7 and 0 for

<sup>&</sup>lt;sup>1</sup> Table updated December 16, 2009.

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projection year 8 and greater, and for the entire illustrative portfolio the weighted average vector for the first five projection years is:

1	2	3	4	5
218.1	231.0	244.0	257.0	257.0

c. We calculate the vector of net spreads for a Benchmark asset with a maturity equal to the portfolio WAL, Expenses equal to the portfolio weighted average Expenses (e.g., 14.5 bps) and a Rating equal to the Threshold T:

151.7 157.1	162.6	168.0	168.0
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d. We define a vector that is 1 in year 1, 0 in year N+1 and interpolated in between:

1.000 0.6666667 0.3333333	0	0
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e. We define the Maximum Net Spread Adjustment as (b-c) x d

	66.4	49.3	27.1	0.0	0.0
--	------	------	------	-----	-----

# **Special Instructions for Certain Asset Types**

# A) Floating Rate Notes or Bonds with Embedded Derivatives

For floating rate notes, the OAS shall be calculated as the equivalent spread over Treasuries if the notes were swapped to a fixed rate. For example, if an 5-year floating note trades at a spread of F bps over LIBOR, then the OAS shall equal F bps + the 5 year swap spread. For a note with an embedded derivative (e.g., long an equity index call option), the OAS shall be calculated as the equivalent spread over Treasuries if the note were swapped to a fixed rate.

# B) Bonds or Preferred Stock that are Perpetual or Mature after 30 years

For bonds or preferred stock that are perpetual or mature after 30 years, cap the WAL for such bonds at 30 years.

# C) Bonds or Preferred Stock that are Convertible

TBD

# D) Residential Mortgage Backed Securities

TBD pending review of new SVO rating methodology proposed by Valuation of Securities Task Force.

# E) <u>Commercial Mortgage Backed Securities and other Asset Backed Securities</u>

TBD

# F) <u>Commercial Mortgage Loans</u>

TBD

# III. Data & Methodology to Calculate Prescribed Baseline Default Costs

# **Prescribed Baseline Default Costs**

The current process to determine Prescribed Baseline Default Costs is as follows:

- 1) Determine a matrix of Prescribed Cumulative Default Rates, for maturities of 1 to 10 years and for 20 ratings classes (Aaa, Aa1, Aa2, Aa3, ...Caa2, Caa3, Ca).
- 2) Determine a Prescribed Recovery Rate that is applicable for all bonds.
- Determine a matrix of Prescribed Baseline Default Costs (in bps), where for a given rating the Baseline Default Cost for year t = 10,000\* (1-Recovery Rate) \* (1-[1-Cumulative Default Rate (t)]^[1/t]).
- 4) Currently items 1) and 2) above are determined from Moody's reports that were published in February 2008. In February 2009, Moody's published updated versions of these reports but Moody's in general intends to publish updated versions of such research every one to five years depending on market conditions and its own discretion. The LRWG has not yet explored whether another source for one or both elements might be preferable. If LHATF decides to use Moody's as the source going forward, then the matrix of Prescribed Baseline Default Costs could be updated (perhaps by the SOA or the SVO) shortly after Moody's publishes its updated research.

Note that items 1) and 2) above are currently determined using CTE 70 so the Prescribed Baseline Default Costs are slightly more conservative than CTE 70. Offsetting such conservatism, the above calculations assume that every insurer owns every bond in the market and does not reflect the variability of results if it were assumed that every insurer owns S statistically independent bonds. Nevertheless, since items 1) and 2) are not 100% correlated further consideration is warranted as to whether item 2) above should be determined perhaps at the 85<sup>th</sup> percentile rather than at CTE 70.

In the Appendix,

- Table A shows Prescribed Baseline Default Costs using Moody's Data as of Feb 2008, and
- Table B shows Prescribed Baseline Default Cost Margin as of Feb 2008

# **Prescribed Cumulative Default Rates**

The current process to determine Prescribed Cumulative Default Rates is as follows:

- 1) Obtain the most recent Moody's report on Default Rates (e.g., Moody's 2008-02-11 Special Comment Corporate Default & Recovery Rates 1920-2007).
- 2) Extract 1 year, 5 year and 10 year average cumulative default rate data by whole letter rating (e.g., Aaa, Aa, ...CCC) from the report (e.g., Exhibit 27 Average Cumulative Issuer-Weighted Global Default Rates, 1970-2007\*).
- 3) Extract 1 year, 5 year and 10 year cumulative default rate cohort data by whole letter rating from the report (e.g., Exhibit 36 Cumulative Issuer-Weighted Default Rates by Annual Cohort, 1970-2007). Calculate the mean of these 1y, 5y and 10y cumulative default rates.
- 4) Sort the data in 3) to calculate preliminary CTE 70 1y, 5y and 10y cumulative default rates at each whole letter rating.
- 5) Adjust the result in 4) to reflect any differences between 2) and 3). For example, 5 = 4 + (2) 3.
- 6) Use linear interpolation to determine cumulative default rates for maturities 2 to 4 and 6 to 9.
- 7) Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,..., Caa2, Caa3, Ca) using an algorithm to ensure that in the new matrix the rows are monotonic by maturity, the columns are monotonic by rating, and to the extent possible the new matrix has a shape comparable to another Moody's cumulative default rate table that varies by notch( e.g., Moody's Idealized Cumulative Default Rates).
- 8) For maturities greater than 10 years define Prescribed Baseline Default Rates as equal to 10 year Prescribed Baseline Default Rates.

In the Appendix,

- Table C shows Empirical CTE 70 Default Rates from Moody's Data as of Feb 2008
- Table D shows Prescribed Cumulative Default Rates derived from Moody's Data as of Feb 2008

# Prescribed Recovery Rates

The current process to determine Prescribed Recovery Rates is as follows:

- 1) Obtain the most recent Moody's report on Recovery Rates (e.g., Moody's 2008-02-11 Special Comment Corporate Default & Recovery Rates 1920-2007).
- 2) Extract historical annual data on recovery rates (e.g., the All Bonds column from Exhibit 22 Annual Average Defaulted Bond and Loan Recovery Rates, 1982-2007).
- 3) Determine Prescribed Recovery Rates as CTE 70 on these observations.

Note that using the above approach the Prescribed Recovery Rate for All Bonds as of February 2008 was 29.1%. However, for the illustrative examples prepared by the LRWG thus far (including this write-up), we have used a recovery rate of 27%, which was a CTE 70 statistic for 1987-2006 Moody's data in a format that Moody's discontinued after 2007 (Exhibit 15 of 2007-04-12 Moody's Special Comment on Moody's Ultimate Recovery Database).

In the Appendix,

• Table E shows a sorted version of "Exhibit 22 - Annual Average Defaulted Bond and Loan Recovery Rates, 1982-2007," and develops the CTE 70 Recovery Rates and the implied Margin.

Table E develops CTE 70 Recovery Rates for All Bonds as well as for Senior Bank Loans and five bond lien position categories that make-up the All Bonds statistics. Implementation would be facilitated if VM-20 uses one Prescribed

Recovery Rate for All Bonds rather than using all six lien position categories.

Prescribed Recovery Rates for all six categories would increase the accuracy of the calculation but would require that the SVO assign each fixed income asset to one of these categories and instructions for each insurer to implement for assets not yet assigned by the SVO.

# IV. Data & Methodology to Calculate Prescribed Gross Spreads

# Current Benchmark Spreads

Current Benchmark Spreads are not specifically used in the methodology, but are useful in development of valuation date OAS assumptions in order to evaluate the impact for illustrative portfolios. The current process to determine Current Benchmark Spreads is as follows:

- 1) Extract valuation date Investment Grade bond index spread data by ratings category and maturity bucket (e.g., download JULI (JPMorgan US Liquid Index) Interpolated Spread over Treasury data for All Industries).
- Extract valuation date Below Investment Grade bond index spread data by ratings category (e.g., download JPMorgan Domestic High Yield Index Spread to Worst data by Rating Tier ), and assume that the Below Investment Grade spread curve is flat across maturities.
- 3) Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,..., Caa2, Caa3, Ca) and maturity (1, 2, ..., 30) using an algorithm to ensure that in the new matrix: (a) the rows are monotonic by rating, (b) the investment grade columns are monotonic by maturity, and (c) the columns on the border between investment grade and below investment grade (Baa3/BBB- and Ba1/BB+) are interpolated between Baa2/BBB and Ba2/BB.

In the Appendix,

- Table F shows Current Benchmark Spreads as of 11/30/2007 for Investment Grade bonds.
- Table G shows Current Benchmark Spreads as of 11/30/2007 for Below Investment Grade bonds.

#### Mean Benchmark Spreads

The current process to determine Mean Benchmark Spreads is as follows:

- 1) Extract daily Investment Grade bond index spread data by ratings category and maturity bucket (e.g., download JULI (JPMorgan US Liquid Index) Interpolated Spread over Treasury data for All Industries).
- 2) Extract daily date Below Investment Grade bond index spread data by ratings category (e.g., download JPMorgan Domestic High Yield Index Spread to Worst data by Rating Tier ), and assume that the Below Investment Grade spread curve is flat across maturities.
- 3) Calculate for each ratings category the mean over the prescribed period (e.g., 7 years).
- 4) Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,..., Caa2, Caa3, Ca) and maturity (1, 2, ..., 30) using an algorithm to ensure that in the new matrix: (a) the rows are monotonic by rating, (b) the investment grade columns are monotonic by maturity, and (c) the columns on the border between investment grade and below investment grade (Baa3/BBB- and Ba1/BB+) are interpolated between Baa2/BBB and Ba2/BB.

In the Appendix,

- Table H shows 7y Mean Benchmark Spreads as of 11/30/2007 for Investment Grade bonds.
- Table I shows 7y Mean Benchmark Spreads as of 11/30/2007 for Below Investment Grade bonds.

#### V. Further Research and Decisions Required to Implement the Methodology

# Pending Special Instructions for Certain Asset Types

See "Special Instructions for Certain Asset Types" in section II.

# Finalize Approaches for Cumulative Default Rates, Recovery Rates and Benchmark Spreads

Cumulative Default Rate decisions that need to be made include:

1) Decide whether Prescribed Cumulative Default Rates should be calculated over a rolling n-year (e.g., 40-year) period or whether there should be a fixed starting date (e.g., 1970).

Recovery Rate decisions that need to be made include:

1) Decide whether to use CTE 70, 85<sup>th</sup> Percentile or some other statistic.

2) Decide whether to use one Prescribed Recovery Rate for all lien position categories (e.g., senior unsecured, senior subordinated, junior subordinated) and asset types or, if not, decide on the list of categories and types for which recovery rates will be prescribed.

Baseline Default Cost decisions that need to be made include:

1) Decide on whether Prescribed Default Costs should vary by WAL (1, 2, ..., 9, 10+) as shown herein or whether they should be based on one WAL (e.g., 5 years) and thus not vary by WAL.

Benchmark Spread decisions that need to be made include:

1) Decide whether Mean Benchmark Spreads should be calculated over a rolling n-year (e.g., 7-year) period or whether they should be the mean after a fixed starting date.

# Optimal Data Sources for Cumulative Default Rates, Recovery Rates and Benchmark Spreads

Decisions that need to be made are:

- 1) Cumulative Default Rates: Decide on a data source.
- 2) Recovery Rates: Decide on a data source.
- 3) Benchmark Spreads: Decide on a data source and clarify data access logistics.

# Optimal interpolation/smoothing algorithms to calculate Prescribed Baseline Default Costs and Mean Benchmark Spreads

The LRWG has been using illustrative interpolation/smoothing algorithms to calculate Prescribed Baseline Default Costs and Mean Benchmark Spreads. Further research is needed to determine whether the LRWG will recommend modifications to these algorithms.

# Values for Prescribed Parameters: N, T, X% and Z%

LHATF needs to decide on values for these prescribed parameters. To facilitate LHATF's decision the LRWG will perform illustrative portfolio calculations for a few parameter sets.

# Decide whether to apply Prescribed Default Costs to Statement Value or to Par Value: N, T, X% and Z%

The LRWG believes that Prescribed Default Costs should be applied to par value rather than statement value, even though the latter is the most common practice today for cash flow testing. The rationale for this position can be explained through an example: If two companies bought the same bond and different times, where today one has a statement value of 90 and the other has a statement value of 110, if the bond defaults today each company will have the same claim of 100 against the issuer. LHATF needs to decide whether to a) prescribe that costs be applied to par value, b) prescribe that costs be applied to statement value, or c) request that the LRWG address this via Practice Notes.

# **VI.** Appendices

70 CTE	1	2	3	4	5	6	7	8	9	10
Aaa	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Aa1	0.1	0.2	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.1
Aa2	0.1	0.5	1.0	1.3	1.5	1.6	1.8	1.9	2.1	2.3
Aa3	0.3	1.1	2.2	2.8	3.1	3.4	3.7	3.9	4.2	4.6
A1	0.5	2.2	4.3	5.1	5.6	6.1	6.6	6.9	7.3	8.1
A2	1.0	4.1	8.2	9.4	10.1	10.8	11.5	11.9	12.6	13.9
A3	3.5	8.7	13.3	14.7	15.8	16.9	18.0	18.7	19.6	20.9
Baa1	8.0	16.3	20.7	22.7	23.9	25.6	27.2	28.4	29.4	30.4
Baa2	19.6	31.6	39.0	44.2	47.8	48.4	50.9	52.8	53.7	54.3
Baa3	48.4	70.8	80.8	88.6	93.4	92.2	93.0	93.9	94.4	94.3
Ba1	100.3	136.7	149.2	158.5	164.8	159.4	155.6	153.4	152.0	150.4
Ba2	185.2	241.4	259.9	275.2	285.6	270.9	257.2	248.1	243.3	239.1
Ba3	269.8	303.7	320.5	338.3	359.9	344.3	330.5	322.4	317.3	315.0
B1	449.3	467.2	482.4	494.3	509.6	477.7	454.6	438.1	427.5	421.5
B2	640.2	590.8	582.0	577.4	584.2	541.3	507.5	481.0	463.0	449.3
B3	1,039.0	857.2	813.2	802.3	811.9	747.8	710.0	683.4	660.2	644.6
Caa1	1,483.6	1,127.6	1,034.1	1,013.0	1,028.9	950.1	905.6	880.3	865.6	864.3
Caa2	2,086.5	1,469.3	1,290.1	1,226.7	1,227.2	1,121.6	1,054.0	1,011.6	989.3	980.5
Caa3	4,092.0	2,890.0	2,455.8	2,337.0	2,384.7	2,152.4	2,000.4	1,905.0	1,862.5	1,869.4
Ca	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0	7,300.0

Table A. Prescribed Baseline Default Costs (in bps) using Moody's Data as of Feb 2008

# Table B. Default Cost Margin (in bps) included in Table A

70CTE Margin	1	2	3	4	5	6	7	8	9	10
Aaa	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Aa1	0.0	0.1	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7
Aa2	0.1	0.4	0.7	0.9	0.9	1.0	1.1	1.2	1.3	1.3
Aa3	0.2	0.8	1.6	1.9	2.0	2.1	2.3	2.4	2.5	2.7
A1	0.4	1.6	3.1	3.5	3.6	3.9	4.1	4.2	4.4	4.7
A2	0.7	3.1	5.9	6.4	6.5	6.8	7.1	7.2	7.6	8.2
A3	2.6	6.7	9.5	10.0	10.2	10.7	11.2	11.4	11.8	12.3
Baa1	5.9	12.4	14.8	15.4	15.4	16.1	16.9	17.4	17.7	17.9
Baa2	15.7	25.1	30.3	33.6	35.6	34.8	35.9	36.8	36.9	26.6
Baa3	30.9	43.6	46.1	48.0	49.8	46.4	45.2	44.6	43.8	46.7
Ba1	64.1	84.4	85.5	86.4	88.7	81.1	76.5	73.8	71.6	75.6
Ba2	120.3	151.2	153.7	157.1	162.6	146.1	134.9	127.9	123.4	118.8
Ba3	162.6	157.6	155.5	162.7	176.6	157.2	143.8	137.2	133.9	134.0
B1	270.9	243.7	236.4	241.3	254.7	222.9	202.7	191.5	185.8	185.1
B2	367.2	277.2	246.9	239.3	248.2	208.6	180.0	162.2	151.6	146.0
B3	617.0	434.4	392.3	394.0	415.3	365.5	341.3	327.1	316.2	312.9
Caa1	860.9	545.6	469.3	470.6	505.5	450.9	429.2	419.2	414.6	420.0
Caa2	1,155.1	637.9	490.8	451.5	470.9	393.9	347.4	311.2	279.0	253.0
Caa3	2,282.1	1,374.0	1,088.0	1,066.8	1,200.5	1,049.4	975.7	924.8	895.4	897.5
Ca	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0

CTE70	1	2	3	4	5	6	7	8	9	10
AAA	0.0000	0.0942	0.1884	0.2825	0.3767	0.6800	0.9833	1.2866	1.5899	1.8932
AA	0.0492	0.2182	0.3873	0.5563	0.7253	0.8800	1.0347	1.1895	1.3442	1.4989
А	0.0583	0.3600	0.6617	0.9634	1.2651	1.6266	1.9881	2.3496	2.7111	3.0726
BBB	0.5481	1.2977	2.0474	2.7971	3.5467	4.1928	4.8389	5.4850	6.1311	6.7771
BB	2.6013	6.6703	10.7393	14.8082	18.8772	21.0961	23.3149	25.5337	27.7526	29.9714
В	9.9611	16.9257	23.8903	30.8549	37.8196	41.2080	44.5965	47.9850	51.3735	54.7619
CCC	34.5818	41.8637	49.1457	56.4277	63.7096	66.1152	68.5208	70.9263	73.3319	75.7375

# Table C. Empirical CTE 70 Default Rates (%) from Moody's Data as of Feb 2008

# Table D. Prescribed Cumulative Default Rates derived from Moody's Data as of Feb 2008

Rating \ Term	1	2	3	4	5	6	7	8	9	10
Aaa	0.0001%	0.0003%	0.0011%	0.0027%	0.0043%	0.0061%	0.0080%	0.0103%	0.0129%	0.0157%
Aa1	0.0007%	0.0048%	0.0151%	0.0313%	0.0458%	0.0639%	0.0834%	0.1046%	0.1288%	0.1571%
Aa2	0.0017%	0.0128%	0.0393%	0.0701%	0.1004%	0.1354%	0.1715%	0.2107%	0.2576%	0.3142%
Aa3	0.0037%	0.0303%	0.0892%	0.1506%	0.2097%	0.2784%	0.3506%	0.4245%	0.5137%	0.6284%
A1	0.0071%	0.0590%	0.1770%	0.2818%	0.3855%	0.5020%	0.6271%	0.7492%	0.9001%	1.0997%
A2	0.0132%	0.1116%	0.3358%	0.5143%	0.6897%	0.8869%	1.0967%	1.2939%	1.5426%	1.8851%
A3	0.0473%	0.2391%	0.5445%	0.8051%	1.0781%	1.3844%	1.7146%	2.0290%	2.3877%	2.8277%
Baa1	0.1096%	0.4463%	0.8470%	1.2374%	1.6245%	2.0842%	2.5796%	3.0748%	3.5658%	4.0844%
Baa2	0.2684%	0.8635%	1.5933%	2.4024%	3.2287%	3.9116%	4.7777%	5.6428%	6.4307%	7.1958%
Baa3	0.6631%	1.9290%	3.2827%	4.7647%	6.2327%	7.3466%	8.5839%	9.8402%	11.0552%	12.1929%
Ba1	1.3735%	3.7110%	6.0086%	8.4083%	10.7897%	12.4098%	13.9960%	15.6215%	17.2477%	18.7890%
Ba2	2.5368%	6.5040%	10.3058%	14.2473%	18.0898%	20.2970%	22.2031%	24.1689%	26.2970%	28.3259%
Ba3	3.6955%	8.1474%	12.6022%	17.2882%	22.3370%	25.1659%	27.6984%	30.3257%	32.9668%	35.6626%
B1	6.1549%	12.3912%	18.5430%	24.4577%	30.3603%	33.3742%	36.2428%	39.0509%	41.9040%	44.8307%
B2	8.7700%	15.5309%	22.0600%	28.0790%	34.1026%	37.0125%	39.6120%	42.0311%	44.5486%	47.0164%
B3	14.2329%	22.1052%	29.8341%	37.2322%	44.5424%	47.7158%	51.1441%	54.4483%	57.3933%	60.3261%
Caa1	20.3231%	28.5079%	36.7603%	44.9831%	53.2154%	56.6807%	60.4333%	64.2277%	67.8897%	71.6386%
Caa2	28.5824%	36.2037%	44.2010%	52.0905%	60.1578%	63.2458%	66.4304%	69.6787%	73.0350%	76.3641%
Caa3	56.0548%	63.5055%	70.7783%	78.6366%	86.1597%	87.7061%	89.3719%	91.1008%	92.9422%	94.8089%
Ca	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%

orted Version of I	Exhibit 22 - Ar	nual Average	e Defaulted B	ond and Loan	Recoverv Ra	ates. 1982-20	07*
		lindan in orage	Donalanoa D				
			Sr.	Sr.		Jr.	
Summary	Sr. Secured	Sr. Secured	Unsecured	Subordinate	Subordinate	Subordinate	
Statistics	Bank Loans	Bonds	Bonds	d Bonds	d Bonds	d Bonds	All Bond
	51.40	33.81	21.45	19.82	12.31	7.79	22.21
	53.40	37.98	23.81	20.75	15.94	10.70	25.18
	58.80	39.23	29.69	23.21	18.19	13.50	25.50
	61.13	40.00	35.79	25.64	19.09	15.50	30.18
	66.16	43.00	36.66	26.06	22.60	16.85	32.31
	67.59	46.54	37.01	28.01	24.42	30.58	34.33
	67.74	47.58	37.13	29.61	24.51	36.50	35.53
	68.32	48.14	38.04	30.88	26.36	47.00	35.57
	73.43	48.37	41.63	33.41	29.99	48.50	38.98
	74.67	48.39	41.87	34.30	31.86	62.00	39.65
	75.25	55.40	43.81	34.57	33.77	NA	40.69
	75.44	59.22	45.24	37.27	35.64	NA	41.54
	75.82	62.02	47.60	41.41	35.96	NA	43.08
	76.02	62.05	49.19	41.82	38.04	NA	43.28
	78.75	63.46	49.41	43.50	38.23	NA	43.64
	82.07	69.25	51.02	43.75	39.42	NA	43.66
	87.74	71.00	52.60	44.73	40.54	NA	45.49
	88.23	71.93	52.72	44.81	41.54	NA	45.57
	NA	72.50	53.73	44.99	42.58	NA	45.89
	NA	73.25	54.25	46.54	44.15	NA	48.38
	NA	74.63	54.88	48.09	44.26	NA	49.39
	NA	75.50	55.02	49.40	46.89	NA	50.48
	NA	80.54	56.10	50.16	51.25	NA	53.53
	NA	83.63	60.16	51.91	56.11	NA	55.02
	NA	NA	62.73	54.47	94.00	NA	55.97
	NA	NA	62.75	67.88	NA	NA	59.12
suer-weighted,	based on 30-	day post-defa	ult market pr	ices. Discour	nted debt exc	luded.	
oan recoveries	in 2007 are b	ased on 5 loa	ans from 2 is:	suers, one of	the 5 loans is	s 2nd lien deb	t
bservations	18	24	26	26	25	10	26
0 CTE	30%	30%	30%	30%	30%	30%	30%
bs. for 70 CTE	5.4	7.2	7.8	7.8	7.5	3.0	7.8
70CTEestimate	59.7%	40.1%	30.7%	23.9%	18.8%	10.7%	28.3%
h70CTFestimate	60.9%	41.2%	31.6%	24.7%	19.6%	11.9%	29.3%

# Table E. Development of Prescribed Recovery Rates from Moody's Data as of Feb 2008

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40.3%

58.6%

18.3%

31.5%

45.9%

14.5%

24.6%

39.1%

14.5%

19.2%

36.3%

17.1%

10.7%

28.9%

18.2%

29.1%

41.7%

12.6%

60.2%

71.2%

11.0%

70 CTE

Mean

Margin

Years to				Moody's	s / S&P Investr	ment Grade Ra	ating			
Maturity	Aaa/AAA	Aa∜AA+	Aa2/AA	Aa3/AA-	A∜A+	A2/A	A3/A-	Baa1/BBB+	Baa2/BBB	Baa3/BBB-
1	115.2	132.6	150.0	154.0	158.1	162.1	170.9	179.8	188.6	250.5
2	116.6	135.2	153.7	157.7	161.8	165.8	175.9	186.0	196.1	255.5
3	118.0	137.7	157.4	161.4	165.5	169.5	180.9	192.2	203.6	260.5
4	119.4	140.3	161.1	165.1	169.1	173.1	185.8	198.4	211.1	265.5
5	120.8	142.8	164.8	168.8	172.7	176.7	190.7	204.7	218.7	270.6
6	122.2	145.4	168.5	172.4	176.4	180.3	195.6	210.9	226.2	275.6
7	123.6	147.9	172.2	176.1	180.0	183.9	200.5	217.1	233.7	280.6
8	124.1	148.9	173.6	177.5	181.4	185.3	202.4	219.5	236.6	282.5
9	124.6	149.9	175.1	179.0	182.8	186.7	204.3	222.0	239.6	284.5
10	125.1	150.8	176.5	180.4	184.2	188.1	206.2	224.4	242.5	286.5
11	125.3	151.1	176.9	180.8	184.6	188.5	206.8	225.1	243.4	287.1
12	125.4	151.4	177.4	181.2	185.1	188.9	207.3	225.8	244.2	287.6
13	125.6	151.7	177.8	181.6	185.5	189.3	207.9	226.5	245.1	288.2
14	125.7	152.0	178.2	182.0	185.9	189.7	208.5	227.2	246.0	288.8
15	125.9	152.3	178.6	182.5	186.3	190.2	209.1	227.9	246.8	289.3
16	126.1	152.6	179.1	182.9	186.8	190.6	209.6	228.7	247.7	289.9
17	126.2	152.9	179.5	183.3	187.2	191.0	210.2	229.4	248.6	290.5
18	126.4	153.2	179.9	183.7	187.6	191.4	210.7	230.1	249.4	291.1
19	126.5	153.4	180.3	184.1	188.0	191.8	211.3	230.8	250.3	291.7
20	126.7	153.8	180.8	184.6	188.4	192.2	211.9	231.5	251.2	292.3
21	126.9	154.1	181.2	185.0	188.8	192.6	212.4	232.2	252.0	292.8
22	127.0	154.3	181.6	185.4	189.2	193.0	213.0	232.9	252.9	293.4
23	127.2	154.6	182.0	185.8	189.6	193.4	213.5	233.6	253.7	293.9
24	127.3	154.9	182.5	186.3	190.0	193.8	214.1	234.3	254.6	294.5
25	127.5	155.2	182.9	186.7	190.5	194.3	214.7	235.1	255.5	295.1
26	127.7	155.5	183.3	187.1	190.9	194.7	215.2	235.8	256.3	295.7
27	127.8	155.8	183.7	187.5	191.3	195.1	215.8	236.5	257.2	296.3
28	128.0	156.1	184.2	188.0	191.7	195.5	216.4	237.2	258.1	296.9
29	128.1	156.4	184.6	188.4	192.1	195.9	216.9	237.9	258.9	297.4
30	128.3	156.7	185.0	188.8	192.5	196.3	217.5	238.6	259.8	298.0

# Table F. Illustrative Current Benchmark Spreads as of 11/30/2007 for Investment Grade Bonds

Years to				Moody	s / S&P Below	Investment G	rade Rating			
Maturity	Ba∜BB+	Ba2/BB	Ba3/BB-	B1/B+	B2/B	B3/B-	Caa∜CCC+	Caa2/CCC	Caa3/CCC-	Ca/CC
1	312.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
2	315.0	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
3	317.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
4	320.0	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
5	322.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
6	325.0	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
7	327.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
8	328.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
9	329.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
10	330.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
11	330.8	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
12	331.0	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
13	3313	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
14	331.6	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
15	3319	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
16	332.2	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
17	332.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
18	332.8	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
19	333.1	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
20	333.4	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
21	333.6	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
22	333.9	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
23	334.2	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
24	334.5	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
25	334.8	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
26	335.1	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
27	335.4	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
28	335.7	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
29	335.9	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9
30	336.2	374.4	443.5	512.6	581.7	683.2	784.8	886.3	987.8	1,100.9

# Table G. Illustrative Current Benchmark Spreads as of 11/30/2007 for Below Investment Grade Bonds

Years to				Moody	s / S&P Investr	ment Grade Ra	ating			
Maturity	Aaa/AAA	Aa1∕AA+	Aa2/AA	Aa3/AA-	A1∕A+	A2/A	A3/A-	Baa1/BBB+	Baa2/BBB	Baa3/BBB-
1	40.2	42.1	44.0	519	59.7	67.6	92.2	116.9	141.5	201.6
2	46.9	49.5	52.0	59.8	67.5	75.3	99.4	123.6	147.7	205.7
3	53.6	56.8	60.0	67.7	75.3	83.0	106.6	130.3	153.9	209.9
4	60.3	64.1	67.9	75.5	83.0	90.6	113.8	136.9	160.1	214.0
5	67.1	71.5	75.9	83.4	90.8	98.3	121.0	143.6	166.3	218.1
6	73.8	78.8	83.8	912	98.6	106.0	128.1	150.3	172.4	222.2
7	80.6	86.2	918	99.1	106.4	113.7	135.3	157.0	178.6	226.3
8	83.2	89.1	94.9	102.2	109.4	116.7	138.1	159.6	181.0	227.9
9	85.8	91.9	98.0	105.2	112.4	119.6	140.9	162.1	183.4	229.5
10	88.4	94.8	101.1	108.3	115.4	122.6	143.7	164.7	185.8	2311
11	89.2	95.6	102.0	109.2	116.3	123.5	144.5	165.5	186.5	231.6
12	89.9	96.4	102.9	110.1	117.2	124.4	145.3	166.3	187.2	232.1
13	90.7	97.3	103.8	110.9	118.1	125.2	146.1	167.0	187.9	232.5
14	915	98.1	104.7	111.8	119.0	126.1	146.9	167.8	188.6	233.0
15	92.3	99.0	105.6	112.7	119.9	127.0	147.8	168.5	189.3	233.5
16	93.0	99.8	106.5	113.6	120.8	127.9	148.6	169.3	190.0	233.9
17	93.8	100.6	107.4	114.5	121.6	128.7	149.4	170.0	190.7	234.4
18	94.6	101.5	108.3	115.4	122.5	129.6	150.2	170.8	191.4	234.9
19	95.3	102.3	109.2	116.3	123.4	130.5	151.0	17 1.6	192.1	235.3
20	96.1	103.1	110.1	117.2	124.3	131.4	151.9	172.4	192.9	235.9
21	96.9	104.0	111.0	118.1	125.1	132.2	152.7	173.1	193.6	236.3
22	97.6	104.8	111.9	119.0	126.0	133.1	153.5	173.9	194.3	236.8
23	98.4	105.6	112.8	119.9	126.9	134.0	154.3	174.7	195.0	237.3
24	99.2	106.5	113.7	120.8	127.8	134.9	155.2	175.4	195.7	237.7
25	100.0	107.3	114.6	121.6	128.7	135.7	155.9	176.2	196.4	238.2
26	100.7	108.1	115.5	122.5	129.6	136.6	156.8	176.9	197.1	238.7
27	101.5	109.0	116.4	123.4	130.5	137.5	157.6	177.7	197.8	239.1
28	102.3	109.8	117.3	124.3	131.4	138.4	158.4	178.5	198.5	239.6
29	103.0	110.6	118.2	125.2	132.2	139.2	159.2	179.2	199.2	240.1
30	103.8	111.5	119.1	126.1	133.1	140.1	160.0	180.0	199.9	240.5

# Table H. Illustrative 7y Mean Benchmark Spreads as of 11/30/2007 for Investment Grade Bonds

Years to				Moody':	s / S&P Below	Investment G	rade Rating			
M aturity	Ba∜BB+	Ba2/BB	Ba3/BB-	B1/B+	B2/B	B3/B-	Caa1/CCC+	Caa2/CCC	Caa3/CCC-	Ca/CC
1	2617	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
2	263.8	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
3	265.8	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
4	267.9	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
5	270.0	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
6	272.0	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
7	274.1	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
8	274.9	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
9	275.7	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
10	276.5	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
11	276.7	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
12	276.9	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
13	277.2	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
14	277.4	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
15	277.6	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
16	277.9	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
17	278.1	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
18	278.3	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
19	278.6	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
20	278.8	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
21	279.1	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
22	279.3	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
23	279.5	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
24	279.8	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
25	280.0	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
26	280.2	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
27	280.5	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
28	280.7	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
29	280.9	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9
30	2812	321.8	397.0	472.3	547.5	758.8	970.2	1,181.5	1,392.8	1,641.9

Table I. Illustrative 7y Mean Benchmark Spreads as of 11/30/2007 for Below Investment Grade Bonds

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VM-20 090612 001

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Academy Life Reserve Work Group, David Neve, Chair – Prescribed default assumptions on below investment grade assets.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20: Requirements for Principles-based Reserves for Life Products dated 6/12/09 Section 8.F.1.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (Please red-line it from the current version with existing changes already accepted. You may do this through an attachment.)

Insert the following drafting note at the end of Section 8.F.1

**Drafting Note:** To address the concern that investing in lower quality assets could increase discount rates and thus reduce the minimum reserve, default assumptions (or the approach to determine default assumptions) will be prescribed for starting assets rated below investment grade (for example, assets rated below NAIC 2). The intent is to cap the spread on –starting assets rated below investment grade at a level that does not give "credit" in the discount rate for higher spreads on below investment grade assets. Further research and analysis is needed to:

- Define what is meant by "investment grade" for this purpose;
- Define the exact nature of the prescribed default assumptions or the prescribed approach to determine default assumptions for below investment grade assets; and
- Determine the approach used to identify the specific assets that are subject to this prescribed assumption (for example, when there is no specific quality rating of an asset, or there are conflicting ratings).
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Some regulators have expressed a concern with the current approach in VM-20 that defines the discount rate to be equal to the path of net asset earned rates, since this may create an incentive for companies to invest in lower quality assets to increase discount rate in order to reduce the minimum reserve. The LRWG believes this concern can be adequately addressed by capping the default assumption on below investment grade assets at a level that gives no "credit" in the discount rate for higher spreads above treasuries on below investment grade assets.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

# Dates: ReceivedReviewed by StaffDistributedConsidered4/30/08JLETabled - 5/6/08Notes: Carryover from VM-20\_080922\_011. Carry over from VM-20\_080922\_003.<br/>Carryover from VM-20\_090122\_002.<br/>..

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# VM-20 090612 002

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen - New York State Insurance Department - Discount Rate

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20: Requirements for Principles-Based Reserves for Life Products dated 6/12/09 paragraph Section 8.H.4.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and Identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

#### Section 8. Assumptions

- H. Net Asset Earned Rates and Discount Rates
  - 4. The company shall use the path of net asset earned rates as the discount rates for each model segment in the deterministic reserve calculations in Section 3 with the following exceptions:
    - a. For the Deterministic Reserve the Net Asset Earned Rates used in the projections shall be no greater than the applicable corresponding historical U.S. Treasury yield rates most closely coinciding with the dates of purchase and maturity structure of supporting assets, plus 50 basis points.
    - b. For the Stochastic Reserve the Net Asset Earned Rates used in the projections shall, on average over all scenarios, be no greater than the applicable corresponding historical U.S. Treasury yield rates most closely coinciding with the dates of purchase and maturity structure of supporting assets, plus 75 basis points.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Using a discount rate higher than the risk-free rate would imply that the policyholders should not see their insurance benefits as being guaranteed and should instead view them as being exposed to the default risk of the insurer's assets. Some net spread for illiquidity may be appropriate, in that a company would not necessarily need to hold liquid assets to back insurance liabilities.

There may be cases where an entity can consistently "beat the market" by investing in assets that have spreads in excess of expected defaults. However, we believe this instance to be rare and not sustainable and thus we do not believe that the door should be opened for the possibility of a company holding lower reserves due to the setting of inappropriate default assumptions. This is a level playing field issue as well as a reserve adequacy issue in that taking on additional risk in assets should not result in lower reserves.

We believe the value of a liability should be independent of the assets supporting it, consistent with the international approach.

We support insurers being able to set their own assumptions in areas where they have control over the factor (e.g., mortality with company-specific underwriting). However, there should be more structure applied to the setting of assumptions where experience is limited or an insurer is exposed to the same risks as other insurers.

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VM-20 090612 003

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

John Bruins, ACLI, Revise the need to additional margins when projecting NGE.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20: Requirements for Principles-Based Reserves for Life Products dated 6/12/09 paragraph Section 6.C.4.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and Identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

#### Section 6. Cash Flow Models

- C. Non-Guaranteed Element Cash Flows
  - 1. The company shall include non-guaranteed elements in the cash flow models used to project future cash flows for both the deterministic reserve and the stochastic reserve. When a non-guaranteed element is based on some aspect of experience, the company shall reflect future changes in the level of non-guaranteed element in the cash flow models based on the experience assumed in each scenario.
  - 2. The company may not assume that the projected non-guaranteed element changes simultaneously with the change in projected experience, but rather only at the date following the recognition of a change in experience on which the company would normally implement a change.
  - 3. When determining the projected non-guaranteed element for each scenario, the company shall take into consideration those factors that affect how the company will modify its current non-guaranteed element scale, such as existence of contract guarantees, the company's past non-guaranteed element practices and current non-guaranteed element policies.

# 4. The company shall establish a margin for the projected non guaranteed element that increases the minimum reserve.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The reserve should assume that the actuary is appropriately following professional standards, as well as the instructions in 6.C.1, 2, and 3 above, and that a margin for management not following its own strategy is unnecessary. Today, any deviations in actual NGE relative to a company's plan flows through surplus, and we don't see that there is a reason to change this treatment and set up a reserve for such possible changes.

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VM-20 090612 004

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Amanda Fenwick (NY) - Credit for Reinsurance

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principles-based Reserves for Life Products dated 6/12/09.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

#### Section 3. Deterministic Reserve

The company shall calculate the deterministic reserve as follows:

- A. Calculate the seriatim reserve for each policy equal to the actuarial present value of benefits, expenses, and related amounts less the actuarial present value of premiums and related amounts where:
  - 1. Cash flows are projected in compliance with the applicable requirements in Sections 6, 7 and 8 over the single economic scenario described in Section 6.E.3.
  - 2. Present values are calculated using the path of discount rates for the corresponding model segment determined in compliance with Section 6.H.4.
  - 3. The actuarial present value of benefits, expenses and related amount equals the sum of
    - a. Present value of future benefits;

Guidance Note: Future benefits include but are not limited to death and cash surrender benefits.

- b. Present value of future expenses;
- c. Policy account value invested in the separate account at the valuation date; and
- d. Policy loan balance at the valuation date with appropriate reflection of any relevant due, accrued, or unearned loan interest, if policy loans are explicitly modeled under Section 6.E.
- 4. The actuarial present value of premiums and related amounts equals the sum of the present values of
  - a. Future gross premium payments and/or other applicable revenue;
  - b. Future net cash flows to or from the general account or from or to the separate account;
  - c. Future net policy loan cash flows, if policy loans are explicitly modeled under Section 6.E;

d. Future net reinsurance cash flows determined in compliance with Section 7;

e. The future net reinsurance aggregate cash flows allocated to such policy as described in Subsection E of this section; and

- fd. The future derivative liability program net cash flows (i.e., cash received minus cash paid) that are allocated to such policy.
- B. Calculate the per policy reserve for each policy as the greater of the seriatim reserve and the cash surrender value for the policy-adjusted for reinsurance as described in Subsection D.4 of this section.

# Section 7. Reinsurance

- B. Reinsurance Ceded
  - 2. The company shall calculate a gross reserve using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance. If the group of policies is required to perform stochastic modeling when the reinsurance is excluded, then the stochastic modeling shall be performed for the gross reserve even if not required for the minimum reserve. The company shall determine the credit for reinsurance ceded as the excess, if any, of the gross reserve over the minimum reserve. If a reinsurance agreement is considered inforce as specified in Section 8.A.4 the ceding company may recognize a credit for reinsurance calculated as RD + RA, where:
    - a. RD = the present value of future net reinsurance discrete cash flows, determined by discounting these future net cash flows using the path of discount rates for the corresponding model segment;
    - b. RA = the present value of the future net reinsurance aggregate cash flows allocated to such policy as described in Section 4.d.5, determined by discounting these future net cash flows using the path of discount rates for the corresponding model segment.
  - 3. The company shall use assumptions that represent company experience in the absence of reinsurance and assuming that the business was managed in a manner consistent with the manner that retained business is managed.

**Guidance Note:** The assumptions used to calculate the gross reserve are to some degree hypothetical, since this is not the situation that actually occurs. For example, assets backing ceded reserves may be held by the assuming company, not the ceding company.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The minimum statutory formula reserves are Gross Reserves. A credit for reinsurance is recognized if the reinsurance agreement meets the requirements for reinsurance accounting. The reserve methodology in VM-20 should specify the Gross Reserve and the methodology for determining the Credit for Reinsurance.

The incorporation of reinsurance cash flows should be included in the Section of VM20 regarding the credit for reinsurance, not in the calculation of the minimum reserves.

In addition the wording in the guidance note should be removed.

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VM-20\_090612\_005

# Amendment Proposal Form\*

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen (NY) – Equity returns in deterministic reserve

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

6/12/09 VM-20 Draft, Section 6.H.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

# Section 6. Cash Flow Models

- H. Determination of Net Asset Earned Rates and Discount Rates
  - 4. The company shall use the path of net asset earned rates as the discount rates for each model segment in the deterministic reserve calculations in Section 3, and the stochastic exclusion test in Section 5. The path of equity returns will be a 3% annual return.
  - 5. The company shall use the path of one-year U.S. Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the stochastic reserve calculations in Section 4 and the modified deterministic reserve in Section 5.

**Guidance Note**: The use of different discount rate paths for the seriatim and scenario reserves is driven by differences in methodology. The seriatim reserve is based on a present value of all liability cash flows, with the discount rates reflecting the investment returns of the assets backing the liabilities. The scenario reserve is based on a starting estimate of the reserve, and assets that support that estimate, plus the greatest present value of accumulated deficiencies. Here, the discount rates are a standard estimate of the investment returns of only the marginal assets needed to eliminate either a positive or negative deficiency.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

To make the Deterministic Reserve a meaningful proxy for an economic tail CTE value, it needs to account for the volatility of equity returns.

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Dates: Received	Reviewed by Staff	Distributed	Considered				
7/9/08	/9/08 JLE Tabled 7/24/08						
<b>Notes:</b> Carryover from V Carryover from VM-20_	/M-20_080329_032. Car 090122_008	ryover from VM-20_080	0922_013.				

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VM-20\_090612\_006

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Bob DiRico, Chair, American Academy of Actuaries Consistency Work Group

The recommended changes are proposed in order to make the NGE requirement of VM-20 and other Principle-based Approaches consistent with one another and consistent with the definition in VM-01

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

The document to change is the 6/12/09 draft of VM-20

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

# OLD VERSION

# Section 6. Cash Flow Models

- C. Non-Guaranteed Element Cash Flows
  - 1. The company shall include non-guaranteed elements in the cash flow models used to project future cash flows for both the deterministic reserve and the stochastic reserve. When a non-guaranteed element is based on some aspect of experience, the company shall reflect future changes in the level of non-guaranteed element in the cash flow models based on the experience assumed in each scenario.
  - 2. The company may not assume that the projected non-guaranteed element changes simultaneously with the change in projected experience, but rather only at the date following the recognition of a change in experience on which the company would normally implement a change.
  - 3. When determining the projected non-guaranteed element for each scenario, the company shall take into consideration those factors that affect how the company will modify its current non-guaranteed element scale, such as existence of contract guarantees, the company's past non-guaranteed element practices and current non-guaranteed element policies.
  - 4. The company shall establish a margin for the projected non-guaranteed element that increases the minimum reserve.
  - 5. The company shall report any liability for dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, the company shall exclude any dividends that are included in the separate liability from the reserve cash flow projection.

Drafting Note: The reporting requirements for NGE's should be reviewed.

**Drafting Note:** The LRWG is considering a procedure whereby the treatment of non-guaranteed elements outlined above would apply only to policies that have material tail risk, as defined by a test. A simplified procedure is under development for policies that do not have material tail risk.

#### NEW VERSION

#### Section 6. Cash Flow Models

- C. Non-Guaranteed Element Cash Flows
  - 1. Include non-guaranteed elements (NGE) that are based on some aspect of the policy's or contract's experience or on the competitive environment in the models used to project future cash flows beyond the time the company has authorized their payment or crediting. Future changes in the level of NGE in the cash flow models should be based on the experience assumed in each Scenario.
  - 2. For NGE that are not based on some aspect of the policy's or contract's experience, include any payment or crediting already authorized by the company in the models used to project future cash flows. Do not include non-experience-based NGE that are not already authorized by the company unless the company determines that inclusion is appropriate based on its practices in dealing with the competitive environment or based on its established NGE policy
  - 3. The projected NGE used in the model shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
    - a. <u>the nature of contractual guarantees;</u>
    - b. the company's past NGE practices and established NGE policies;
    - c. <u>the timing of any change in NGE relative to the date of recognition of a change in experience;</u>
    - d. the source of any past non-experience based payment or crediting; and
    - e. the benefits and risks to the company of continuing to authorize NGE.
  - 4. <u>Projected NGE should be established in a way that does not eliminate the margin in the Minimum</u> <u>Reserve.</u>
  - 5. <u>Projected levels of NGE in the cash flow model must be consistent with the experience</u> <u>assumptions used in each scenario. Policyholder Behavior Assumptions in the model must be</u> <u>consistent with the NGE assumed in the model.</u>
  - 6. Report any liability for dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date separately from the Minimum Reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, exclude any dividends that are included in the separate liability from the reserve cash flow projection
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

The old section contains language and requirements that are not consistent with the definition and that, in the view of the Academy, should not have been part of the document. Additionally, it was felt that more guidance was needed in certain areas.

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Dates: Received	Reviewed by Staff	Distributed	Conside	ered				
9/2/08	JLE		Tabled	10/29/08;	Discussed	2/12/09;		
			Withdray	wn 11/12/09				
Notes: Carryover from VM-20 080329 039								
New York suggested that	New York suggested that if a NGE is illustrated it should be included in the projection. Need more information from							
mutual companies.								
Carryover from VM-20	Carryover from VM-20 080922 017. Carryover from VM-20 090122 010.							

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VM-20 090612 007

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

American Academy of Actuaries Life Reserves Work Group, David Neve, Chair

Eliminate the requirement in VM-20 that the credibility adjusted experience rates be "mapped" to a published mortality table when determining the prudent estimate assumption for mortality.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principle-based Reserves for Life Products dated 6/12/09, E.2.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (Please red-line it from the current version with existing changes already accepted. You may do this through an attachment.)

See attached document entitled: "Mapping to Published Table, VM-20"

4. State the reason for the proposed amendment (You may do this through an attachment.)

The current VM-20 draft requires that once the company's credibility adjusted experience rates have been determined, the resulting rates must then be used to "map" to a corresponding published mortality table. The mapping is accomplished by calculating a preliminary seriatim reserve using the credibility adjusted experience rates and then selecting an industry table that produces a seriatim reserve that is at least as large as the preliminary seriatim reserve. This "mapping" was incorporated in VM-20 for reasons that are no longer necessary. Thus, this proposal eliminates this "mapping" requirement as part of the process to determine the prudent estimate mortality assumption.

Note: as a point of clarification, the process of applying the underwriting criteria scoring procedure to select an appropriate industry basic table for credibility weighting purposes is being maintained. Similarly, the process to select the industry prudent estimate mortality table (under the simplified method) by applying the underwriting criteria scoring procedure is also being maintained. Both of these processes are different from the "mapping" process described above that is being eliminated under this proposal.

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Dates: Received	Reviewed by Staff	Distributed	Considered
11/14/08	JLE		Tabled 2/5/09
Notes: Carryover from V	/M-20_080922_020. Ca	ryover from VM-20_090	0122_012.

#### Section 8. Assumptions

# C. Prudent Estimate Mortality Assumptions

- 1. Procedure for Setting Prudent Estimate Mortality Assumptions
  - a. The company shall determine credibility segments for the purpose of determining which policies will qualify for the simplified method described in Subsection C.1.e. The determination of each credibility segment shall be subject to the following:
    - i. Each credibility segment shall consist of policies with similar underwriting and mortality experience characteristics.
    - ii. The company may group policies with different plans of insurance into the same credibility segment, if underwriting and mortality experience characteristics are similar for all the policies.

**Guidance Note:** It is anticipated that most companies will define a credibility segment to be a block of policies with similar underwriting rules, such as guaranteed issue, or regularly underwritten policies.

- iii. The company shall remove from the credibility segments any policies for which the experience is reflected through adjustments to the prudent estimate mortality rate assumptions under Paragraph f below, including policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.
- b. The company shall determine mortality segments for the purpose of determining separate valuation mortality tables by grouping policies within each credibility segment that the company expects will have similar underwriting characteristics and mortality experience.
- c. The company shall determine the credibility data set subject to the following:
  - i. The credibility data set for each credibility segment includes all in force and claim data pertaining to the last three years prior to the valuation date for all policies currently in the credibility segment or that would have been in the credibility segment at any time during the three- year period.
  - ii. The company shall use actual mortality experience data directly applicable to the credibility segment when available.
  - iii. The company shall use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the credibility segment have underwriting and mortality experience characteristics similar to those of the policies in the pool and the aggregate pool data are available to the company.
  - iv. The company shall update the mortality experience described in subparagraphs i and ii above at least once every three years.
- d. If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall use the following procedure to determine prudent estimate assumption for the credibility segment:
  - i. Select a credibility procedure meeting the requirements in Subsection C.2 below.

- ii. Use the underwriting scoring procedure described in Subsection C.3 below to determine which of the valuation basic tables shall serve as the industry table for that mortality segment required by the selected credibility procedure.
- iii. Determine the mortality experience rates and apply the selected credibility procedure to determine credibility adjusted experience rates, as provided in Subsection C.4 below.
- iv. Determine margin as provided in Subsection C.5 below.
- v. Set the prudent estimate mortality assumption to equal to the corresponding rates in the commissioners' table for which the seriatim reserve for the mortality segment is nearest to, but not less than, the seriatim reserve using the credibility adjusted experience rates increased by the margin.

**Guidance Note**: Based on a Limited Fluctuation Method calculation which sets the standard for full credibility as being within 3% of the true value with 90% probability, assuming a Poisson distribution for the number of deaths and assuming no variation in net amount at risk, the number of deaths required for 10% credibility is 30 and for 20% credibility it is 120. Note that the credibility data set includes all deaths within the three years prior to the valuation date. Because the purpose of the credibility criterion is to provide a simple test that would improve the efficiency of the principles-based valuation process by exempting small blocks of business, it may be appropriate to determine the level of deaths that is consistent with this goal by, for example, surveying small companies.

- e. If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall use the following simplified method to determine prudent estimate assumption for the credibility segment:
  - i. Determine the applicable valuation basic table using the underwriting scoring procedure described in Subsection C.3.
  - ii. Set the prudent estimate mortality assumption for each mortality segment within the credibility segment equal to the mortality rates in the commissioners' table that correspond to the applicable valuation basic table determined in Subparagraph e.i. above.
- f. Adjust the prudent estimate mortality assumptions to reflect differences associated with impaired lives, and differences due to policyholder behavior if there is a reasonable expectation that due to conditions such as changes in premiums or other policy provisions, policyholder behavior will lead to mortality results that vary from the mortality results that would otherwise be expected.
  - i. The adjustment for impaired lives shall follow established actuarial practice, including the use of mortality adjustments determined from clinical and other data.
  - ii. The adjustment for policyholder behavior shall follow accepted actuarial practice, including the use of dynamic adjustments to base mortality.

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# VM-20\_090612\_008

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen, New York State Insurance Department - Revise Revenue Sharing section

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principle-based Reserves for Life Products dated 6/12/09 - Section 8.G.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

#### Section 8. Assumptions

- G. Revenue Sharing Assumptions
  - 1. The company may include income from projected future revenue sharing (as defined in these requirements equals gross revenue sharing income (GRSI) net of applicable projected expenses (net revenue sharing income)) in cash flow projections, if:
    - a. The GRSI is received by the company;
    - b. Signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the GRSI; and
    - c. The GRSI is not already accounted for directly or indirectly as a company asset.: and
    - <u>d.</u> <u>The GRSI is contractually guaranteed to the insurer and its liquidator, receiver, conservator, or statutory successor.</u>
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

There should be guidance in so that revenue sharing must be contractually guaranteed.

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Dates: Received	Reviewed by Staff	Distributed	Considered
2/10/08	JLE		Tabled 3/14/09
<b>Notes:</b> Wait to see what Carryover from VM-20_	happened to revenue sha 090122_016.	aring during the past few	months.

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# VM-20\_090612\_009

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen (NY) - Calculation of Reinsurance Credit

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principles-based Reserves for Life Products, draft dated 6/12/09.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

#### **Revise Section 7.B.2 as follows:**

#### Section 7. Reinsurance

- B. Reinsurance Ceded.
  - 2. The company shall calculate a gross reserve using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance. If the group of policies is required to perform stochastic modeling when the reinsurance is excluded, then the stochastic modeling shall be performed for the gross reserve even if not required for the minimum reserve. The company shall determine the credit for reinsurance ceded as the excess, if any, of the gross reserve over the minimum reserve.

Credit for Reinsurance. The company shall determine the reinsurance reserve credit from the assuming company's perspective as RD + RA, where

- a. RD = the present value of future net reinsurance discrete cash flows, determined by discounting these future net cash flows using the path of discount rates for the corresponding model segment;
- b. RA = the present value of the future net reinsurance aggregate cash flows allocated to such policy as described in Section 4.d.5, determined by discounting these future net cash flows using the path of discount rates for the corresponding model segment.
- 3. Preliminary gross reserve. The company shall calculate a preliminary gross reserve using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance. In the calculation of the preliminary gross reserve, Tthe ceding company shall use assumptions that represent company experience in the absence of reinsurance and assuming that business was managed in a manner consistent with the manner the retained business is managed.
- 4. Gross reserve. The gross reserve is the greater of the following:

a. The preliminary gross reserve; and

4. State the reason for the proposed amendment?

Because it is important to accurately calculate the collateral amount held by the assuming company, it is important to accurately calculate the reserve credit from the assuming company's perspective.

b. The sum of the minimum reserve and the reinsurance reserve credit.

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# Dates: Received Reviewed by Staff Distributed Considered 3/3/09 JLE Tabled 6/12/09 Notes: Carryover from VM-20\_090122\_019. VM-20\_090122\_019.

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VM-20 090612 010

# Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

AAA Life Reserves Work Group, David Neve, Chair- clarify the requirements to determine assumption margins.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principles-based Reserves for Life Products, draft dated 6/12/09, Section 8.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (Please red-line it from the current version with existing changes already accepted. You may do this through an attachment.)

# Section 8. Assumptions

# B. Assumption Margins

The company shall include a margin to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor, or combination of risk factors that is not stochastically modeled or prescribed, subject to the following:

**Guidance Note:** Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

- 1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks and outcomes.
- 2. If the company is unable to establish margins as described in Paragraph 1 above, the company shall determine margins for each assumption independently in compliance with this section. However, if applicable, the level of margins may take into account the fact that risk factors may not be 100% correlated by utilizing an appropriate method to determine the amount of correlation., unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination.

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

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The proposed wording provides greater clarity in how the company reflects the covariance between multiple risk factors when establishing margins.

<sup>\*</sup> This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated.
NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
4/20/09	JLE		Discussed 6/12/09; Withdrawn 10/15/09
Notes: Carryover from V	/M-20_090122_020.		

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# VM-20\_090612\_011

# Amendment Proposal Form\* (NAIC Research Division)

# 1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Frank Horn, New York State Department of Insurance - clarify the requirements to determine assumption margins.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principles-based Reserves for Life Products, draft dated 6/12/09, Section 8.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (Please red-line it from the current version with existing changes already accepted. You may do this through an attachment.)

#### Section 8. Assumptions

B. Assumption Margins

The company shall include a-margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor, or combination of risk factors that is not stochastically modeled or prescribed, subject to the following:

**Guidance Note:** Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

- 1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks.
- 21. If the company is unable to establish margins as described in Paragraph 1 above, tThe company shall determine <u>an explicit set of margins for each material</u> assumption independently, in compliance with this section, unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination. For a particular assumption, margins for different durations shall reflect that in some cases an increase is conservative, and in others a decrease is conservative. If applicable, the level of a particular margin may be adjusted to be less adverse to take into account the fact that risk factors are not normally 100% correlated. However, such margin may not be reduced to an amount that is less than 75% of the initially determined margin, since under adverse circumstances margins may become more heavily correlated than under less adverse circumstances. Examples of assumptions that are generally considered material include but are not limited to mortality, morbidity, interest, equity returns, expenses, lapses, partial withdrawals, loans, and option elections.

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

4. State the reason for the proposed amendment? (You may do this through an attachment.)

It is impossible to verify the reasonableness of a reserve if each assumption is not reasonable and justified.

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NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered				
5/15/09	JLE		Discussed 6/12/09; Withdrawn 10/15/09				
Notes: Replaced VM-20_090122_007. Carryover from VM-20_090122_025.							

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VM-20\_090612\_013

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen, New York State Insurance Department – guidance on setting non-prescribed, non-stochastic assumptions when experience is less than fully credible

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 dated 6/12/09, Section 8.A. and 8.B.

3. Show what changes are needed:

# Section 8. Assumptions

- A. General Assumption Requirements
  - 1. The company shall determine prudent estimate assumptions in compliance with this section for each risk factor that is not prescribed or is not stochastically modeled by applying a margin to the anticipated experience assumption for the risk factor.
  - 2. The company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of the Standard Valuation Law and must periodically review and update the assumptions as appropriate in accordance with these requirements.
  - 3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 6:
    - a. Interest rate movements (i.e., Treasury interest rate curves) and
    - b. Equity performance (e.g., S&P 500 returns and returns of other equity investments).
  - 4. If the company elects to stochastically model risk factors in addition to those listed in A.3 above, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.
  - 5. In determining the stochastic reserve the company shall use prudent estimate assumptions that are consistent with those assumptions used for determining the deterministic reserve, modified as appropriate to reflect the effects of each scenario.
  - 6. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company <u>and blending the relevant company experience with the industry experience or other data using a blending process that is based on a credibility methodology that is recognized by the actuarial profession and is acceptable to the commissioner.</u>

The appointed actuary shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the appointed actuary shall set a new, adequate, anticipated experience assumption for the factor.

# B. Assumption Margins

- 1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks. [C.5.4.2]
- 2. If the company is unable to establish margins as described in Paragraph 1 above, the company shall determine margins for each assumption independently in compliance with this section, unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination. [C.5.4.3]
- 3. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger minimum reserve than would otherwise result. For example, the company shall use a higher margin when: [C.5.4.4]
  - a. The experience data are either not relevant or not credible of less relevance or lower credibility.
  - b. The experience data are of lower quality, such as incomplete, internally inconsistent, or not current.
  - c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to recent changes in circumstances or changes in company policies.
  - d. There are constraints in the modeling that limit an effective reflection of the risk factor.

4. State the reason for the proposed amendment?

There is a gap in the current general assumption wording in that it does not address the situation of having partially credible experience or provide requirements for updating an assumption.

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NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered			
5/21/09	JLE		Discussed 7/16/09, Withdrawn 7/30/09			
Notes: Carryover from VM-20 090122 027.						
Change "blending process that is based on a credibility methodology" to "blending process that is consistent						
with a credibility methodology"						
Change "The appointed actuary shall annually review" to "The company annually review"						
Fred Andersen will revise the language 7/16/09						

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### VM-20\_090612\_014

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

John Bruins, ACLI, Refine the requirements on the modeling of nonguaranteed elements (NGE)

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM20, 6/12/09, Section 6.C

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 6. Cash Flow Models

- C. Non-Guaranteed Element Cash Flows
  - 1. The company shall include non guaranteed elements in the cash flow models used to project future cash flows for both the deterministic reserve and the stochastic reserve. When a non guaranteed element is based on some aspect of experience, the company shall reflect future changes in the level of non guaranteed element in the cash flow models based on the experience assumed in each scenario. Except as noted in 5. below, the company shall include non-guaranteed elements (NGE) in the models to project future cash flows beyond the time the company has authorized their payment or crediting. Future NGE amounts should be adjusted in each scenario to reflect changes in experience in the NGE amounts.
  - 2. The company may not assume that the projected non-guaranteed element changes simultaneously with the change in projected experience, but rather only at the date following the recognition of a change in experience on which the company would normally implement a change. The projected NGE shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
    - a. the nature of contractual guarantees;
    - b. the company's past NGE practices and established NGE policies;
    - c. the timing of any change in NGE relative to the date of recognition of a change in experience;
    - d. the benefits and risks to the company of continuing to authorize NGE.
  - 3. When determining the projected non-guaranteed element for each scenario, the company shall take into consideration those factors that affect how the company will modify its current non-guaranteed element scale, such as existence of contract guarantees, the company's past non-guaranteed element practices and current non-guaranteed element policies. Projected NGE should be established in a way that does not eliminate the margin in the minimum reserve.
  - 4. The company shall establish a margin for the projected non guaranteed element that increases the minimum reserve. Projected levels o fNGE in the cash flow model must be consistent with the experience assumptions used in each scenario. Policyholder behavior assumptions in the model must be consistent with the NGE assumed in the model.

- 5. The company shall report any liability for dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, the company shall exclude any dividends that are included in the separate liability from the reserve cash flow projection. For any portion of an NGE that is not based on some aspect of the policy's or contract's experience, that portion should not be included unless it has been authorized for payment by the Board of Directors.
- 6. Report any liability for dividends declared by not yet paid that has been establisted according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, exclude any dividends that are included in the separate liability from the reserve cash flow projection.

#### Drafting Note: The reporting requirements for non-guaranteed elements should be reviewed.

**Drafting Note:** The LRWG is considering a procedure whereby the treatment of non guaranteed elements outlined above would apply only to policies that have material tail risk, as defined by a test. A simplified procedure is under development for policies that do not have material tail risk.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

should not be included in the NGE unless or until it is authorized by the board.

Dividends or NGE that arise from a source other than the policy cash flows considered in the modeling will, unless adjusted, result in a reserve for future payment. These payments are under the authority of the Board of Directors to declare or not declare, and should not be reserved in advance.

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Dates: Received	Reviewed by Staff	Distributed	Considered	
6/12/09	JLE		Discussed 6/12/09; Adopted 7/16/09	
Notes: Carryover from VM-20_090122_030				
Add a drafting note that section 5 need to be reworded to provide clarification that income not reflected in the model				

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VM-20 090612 015

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Sheldon Summers, California Department of Insurance, reinsurance counter-party credit risk

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20, 6/12/09, Subsection 7.D.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 7. Reinsurance

- D. Reinsurance Assumptions
  - 9. If a ceding company has knowledge that an assuming company is financially impaired, t<u>T</u>he ceding company shall establish a margin for default by the assuming company. In the absence of knowledge that the assuming company is financially impaired, the ceding company is not required to establish a margin for default by the assuming company.
  - 10. If an assuming company has knowledge that a ceding company is financially impaired, t<u>T</u>he assuming company shall establish a margin for default by the ceding company. Such margin may be reduced or eliminated if the assuming company has a right to terminate the reinsurance upon non-payment by the ceding company. In the absence of knowledge that a ceding company is financially impaired, the assuming company is not required to establish a margin for default by the ceding company.
  - 11. In setting margins to reflect potential uncertainty regarding the receipt of cash flows from a counterparty, the company shall take into account the ratings, risk-based capital ratio or other available information related to the probability of default by the counterparty, as well as any security or other factor limiting the impact on cash flows.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

The proposed replacement language would require recognition of reinsurance counter-party credit risk in the calculation of reserves. The current language in VM-20 only requires a margin for counter-party credit risk when the reinsurance counter-party is known to be impaired.

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Dates: Received	Reviewed by Staff	Distributed	Considered
6/12/09	JLE		Rejected 8/21/09
Notes: Carryover from V	/M-20_090122_031.		

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### VM-20\_090612\_016

# Amendment Proposal Form\*

## (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

John Bruins, ACLI, Refine the requirements on the modeling of nonguaranteed elements (NGE)

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM20, 6/12/09, Section 6.C

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 6. Cash Flow Models

C. Non-Guaranteed Element Cash Flows

For purposes of this Section, Non-guaranteed Elements includes both non-guaranteed elements and policyholder dividends. In Sections 4 and 5, this Valuation Manual defines methods to value the obligations of the company relative to life contracts under more realistic methods and assumptions than under the prior valuation law. Since these methods consider additional revenues, dividends and non-guaranteed elements resulting from those additional revenue sources need to be considered or the resulting reserves may be too low. The presence of NGE's, as anticipated payments but not obligations, should not increase the reserves beyond what that reserve would be if experience was such as to not justify any NGE. That is, they should be viewed as an offset to excess income, not as an obligation to be valued.

- Except as noted in 5. below, t<u>T</u>he company shall include non-guaranteed elements (NGE) in the models to project future cash flows <u>that would be expected to be paid based on the experience of</u> <u>the model projection</u>. <u>beyond the time the company has authorized their payment or crediting</u>. Future NGE amounts should be adjusted in each scenario to reflect changes in experience in the NGE amounts, and must be consistent with the experience assumptions used in each scenario. -
- 2. The projected NGE shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
  - a. the nature of contractual guarantees;
  - b. the company's past NGE practices and established NGE policies;
  - c. the timing of any change in NGE relative to the date of recognition of a change in experience;
  - d. the benefits and risks to the company of continuing to authorize NGE.

3. <u>The pProjected NGE should transition from the current scale to future experience in a way that reflects: be established in a way that does not eliminate the margin in the minimum reserve.</u>

_	a.	the company's past NGE practices and established NGE policies;
_	b.	the timing of any change in NGE relative to the date of recognition of a change
	in expe	rience; and
_	с.	the elimination of that portion of the current scale which is based on a source of
	income	that is not considered in the model.

- 4. Projected levels of NGE in the cash flow model must be consistent with the experience assumptions used in each scenario. Policyholder behavior assumptions in the model must be consistent with the NGE assumed in the model.
- 5. For any portion of an NGE that is not based on some aspect of the policy's or contract's experience, that portion should not be included unless it has been authorized for payment by the Board of Directors.
- 64. Report any liability for dividends declared by not yet paid that has been <u>establisted established</u> according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, exclude any dividends that are included in the separate liability from the reserve cash flow projection.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Dividends or NGE that arise from a source other than the policy cash flows considered in the modeling will, unless adjusted, result in a reserve for future payment. Since the focus of Statutory Accounting is to measure a company's ability to meet it obligations, or guarantees, this is drafted to provide for the appropriate level of NGE to include in the modeling.

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Dates: Received	Reviewed by Staff	Distributed	Considered
7/22/09	JLE		Withdrawn 11/12/09
Notes: Replaces VM-20	_090612_014		

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VM-20\_090612\_017

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen, New York State Insurance Department – guidance on setting non-prescribed, non-stochastic assumptions when experience is less than fully credible

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 dated 6/12/09, Section 8.A.

3. Show what changes are needed:

Add wording at the end of Section 8.A.6., as follows:

### Section 8. Assumptions

- A. General Assumption Requirements
  - 1. The company shall determine prudent estimate assumptions in compliance with this section for each risk factor that is not prescribed or is not stochastically modeled by applying a margin to the anticipated experience assumption for the risk factor.
  - 2. The company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of the Standard Valuation Law and must periodically review and update the assumptions as appropriate in accordance with these requirements.
  - 3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 5:
  - a. Interest rate movements (i.e., Treasury interest rate curves) and
  - b. Equity performance (e.g., S&P 500 returns and returns of other equity investments).
  - 4. If the company elects to stochastically model risk factors in addition to those listed in A.3 above, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.
  - 5. In determining the stochastic reserve the company shall use prudent estimate assumptions that are consistent with those assumptions used for determining the deterministic reserve, modified as appropriate to reflect the effects of each scenario.
  - 6. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.

For each company risk factor (including lapse) that is quantifiable and can be expected to have similar characteristics as an industry risk factor, the relevant company experience would be blended with the industry experience or other data using a blending process and applying a credibility procedure that is consistent with accepted actuarial practice.

The appointed actuary shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the appointed actuary shall set a new, adequate, anticipated experience assumption for the factor.

Change Section 8.B.3., as follows:

### Section 8. Assumptions

- 3. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger minimum reserve than would otherwise result. For example, the company shall use a higher margin when:
  - a. The experience data are either not relevant or not credible have less relevance or lower credibility.
- 4. State the reason for the proposed amendment?

There is a gap in the current general assumption wording in that it does not address the situation of having partially credible experience or provide requirements for updating an assumption.

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NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
7/24/09	JLE		Adopted 10/15/09
Notes:			

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### VM-20\_090612\_018

# Amendment Proposal Form

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Frank Horn, New York State Department of Insurance

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

6/12/2009 VM-20 Exposure Draft

3. Show what changes are needed

### Section 8. Assumptions

B. Assumption Margins

The company shall include <u>a</u>-margin<u>s</u> to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor<del>, or combination of risk factors</del> that is not stochastically modeled or prescribed, subject to the following:

**Guidance Note:** Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

- Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks.
- 2<u>1</u>. If the company is unable to establish margins as described in Paragraph 1 above, t<u>T</u>he company shall determine <u>an explicit set of initial</u> margins for each <u>material</u> assumption independently (i.e., ignoring any correlation among risk factors) in compliance with this section. \_, unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination. For a particular assumption, margins for different durations shall reflect that in some cases an increase is conservative, and in others a decrease is conservative. If applicable, the level of a particular initial margin may be adjusted to take into account the fact that risk factors are not normally 100% correlated. However, the initially determined margin may only be reduced to the extent the company can demonstrate that the method used to justify such a reduction is appropriate under adverse circumstances since risk factors may become more heavily correlated under adverse circumstances. Examples of assumptions that are generally considered material include but are not limited to mortality, morbidity, interest, equity returns, expenses, lapses, partial withdrawals, loans, and option elections.

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

<u>32</u>. The greater the uncertainty in the anticipated experience assumption...

<sup>4.</sup> State the reason for the proposed amendment? (You may do this through an attachment.)

It is very important for verification and auditing purposes that each assumption be reasonable on its own

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NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered	
8/7/09	JLE		Discussed 8/13/09; Withdrawn 11/12/09	
			because of VM-20_090612_24	
Notes: Will coordinate with the Academy to reconcile with VM-20_090612_019.				

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### VM-20\_090612\_019

# **Amendment Proposal Form\***

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

AAA Life Reserve Work Group, David Neve, Chair Clarify the requirements to determine assumption margins.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principle-based Reserves for Life Products, draft dated 6/12/09, Section 8.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 8. Assumptions

B. Assumption Margins

The company shall include a margin to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor, or combination of risk factors that is not stochastically modeled or prescribed, subject to the following:

Guidance Note: Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

- 1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks.
- 2. Generally, establishing a margin on each assumption without considering interdependence and/or covariance between the related risk factors may distort the total actual or expected risk in a product. To the extent a company determines the margins for two or more assumptions in combination under 8.B.1, the company shall be guided by the objective to establish the margins such that the resulting minimum reserve approximates the minimum reserve that would be calculated using a multivariate probability distribution that incorporates the jointly determined risk factors together with the stochastically-generated economic variables.

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

4. State the reason for the proposed amendment? (You may do this through an attachment.)

By switching the order of the paragraphs, the primary emphasis is on determining margins for each assumption independently. Additional language clarifies that the purpose of determining margins for two or more assumptions in combination is to reflect interdependence and/or covariance between the underlying risk factors.

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Dates: Received	Reviewed by Staff	Distributed	Considered
8/11/09	JLE		Withdrawn 10/15/09; See VM-
			20_090612_024
Notes:			

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### VM-20 090612 022

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Steve Ostlund, Alabama Actuary, proposing VM20 consideration of clarifying use of prudent estimate assumptions

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20-PBR-Life\_ED7, draft 6-12-09, incorporating amendments through VM-20\_090612\_021, (modified to insert "use" for "determine" in 8.A.1.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 8. Assumptions

- A. General Assumption Requirements
  - 5. In determining the stochastic reserve the company shall use prudent estimate assumptions that are consistent with those <u>prudent estimate</u> assumptions used for determining the deterministic reserve, modified as appropriate to reflect the effects of each scenario.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Amendment 21 was intended to assure prudent estimate assumptions were used for the deterministic reserve, but my concern is, without amendment, section 5 may create a loophole.

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Dates: Received	Reviewed by Staff	Distributed	Considered
8/20/09	JLE		Adopted 11/12/09
Notes:			

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### VM-20\_090612\_023

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

American Academy of Actuaries' Life Reserve Work Group, David Neve, Chair Clarify the requirements on determining anticipated experience assumptions.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-20 Requirements for Principle-based Reserves for Life Products, draft dated 6/12/09, Section 8.A.6

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 8. Assumptions

- 6. \_\_\_\_\_The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for anyeach material risk factor. To the extent that company\_utilizing its own experience in combination with applicable industry data and other experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.
  - a. For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables, or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.
  - b. For risk factors (such as premium patterns on flexible premium contracts) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as the current situation with some lapse assumptions) to which statistical credibility theory can be appropriately applied, but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:
    - i. Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations;
    - ii. Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data;

- iii.Blending any available relevant company experience with any available relevant<br/>industry experience and/or other applicable data using weightings established in<br/>a manner that is consistent with accepted actuarial practice and that reflects the<br/>risk characteristics of the underlying policies and/or company practices.
- c. For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

To clarify the requirements on when credibility methods are to be used to determine anticipated experience assumptions, and provide examples of alternative techniques when credibility methods are not applicable.

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 Dates: Received
 Reviewed by Staff
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 Image: Considered
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 Notes:
 Image: Considered
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VM-20 090612 024

### Amendment Proposal Form (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Fred Andersen, New York State Department of Insurance

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

6/12/2009 VM-20 Draft

3. Show what changes are needed

Section 8. Assumptions

B. Assumption Margins

The company shall include a margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor, or combination of risk factors that is not stochastically modeled or prescribed, subject to the following:

**Guidance Note:** Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks.

2<u>1</u>. If the company is unable to establish margins as described in Paragraph 1 above, t<u>The</u> company shall determine <u>an explicit set of initial</u> margins for each <u>material</u> assumption independently (i.e., ignoring any correlation among risk factors) in compliance with this section.  $\frac{1}{5}$  unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination. Next, <u>Hif</u> applicable, the level of a particular initial margin may be adjusted to take into account the fact that risk factors are not normally 100% correlated. However, in recognition that risk factors may become more heavily correlated as circumstances become more adverse, the initially determined margin may only be reduced to the extent the company can demonstrate that the method used to justify such a reduction is reasonable considering the range of scenarios contributing to the CTE calculation or considering the scenario used to calculate the deterministic reserve as applicable or considering appropriate adverse circumstances for risk factors not stochastically modeled.

Assumptions that are generally considered material include but are not limited to mortality, morbidity, interest, equity returns, expenses, lapses, partial withdrawals, loans, and option elections.

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

32. The greater the uncertainty in the anticipated experience assumption...

### 4. State the reason for the proposed amendment? (You may do this through an attachment.)

It is very important for verification and auditing purposes that each assumption be reasonable on its own

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Dates: Received	Reviewed by Staff	Distributed	Considered	
8/28/09	JLE		Amended and adopted 11/12/09	
Notes:				
If not stochastically modeled or prescribed, Aassumptions that are generally considered material include but are not				
limited to mortality, m	norbidity, interest, equit	y returns, expenses, la	pses, partial withdrawals, loans, and option	
elections.				

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### VM-30\_090515\_003

# Amendment Proposal Form\*

# (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Shiraz Jetha, WA - Documentation of supporting work and qualification of individual providing support.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-30 5/15/09 Exposure: Section C.1.6 and C.1.12

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 4. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 6. The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has examined the asset and liability records, the reliance section should include only the following statement:

"My examination included such review of the assumptions and methods and of the underlying basic asset and liability records and such tests of the calculations as I considered necessary. I also reconciled the underlying basic asset and liability records to [exhibits and schedules listed as applicable] of the company's current annual statement."

If the appointed actuary has not examined the underlying records, but has relied upon data (e.g., listings and summaries of policies in force or asset records) prepared by the company, the reliance section should include only the following statement:

"In forming my opinion on [specify types of reserves], I relied upon data <u>and/or certain</u> <u>projections/assumptions</u> prepared by [name and title of company officer certifying in force records or other data] as certified in the attached statements. I evaluated that data for reasonableness and consistency. I also reconciled that data to [list applicable exhibits and schedules] of the company's current annual statement. In other respects, my examination included review of the actuarial assumptions and actuarial methods used and tests of the calculations I considered necessary. Documentation which supports the work upon which I have relied has been provided to me by the individuals listed above."

Attached to the appointed actuary's opinion should be a statement by each person relied upon in the form prescribed by Section 4.A.1.

12. If the appointed actuary relies on the certification of others on matters concerning the accuracy or completeness of any data underlying the actuarial opinion, or the appropriateness of any other information used by the appointed actuary in forming the actuarial opinion, the actuarial opinion should so indicate the persons the actuary is relying upon and a precise identification of the items subject to reliance. In addition, the persons on whom the appointed actuary relies shall provide a certification that precisely identifies the specific items on whichinformation that was provided, whether its supporting documentation was included, the person is providing informationa statement as to its accuracy, completeness or reasonableness, as applicable and a statement as to

the accuracy, completeness or reasonableness, as applicable, of the itemsexplains in sufficient detail their own competence, within the context of experience, professional and/or academic qualifications and training, to provide the appointed actuary this information. This certification shall include the signature, <u>name</u>, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

We feel that the area of reliance on work of others needs to be strengthened for PBR. From the regulators' perspective it is important to be satisfied that the work being relied upon by the actuary has been performed under the supervision of individuals who are reasonably qualified through experience, training and/or professional qualifications and that its supporting documentation is accessible both to the actuary and the regulators for review.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
5/6/09	JLE		Tabled 8/18/09; Adopted 10/30/09
Notes: Carryover from V	/M-30_081205_005		

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### VM-30\_090515\_004

### Amendment Proposal Form\* (NAIC Research Division)

### 1. Identify yourself, your affiliation and a very brief description (title) of the issue.

John Bruins, ACLI, Make the reliance letters part of the memorandum rather than the Opinion

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM30 exposed 5/15/09 Section 4. A. 1. d., Section 4. A. 6.; Section 4.A.12.; Section 4.B. 3. (new section)

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 4. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 1. The statement of actuarial opinion shall consist of:
    - d. A reliance section describing those areas, if any, where the appointed actuary has deferred to other experts in developing data, procedures or assumptions, (e.g., anticipated cash flows from currently owned assets, including variation in cash flows according to economic scenarios (see Section 4.A.6), supported by a statement of each such expert in the form prescribed by Section 4.A..10;
  - 6. The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has examined the asset and liability records, the reliance section should include only the following statement:

"My examination included such review of the assumptions and methods and of the underlying basic asset and liability records and such tests of the calculations as I considered necessary. I also reconciled the underlying basic asset and liability records to [exhibits and schedules listed as applicable] of the company's current annual statement."

If the appointed actuary has not examined the underlying records, but has relied upon data (e.g., listings and summaries of policies in force or asset records) prepared by the company, the reliance section should include only the following statement:

"In forming my opinion on [specify types of reserves], I relied upon data prepared by [name and title of company officer certifying in force records or other data] as certified in the attached statements. I evaluated that data for reasonableness and consistency. I also reconciled that data to [list applicable exhibits and schedules] of the company's current annual statement. In other respects, my examination included review of the actuarial assumptions and actuarial methods used and tests of the calculations I considered necessary."

Attached to the appointed actuary's opinion should be a statement by each person relied upon in the form prescribed by Section 4.A.1.

- 12. If the appointed actuary relies on the certification of others on matters concerning the accuracy or completeness of any data underlying the actuarial opinion, or the appropriateness of any other information used by the appointed actuary in forming the actuarial opinion, the actuarial opinion should so indicate the persons the actuary is relying upon and a precise identification of the items subject to reliance. In addition, the persons on whom the appointed actuary relies shall provide a certification that precisely identifies the items on which the person is providing information and a statement as to the accuracy, completeness or reasonableness, as applicable, of the items. This certification shall include the signature, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.
- B. Description of Actuarial Memorandum Including an Asset Adequacy Analysis and Regulatory Asset Adequacy Issues Summary
  - 1. The appointed actuary shall prepare a memorandum to the company describing the analysis done in support of his or her opinion regarding the reserves. The memorandum shall be made available for examination by a commissioner upon request but shall be returned to the company after such examination and shall not be considered a record of the insurance department or subject to automatic filing with a commissioner.
  - 2. In preparing the memorandum, the appointed actuary may rely on, and include as a part of his or her own memorandum, memoranda prepared and signed by other actuaries who are qualified within the meaning of Section 3.A.2, with respect to the areas covered in such memoranda, and so state in their memoranda.
  - 3. If the appointed actuary relies on the certification of others on matters concerning the accuracy or completeness of any data underlying the actuarial opinion, or the appropriateness of any other information used by the appointed actuary in forming the actuarial opinion, the Actuarial Memorandum should so indicate the persons the actuary is relying upon and a precise identification of the items subject to reliance. In addition, the persons on whom the appointed actuary relies shall provide a certification that precisely identifies the items on which the person is providing information and a statement as to the accuracy, completeness or reasonableness, as applicable, of the items. This certification shall include the signature, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed and shall be incorporated into the Actuarial Memorandum.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Certifications of information used by the Appointed Actuary are in the nature of documentation and should be incorporated into the Actuarial Memorandum rather than the Opinion itself. The Opinion should identify those areas where the appointed actuary has relied on another expert, but the documentation of that reliance more appropriately belongs in the memorandum.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
5/26/09	JLE		Tabled 10/30/09; Rejected 12/4/09
Notes: Carryover from V	/M-30_081205_008		

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VM-30\_090515\_005

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

John Bruins, ACLI, RAAIS requirement - submit to domestic regulator

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM30 5/15/09 exposure, Section 4. B. 4.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

The appointed actuary shall prepare a regulatory asset adequacy issues summary, the contents of which are specified in Section 4.B.10. The regulatory asset adequacy issues summary will be submitted to the domiciliary commissioner no later than April 1 of the year following the year for which a statement of actuarial opinion based on asset adequacy is required, and shall be available to all other commissioners on request. A commissioner shall keep the regulatory asset adequacy issues summary confidential to the same extent and under the same conditions as the actuarial memorandum.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Increasing in recent years, commissioners have determined that they do not want to automatically received the RAAIS from all companies every year. At least the following states have stopped automatic submission of the RAAISL: Alaska, Colorado, Idaho, Illinois, Washington. We are therefore asking that the model be set so that submission to the state of domicile is required, but that all others are on request.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
7/27/09	JLE		Amended and adopted 10/16/09
Notes: and shall be avail	able to <del>all<u>any</u> other com</del>	missioners on request	

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VM-30\_090515\_006

# Amendment Proposal Form\*

### (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Katie Campbell, Alaska Department of Insurance

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM30- Draft 5/15/09

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 1. Scope

- A. General
  - 3. The AOM requirements shall be applied in a manner that allows the appointed actuary to utilize his or her professional judgment in performing the actuarial analysis and developing the actuarial opinion and supporting actuarial memoranda, conforming to relevant actuarial standards of practice. However, a state commissioner has the authority to specify methods of actuarial analysis and actuarial assumptions when, in the commissioner's judgment, these specifications are necessary for the actuary to render an acceptable opinion relative to the adequacy of reserves and related actuarial items.
  - 4. These AOM requirements are applicable to all annual statements filed after the operative date of the Valuation Manual. A statement of actuarial opinion on the adequacy of the reserves and related actuarial items and a supporting actuarial memorandum is required each year.

### Definitions

A. The term "actuarial opinion" means the opinion of an appointed actuary regarding the adequacy of reserves and related actuarial items.

### Section 2. General Requirements for Submission of Statement of a Life Actuarial Opinion

- A. General
  - 1. The statement of an appointed actuary, entitled "Statement of Actuarial Opinion," setting forth an opinion relating to reserves and related actuarial items held in support of policies and contracts, in accordance with Section 4.A must be included with an annual statement.

### Section 3. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 1. The statement of actuarial opinion shall consist of:

- A scope section identifying the subjects on which an opinion is to be expressed and c. describing the scope of the appointed actuary's work, including a tabulation delineating the reserves and related actuarial items that have been analyzed for asset adequacy and the method of analysis, (see Section 4.A.5) and identifying the reserves and related actuarial items covered by the opinion that have not been so analyzed;
- 5. The scope section should contain only the following statement (including all specified lines even if the value is zero) if the appointed actuary is using the prescribed wording:

"I have examined the assumptions and methods used in determining reserves, actuarial liabilities and related actuarial items listed below, as shown in the annual statement of the company, as prepared for filing with state regulatory officials, as of December 31, 20\_. Tabulated below are those reserves and related actuarial items which have been subjected to asset adequacy analysis."

	Asset Adequacy Tested Amounts—Reserves and LiabilitiesRelated Actuarial Items					
Statement Item	Formula Reserves (1)	Principles-Based Valuation Reserves (2)	Additional <del>Actuarial</del> Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)

#### Notes:

(a)

6.

The additional actuarial reserves are the reserves established under Section 3.C.2.

- - The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has examined the asset and liability records, the reliance section should include only the following statement:

My examination included such review of the actuarial-assumptions and actuarial-methods and of the underlying basic asset and liability records and such tests of the actuarial calculations as I considered necessary. I also reconciled the underlying basic asset and liability records to [exhibits and schedules listed as applicable] of the company's current annual statement."

The opinion section should include only the following statement if the actuary is using prescribed 7. wording:

"In my opinion the reserves and related actuarial-values items concerning the statement items identified above:

- Are computed in accordance with presently accepted Actuarial Standards of Practice a. consistently applied and are fairly stated, in accordance with sound actuarial principles;
- Are based on actuarial assumptions and methods that produce reserves at least as great as b. those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions;
- Meet the requirements of the Insurance Laws and regulations of the state of [state of c. domicile]; and are at least as great as the minimum aggregate amounts required by the state in which this statement is filed;

- d. Are computed on the basis of assumptions and methods consistent with those used in computing the corresponding items in the annual statement of the preceding year-end (with any exceptions noted below); and
- e. Include provision for all actuarial-reserves and related statement <u>actuarial</u> items which ought to be established.

The reserves and related <u>actuarial</u> items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items including, but not limited to, the investment earnings on the assets, and the considerations anticipated to be received and retained under the policies and contracts, make adequate provision, according to presently accepted actuarial standards of practice, for the anticipated cash flows required by the contractual obligations and related expenses of the company. (At the discretion of the commissioner, this language may be omitted for an opinion filed on behalf of a company doing business only in this state and in no other state.)

The actuarial-methods, considerations and analyses used in forming my opinion conform to the appropriate actuarial standards of practice as promulgated by the Actuarial Standards Board, which standards form the basis of this statement of opinion.

- 10. The adoption for new issues or new claims or other new liabilities of an <del>actuarial</del> assumption that differs from a corresponding assumption used for prior new issues or new claims or other new liabilities is not a change in <del>actuarial</del> assumptions within the meaning of this section (i.e. Section 4.A).
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Consistency and to eliminate redundancy.

* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by
the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated.
NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered			
5/15/09	JLE		Adopted 10/16/09			
Notes: Replaced VM-30	Notes: Replaced VM-30-081205_003 by retaining "reserves and related <u>actuarial</u> items" throughout.					

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VM-30\_090515\_007

# Amendment Proposal Form\*

## (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

American Academy of Actuaries' Life Financial Soundness/Risk Management Committee

VM-30 – Key Indicators

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-30, Actuarial Opinion and Memorandum Requirements, 5/15/09 Exposure Draft, Sections 3.A.1-3 and 3.B.10.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 3. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 1. The statement of actuarial opinion shall consist of:
    - a. A table of key indicators to alert the reader to the type of opinion and any changes from the prescribed language (see Section 3.A.3);

### 

- 2. Each section must be clearly designated. For each section there is prescribed wording described in Section 3.A.3 3.A.7 for that section. If the appointed actuary changes this wording or adds additional wording to clarify the prescribed wording, the appropriate box in the table of key indicators must be appropriately checked and the appointed actuary shall provide the following information for that section in the relevant comments section of the opinion:
  - a. a description of the additional or revised wording in the opinion;
  - b. the rationale for using the additional or revised wording; and
  - c. an explanation of the impact, if any, that the additional or revised wording has on the <u>opinion</u>.

The prescribed wording should be modified only if needed to meet the circumstances of a particular case, and the <u>appointed</u> actuary should in any case, use language that clearly expresses the actuary's professional judgment.

3. The table of key indicators is to be at the top of the opinion and is to be completed consistent with the remainder of the opinion. The only options are those presented below:

This opinion is: 
Unqualified 
Qualified 
Adverse 
Inconclusive

Identification Section Prescribed Wording Only	Prescribed Wording with Additional Wording	Revised Wording
Scope Section Prescribed Wording Only	Prescribed Wording with Additional Wording	Revised Wording

	Relia	nce Section Prescribed	n Wording Only	Prescribed Wording with Additional Wording	Revised Wording
	Opin	ion Section	1		
		Prescribed	Wording Only	Prescribed Wording with Additional Wording	Revised Wording
	Relev	ant Comm	nents		
		Revised W	VordingComments are	Included	
		The Actuar Actuar	rial Memorandum inc ial Standard of Practi	cludes "Deviation from Standard" wording regardin	ng conformity with an
*****	*****	********	*****	*****	
	В.	Descrij Adequa	ption of Actuarial Me acy Issues Summary	morandum Including an Asset Adequacy Analysis	and Regulatory Asset
		10.	The regulatory asse	et adequacy issues summary shall include:	
			a. The follow	ving key indicator. The only options are those prese	ented below:
			This opinion is unq	ualified: 🗆 Yes 🗆 No	
			If the response is ' unqualified in a ma	'No", the appointed actuary shall explain the rease nner that is satisfactory to the commissioner.	on(s) why the opinion is not

\*\*\*\*\*\*\*\* THE REMAINDER OF THIS SUBSECTION NEEDS TO BE RENUMBERED \*\*\*\*\*\*\*\*

4. State the reason for the proposed amendment? (You may do this through an attachment.)

While we understand the need for the requirement to identify whether prescribed wording is used in the opinion, we do not support the first component of proposed key indicators in Section 3.A.3, which would require the appointed actuary to classify the opinion as unqualified, qualified, adverse or inconclusive, for the following reasons:

- a. The opinion itself is typically a 2-3 page document, and we believe the appointed actuary takes great care in wording the opinion. The requirement to condense the opinion into one of four words, all of which are defined in a very general manner and none of which are supported by Actuarial Standards of Practice, and the requirement to do so in a public document, is potentially harmful to the appointed actuary.
- b. The proposed terms may be very confusing to those outside the actuarial profession. For example, the ideal is to receive an unqualified opinion from a qualified actuary; and it is possible for an opinion to be neither "qualified" nor "unqualified."
- c. The classification of the opinion into one of four words could be misinterpreted as changing the 2-3 page opinion provided. For example, it is possible that someone could mistakenly conclude that an "unqualified" opinion means the appointed actuary believes reserves will be adequate under all possible future conditions.
- d. The terms could also be confusing within the actuarial profession. A 2004 survey of appointed actuaries (included in the 2004 Asset Adequacy Analysis Practice Note published on the Academy website) shows eight different criteria for what they would consider to be a "qualified" opinion. Some of those definitions could encompass the way in which proposed VM-30 defines "adverse" and "inconclusive."
- e. We believe that nothing can take the place of the combination of: 1) the requirement for the appointed actuary to properly communicate the opinion; 2) the need for a thorough review of the work performed; and

3) direct communication between the appointed actuary and the regulatory actuary (especially when the first two are not sufficient).

It's important to note that although we do not support the proposal to classify the opinion into one of four single words, we are not opposed to adding provisions to VM-30 that facilitate the review of the opinion.

We do believe the requirement in the current draft of VM-30 to identify whether prescribed wording is used, particularly for the proposed Opinion Section, will provide the regulatory actuary with a strong starting point in this review. For example, it is clear to us that an opinion using "Prescribed Wording Only" throughout would meet the proposed criteria intended for the opinion to be "Unqualified."

We recommend the following:

- i. Move the key indicator describing the type of opinion from section 3.A.3 to section 3.B.10, so that it is addressed in the confidential regulatory asset adequacy issues summary.
- ii. Change this key indicator from a "choice" of four words to an indication of whether or not the opinion is unqualified. This avoids the issue of defining the various "choices."
- iii. Require the appointed actuary to describe and explain where the opinion varies from prescribed and where the opinion is not unqualified, and do so in a manner that is satisfactory to the commissioner.

These modifications will allow regulatory actuaries to identify where the appointed actuary has used language in the opinion that varies from the prescribed language and whether any revised language impacts the opinion. We believe this will address all of the issues raised above.

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NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
10/13/09	JLE		Tabled 10/16/09; Adopted 10/30/09
Notes:			

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VM-30\_090515\_008

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

American Academy of Actuaries' Life Financial Soundness/Risk Management Committee

VM-30 - Additional Reserves and Liabilities

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-30, Actuarial Opinion and Memorandum Requirements, 5/15/09 Exposure Draft, Section 3.A.5.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

	Asset Adequacy Tested Amounts—Reserves and Related Actuarial Items					
Statement Item	Formula Reserves (1)	Principle-Based Reserves (2)	Additional Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)
<b>Exhibit 5</b> A Life Insurance						
B Annuities						
C Supplementary Contracts Involving Life Contingencies						
D Accidental Death Benefit						
E Disability—Active						
F Disability— Disabled						
G Miscellaneous						
Total						
Exhibit 6						
A Active Life Reserve						
B Claim Reserve						
Total						

	Asset Adequacy Tested Amounts—Reserves and Related Actuarial Items					Items
Statement Item	Formula Reserves (1)	Principle-Based Reserves (2)	Additional Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)
Exhibit 7						
Premium and Other Deposit Funds						
Guaranteed Interest Contracts						
Supplemental Contracts						
Annuities Certain						
Dividend Accumulations or Refunds						
Total Exhibit 7						
Exhibit 8 Part 1						
1 Life						
2 Health						
Total Exhibit 8, Part 1						
Separate Accounts (Page 3 of the Annual Statement of the Separate Accounts, Lines 1 and 2)						
Other Reserves and Liabilities Tested						
<u>&lt;<include a<="" u=""> <u>description and the</u> <u>location of other</u> <u>reserves and</u> <u>liabilities tested&gt;&gt;</u></include></u>						

	A	Asset Adequacy Tested Amounts—Reserves and Related Actuarial Items				
Statement Item	Formula Reserves (1)	Principle-Based Reserves (2)	Additional Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)
TOTAL RESERVES						

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The amendment will allow the appointed actuary to include other appropriate reserves or liabilities in the opinion, provided the amounts and the location in the annual statement of those amounts are properly identified and documented. The prescribed table in the current draft will not capture all situations that currently occur in practice and adding a section for additional reserves and liabilities will make it clear that other amounts may need to (and in many situations should) be included in the opinion, and will facilitate the identification and documentation of such amounts.

One example of a potential additional liability is for Reinsurance in Unauthorized Companies, which appears on page 3, line 24.2.

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Dates: Received	Reviewed by Staff	Distributed	Considered				
JLE	8/13/09		Amended and Adopted 10/1609				
Notes: Other Reserves a	Notes: Other Reserves and Liabilities and Related Actuarial Items Tested						

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VM-30 090515 009

# Amendment Proposal Form\*

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Katie Campbell – Reliance language VM-30 – Requirements Specific to Life Actuarial Opinions

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-30, Actuarial Opinion and Memorandum Requirements, 5/15/09 Exposure Draft, Section 3.A.

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### Section 3. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 1. The statement of actuarial opinion shall consist of:

d. A reliance section describing those areas, if any, where the appointed actuary has <u>deferred torelied upon</u> other experts in <u>developing data</u>, <u>procedures or assumptions</u> for <u>data</u>, <u>assumptions</u>, <u>projections</u>, <u>or analysis</u>, (e.g., anticipated cash flows from currently owned assets, including variation in cash flows according to economic scenarios (see Section 3.A.6), supported by a statement of each such expert in the form prescribed by Section 3.A.102; and

6. The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has <u>examined the asset and liability recordsnot relied upon other experts</u> for data, assumptions, projections, or analysis, the reliance section should include only the following statement:

"My examination included <u>sucha</u> review of the <u>assumptions and methodsdata</u>, <u>assumptions</u>, <u>projections</u>, <u>and analysis</u> and of the underlying basic asset and liability <del>recordsdata</del> and such tests of the <u>calculations as assumptions</u>, <u>projections</u>, <u>and analysis</u> I considered necessary. I also reconciled the underlying basic asset and liability <del>records</del><u>data</u> to the <u>extent applicable</u> to [exhibits and schedules listed as applicable] of the company's current annual statement."

If the appointed actuary has not examined the underlying records, but has relied upon data (e.g., listings and summaries of policies in force or asset records) prepared by the companyrelied upon other experts for data, assumptions, projections, or analysis, the reliance section should include only the following statement:

"In forming my opinion on [specify types of reserves], I relied upon data<u>assumptions</u>, <u>projections</u>, <u>or analysis</u> prepared by [name and title of <del>company officer certifying in force records</del> or other datacach expert providing the data, assumptions, projections, or analysis] as certified in the attached statements. I evaluated that data<u>assumptions</u>, projections, or analysis for reasonableness and consistency. I also reconciled that data to the extent applicable to [list applicable exhibits and schedules] of the company's current annual statement. In other respects, my examination included review of the actuarial assumptions, projections, and analysis I considered

necessary. I have received documentation from the experts listed above that supports the data, assumptions, projections, and analysis."

Attached to  $t_{\underline{T}}$  he appointed actuary's opinion shall attach to their opinion should be a statement by each personexpert relied upon in the form prescribed by Section 3.A.12.

- 12. If the appointed actuary relies on <u>other experts on the certification of others on matters concerning</u> the accuracy or completeness of any data underlying the actuarial opinion, or the appropriateness of any other information used by the appointed actuaryfor data, assumptions, projections, or <u>analysis</u> in forming the actuarial opinion, the actuarial opinion should so indicate identify the <u>personsexperts</u> the actuary is relying upon and a precise identification of the <u>itemsinformation</u> <u>provided by the experts-subject to reliance</u>. In addition, the <u>personsexperts</u> on whom the appointed actuary relies shall provide a certification that <u>precisely-identifies the items on which the person is</u> providing information and a statement as to specific information provided, states that supporting <u>documentation was provided</u>, opines on the items on which the person is providing information and describes their qualifications including professional experience, <u>education and training</u>. This certification shall include the signature, <u>name</u>, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

Amendment VM-30\_090515\_003 proposed wording changes to strengthen the area of reliance on work of others. When that amendment was adopted, the subgroup felt additional wording changes may be needed.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
JLE	11/24/09		Adopted 12/4/09
Notes:			

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### VM-00 090921 01

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Christopher H. Hause, President of Hause Actuarial Solutions, representing Consumer Credit Industry Association. Inclusion of an additional definition to bring real estate secured credit-related insurance within VM-26 reserving standards for credit insurance contracts.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-00, Draft 9/21/09, page 7, "CREDIT LIFE AND DISABILITY PRODUCTS"

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

The current definition of credit insurance excludes real estate secured indebtedness from the credit insurance definition. Reserving standards should be prescribed and consistent for all credit related products, including those contracts covering real-estate secured loans.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Dates: Received         Reviewed by Staff		Considered
11/9/09	JLE		Amended and adopted 11/13/09
Notes:			
4 <u>5</u> . Minir contra <u>purpc</u> insura herein	num reserve requirements acts issued on or after the ses of reserves for "otl ance" and "credit disabili as "other credit-related i	s for credit life <u>, and</u> -cred e operative date of the V her credit related insur ity insurance" shall inclu- nsurance."	dit disability <u>and other credit-related insurance</u> /aluation Manual are provided in VM-26. <u>For</u> <u>ance</u> " within VM-26, the terms "credit life ude benefits provided under contracts defined

### **CREDIT LIFE AND DISABILITY PRODUCTS**

- 1. This subsection establishes reserve requirements for all credit life, and credit disability and other creditrelated products defined as follows:
- 2. "Credit life insurance" means insurance on a debtor or debtors, pursuant to or in connection with a specific loan or other credit transaction, to provide for satisfaction of a debt, in whole or in part, upon the death of an insured debtor.

Credit life insurance does NOT include:

- a. Insurance written in connection with a credit transaction that is:
  - i. Secured by a first mortgage or deed of trust; and
  - ii. Made to finance the purchase of real property or the construction of a dwelling thereon, or to refinance a prior credit transaction made for such a purpose;
- b. Insurance sold as an isolated transaction on the part of the insurer and not related to an agreement or a plan for insuring debtors of the creditor.
- c. Insurance on accounts receivable.
- 3. "Credit disability insurance" means insurance on a debtor or debtors to or in connection with a specific loan or other credit transaction, to provide for lump sum or periodic payments on a specific loan or other credit transaction due to the disability of the insured debtor.
- 4. "Other Credit-Related Insurance" means insurance on a debtor or debtors, pursuant to or in connection with a specific loan or other credit transaction, including a real estate secured loan, to provide for satisfaction of a debt, in whole or in part, upon the death or disability of an insured debtor.
  - a. Other Credit-Related insurance includes insurance written in connection with a credit transaction that is:
    - i. Secured by a first mortgage or deed of trust written as credit insurance, debtor group insurance or group mortgage insurance; and
    - ii. Made to finance the purchase of real property or the construction of a dwelling thereon, or to refinance a prior credit transaction made for such a purpose;
  - b. Other Credit-Related insurance DOES NOT include:
    - i. Insurance sold as an isolated transaction on the part of the insurer and not related to an agreement or a plan for insuring debtors of the creditor, and
    - ii. Insurance on accounts receivable.
- 45. Minimum reserve requirements for credit life, and credit disability and other credit-related insurance contracts issued on or after the operative date of the Valuation Manual are provided in VM-26. Within VM-26, the terms "credit life insurance" and "credit disability insurance" shall include benefits provided under contracts defined herein as "other credit-related insurance."

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VM-00 090921 02

## Amendment Proposal Form\* (NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Mike Boerner, Texas Department of Insurance Issue of separate runs for prior versus post VM issues subject to AG43 / VM-21.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-00, Draft 9/21/09, Section II "Reserve Requirements", Second paragraph under "Annuities".

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

### ANNUITY PRODUCTS

- 2. Minimum reserve requirements for variable annuity contracts and similar business, specified in VM-21, shall be those provided by VM-21. <u>The requirements of VM-21</u>, for issues on and after the VM operative date, are the same as the requirements for issues prior to the VM operative date as found in Actuarial Guideline XLIII, Appendix C, of the Accounting Practices and Procedures Manual. Given this equivalence it is acceptable to calculate reserves for issues on and after the VM operative date by applying the VM-21 requirements to all such issues both before and on and after the VM operative date. The minimum reserve requirements of VM-21 are considered "Principle-based Reserve (PBR)" requirements for purposes of the Valuation Manual.
- 4. State the reason for the proposed amendment? (You may do this through an attachment.)

The reason for this amendment is to avoid applying the same resource intensive reserve requirements twice, one for issues before the VM operative date, and a second application for issues on and after the VM operative date, given that the requirements are the same.

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Dates: Received		Reviewed by Staff	Distributed	Considered			
11/13/09		JLE		Amended and adopted 12/4/09			
Notes: 2. Minimu be thos <u>equival</u> <u>Append</u> <u>issued I</u> <u>under V</u> appluin	Notes:         2.       Minimum reserve requirements for variable annuity contracts and similar business, specified in VM-21, shall be those provided by VM-21. The requirements of VM-21, for issues on and after the VM operative date, are equivalent to the requirements for issues prior to the VM operative date as found in Actuarial Guideline XLIII, Appendix C, of the Accounting Practices and Procedures Manual. Because of this equivalence, contracts issued before and after the operative date of the valuation manual may be aggregated for purposes of modeling under VM-21, and it is acceptable to calculate reserves for issues on and after the VM operative date by						
minimu purpose	minimum reserve requirements of VM-21 are considered "Principle-based Reserve (PBR)" requirements for purposes of the Valuation Manual."						

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VM-A\_080228\_01

# **Amendment Proposal Form\***

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Mike Boerner, Texas Department of Insurance Issue referencing the Accounting Practices and Procedures Manual.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-A, Draft 2/28/08

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Reference the applicable sections of Appendix A of the APPM.

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Dates: Received	Reviewed by Staff	Distributed	Considered			
11/13/09	JLE		Amended and adopted 12/4/09			
Notes: Retain the line with A-010						
# VALUATION MANUAL APPENDIX A – VM-A

Draft: 2/28/08

## VM-A VALUATION MANUAL APPENDIX A

This appendix references the following reserve requirements from Appendix A of the Accounting Practices and Procedures Manual which are to be used for policies issued on and after the Valuation Manual operative date unless otherwise provided for in VM-0. "APPM No." is the APPM reference for Appendix A requirements. APPM Appendix A requirements which are copied to the Valuation Manual Appendix A will have the reference provided under "VM Reference" below.

#### **INDEX**

APPM	TITLE	VM Reference
No.		
A-001	Investments of Reporting Entities	N/A
A-010	Minimum Reserves Standards for Individual and Group Health Insurance Contracts	VM-A-010
A-200	Separate Accounts Funding Guaranteed Minimum Benefits Under Group Contracts	VM-A-200
A-205	Illustrative Disclosures of Differences Between NAIC Statutory Accounting	N/A
	Practices and Procedures and Accounting Practices Prescribed or Permitted	
	by the State of Domicile.	
<del>A-225</del>	Managing General Agents	<del>N/A</del>
A-235	Interest-Indexed Annuity Contracts	<del>VM A 235</del>
A-250	Variable Annuities	VM A 250
A-255	Modified Guaranteed Annuities	VM A 255
A-270	Variable Life Insurance	VM-A-270
A-440	Insurance Holding Companies	<del>N/A</del>
A-585	Universal Life Insurance	VM-A-585
A-588	Modified Guaranteed Life Insurance	VM-A-588
A-620	Accelerated Benefits	VM A 620
<del>A-628</del>	Title Insurance	<del>N/A</del>
A-630	Mortgage Guaranty Insurance	<del>N/A</del>
A-641	Long Term Care Insurance	VM A 641
A-695	Synthetic Guaranteed Investment Contracts	VM A 695
A-785	Credit for Reinsurance	<del>N/A</del>
A-791	Life and Health Reinsurance Agreements	<del>N/A</del>
A-812	Smoker/Nonsmoker Mortality Tables for Use in Determining Minimum	<u>VM-A-812</u>
	Reserve Liabilities	
<del>A-818</del>	Determining Reserve Liabilities for Credit Life Insurance Model Regulation	VM A 818
A-820	Minimum Life and Annuities Reserve Standards	VM A 820
A-821	Annuity Mortality Table for Use in Determining Reserve Liabilities for Annuities	<u>VM A 821</u>
A-822	Asset Adequacy Analysis Requirements	VM A 822
A-830	Valuation of Life Insurance Policies (Including the Introduction and Use	VM A 830
	of New Select Mortality Factors)	

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# **Amendment Proposal Form\***

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Mike Boerner, Texas Department of Insurance Issue referencing the Accounting Practices and Procedures Manual.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-A, Draft 2/28/08

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Copy the applicable sections of Appendix A of the APPM.

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Dates: Received	Reviewed by Staff	Distributed	Considered
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Notes:			

## VALUATION MANUAL APPENDIX A – VM-A

Draft: 2/28/08

#### VM-A VALUATION MANUAL APPENDIX A

**Drafting Note:** The following INDEX contains the Valuation Manual reference, "VM-Reference" to reserve requirements to be used for products within the scope of the Valuation Manual unless otherwise provided for in VM-0. These reserve requirements are to be copied from the Accounting Practices and Procedures Manual (APPM) as of the operative date of the Valuation Manual. Each specific requirement to be copied is found under "APPM No" which represents the APPM, Appendix A requirement as of the VM operative date. Thereafter the Valuation Manual may change such requirements as appropriate or as needed for policies issued on and after the VM operative date. <u>"APPM No." is the APPM reference for Appendix A requirements. APPM Appendix A requirements which are copied to the Valuation Manual Appendix A will have the reference provided under "VM Reference" below.</u>

#### INDEX

APPM	TITLE	VM Reference
No.		
A-001	Investments of Reporting Entities	N/A
A-010	Minimum Reserves Standards for Individual and Group Health Insurance Contracts	VM-A-010
A-200	Separate Accounts Funding Guaranteed Minimum Benefits Under Group Contracts	VM-A-200
A-205	Illustrative Disclosures of Differences Between NAIC Statutory Accounting	N/A
	Practices and Procedures and Accounting Practices Prescribed or Permitted	
	by the State of Domicile.	
A-225	Managing General Agents	N/A
A-235	Interest-Indexed Annuity Contracts	VM-A-235
A-250	Variable Annuities	VM-A-250
A-255	Modified Guaranteed Annuities	VM-A-255
A-270	Variable Life Insurance	VM-A-270
A-440	Insurance Holding Companies	N/A
A-585	Universal Life Insurance	VM-A-585
A-588	Modified Guaranteed Life Insurance	VM-A-588
A-620	Accelerated Benefits	VM-A-620
A-628	Title Insurance	N/A
A-630	Mortgage Guaranty Insurance	<del>N/A</del>
A-641	Long Term Care Insurance	VM-A-641
A-695	Synthetic Guaranteed Investment Contracts	VM-A-695
A-785	Credit for Reinsurance	N/ADiscuss
A-791	Life and Health Reinsurance Agreements	N/ADiscuss
A-812	Smoker/Nonsmoker Mortality Tables for Use in Determining Minimum	VM-A-812
	Reserve Liabilities	
A-818	Determining Reserve Liabilities for Credit Life Insurance Model Regulation	VM-A-818
A-820	Minimum Life and Annuities Reserve Standards	VM-A-820
A-821	Annuity Mortality Table for Use in Determining Reserve Liabilities for Annuities	VM-A-821
A-822	Asset Adequacy Analysis Requirements	VM-A-822
A-830	Valuation of Life Insurance Policies (Including the Introduction and Use	VM-A-830
	of New Select Mortality Factors)	

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# **Amendment Proposal Form\***

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Mike Boerner, Texas Department of Insurance Issue referencing the Accounting Practices and Procedures Manual.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-C, Draft 2/28/08

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Reference the applicable sections of Appendix C of the APPM.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
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Notes:			

# VALUATION MANUAL APPENDIX C – VM-C

Draft: 2/28/08

# VM-C VALUATION MANUAL APPENDIX C

**Drafting Note:** <u>This appendix references the following reserve requirements from Appendix C of the Accounting Practices</u> and Procedures Manual which are to be used for policies issued on and after the Valuation Manual operative date unless <u>otherwise provided for in VM-0.</u> <u>"Guideline No." contains the APPM Appendix C reference. APPM Appendix C Actuarial</u> <u>Guidelines which are copied to the Valuation Manual will contain the reference under "VM Reference" below.</u>

Guideline No.	TITLE	VM Reference
Ι	Interpretation of the Standard Valuation Law With Respect to the Valuation of	VM-C-1
	Policies Whose Valuation Net Premiums Exceed the Actual Gross Premium Collected	
II	Reserve Requirements With Respect to Interest Rate Guidelines on Active Life Funds	VM-C-2
	Held Relative to Group Annuity Contracts	
H	Interpretation of Minimum Cash Surrender Benefits Under Standard Nonforfeiture	<del>N/A</del>
	Law for Individual Deferred Annuities	
IV	Actuarial Interpretation Regarding Minimum Reserves for Certain Forms of Term	VM-C-4
	Life Insurance	
V	Interpretation Regarding Acceptable Approximations for Continuous Functions	<del>VM-C-5</del>
VI	Interpretation Regarding Use of Single Life or Joint Life Mortality Tables Draft 20	<del>VM-C-6</del>
	June 1983	
VII	Interpretation Regarding Calculations of Equivalent Level Amounts	VM-C-7
VIII	The Valuation of Individual Single Premium Deferred Annuities	VM-C-8
IX	Form Classification of Individual Single Premium Immediate Annuities for	VM-C-9
	Application of the Valuation and Nonforfeiture Laws	
IX-A	Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under	VM-C-9A
	Structured Settlements	
IX-B	Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under	VM-C-9B
	Individual Single Premium Immediate Annuities	
IX-C	Use of Substandard Annuity Mortality Tables in Valuing Impaired Lives Under	<del>VM-C-9C</del>
	Individual Single Premium Immediate Annuities	
X	Guideline for Interpretation of NAIC Standard Nonforfeiture Law for Individual	<del>N/A</del>
	Deferred Annuities	
<del>XI</del>	Effect of an Early Election by an Insurance Company of an Operative Date Under	<del>N/A</del>
	Section 5 C of the Standard Nonforfeiture Law for Life Insurance	
XII	Interpretation Regarding Valuation and Nonforfeiture Interest Rates. ACTUARIAL	Withdrawn
	GUIDELINE XII WAS WITHDRAWN MARCH 7, 1993.	
XIII	Guideline Concerning the Commissioners' Annuity Reserve Valuation Method	<u>VM-C-13</u>
XIV	Surveillance Procedure for Review of the Actuarial Opinion for Life and Health	<del>VM-C-14</del>
3/3/		
XV	Illustrations Guideline for Variable Life Insurance Model Regulation	<del>N/A</del>
XVI	Calculation of CRVM Reserves on Select Mortality and/or Split Interest	<u>VM-C-16</u>
XVII	Calculation of CRVM Reserves When Death Benefits are not Level	<u>VM-C-17</u>
XVIII	Calculation of CRVM Reserves on Semi-Continuous, Fully Continuous or Discounted	<del>VM-C-18</del>
37137	Continuous Basis	
	1980 CSO Mortality Table With Ten-Year Select Mortality Factors	<u>VM C 19</u>
XX	Joint Life Functions for 1980 CSO Mortality Table	<u>VM-C-20</u>
	Calculation of CRVM Reserves When (B) is Greater Than (a) and Some Rules for	<del>VM-C-21</del>
	Determination of (a)	
XXII	Interpretation Regarding Nonforfeiture Values for Policies With Indeterminate	<del>VM-C-22</del>
	Premiums	
XXIII	Guideline Concerning Variable Life Insurance Separate Account Investments	<del>VM-C-23</del>

### **INDEX**

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# VALUATION MANUAL APPENDIX C – VM-C

Guideline No.	TITLE	VM Reference
XXIV	Guidelines for Variable Life Nonforfeiture Values	<del>VM-C-24</del>
XXV	Calculation of Minimum Reserves and Minimum Nonforfeiture Values for Policies With Guaranteed Increasing Death Benefits Based on an Index	<del>VM-C-25</del>
XVI	Election of Operative Dates Under Standard Valuation Law and Standard Nonforfeiture Law	<del>VM C 26</del>
XVII	Accelerated Benefits	VM-C-27
XVIII	Statutory Claim Reserves For Group Long-Term Disability Contracts With a Survivor Income Benefit Provision	<del>VM-C-28</del>
XIX	Guideline Concerning Reserves of Companies in Rehabilitation	<del>VM-C-29</del>
XXX	Guideline for the Application of Plan Type to Guaranteed Interest Contracts (GICS) With Benefit Responsive Payment Provisions Used to Fund Employee Benefit Plans	<del>VM-C-30</del>
XXXI	Valuation Issues vs. Policy Form Approval	VM-C-31
XXXII	Reserve for Immediate Payment of Claims	<del>VM-C-32</del>
XXXIII	Determining CARVM Reserves for Annuity Contracts With Elective Benefits	<del>VM-C-33</del>
XXXIV	Variable Annuity Minimum Guaranteed Death Benefit Reserves	<del>VM-C-34</del>
XXXV	The Application of the Commissioners Annuity Reserve Method to Equity Indexed Annuities	<del>VM C 35</del>
XXXVI	The Application of the Commissioners Reserve Valuation Method to Equity Indexed Life Insurance Policies	<del>VM-C-36</del>
XXXVII	Variable Life Insurance Reserves for Guaranteed Minimum Death Benefits	<del>VM-C-37</del>
XXXVIII	The Application of the Valuation of Life Insurance Policies Model Regulation ("Model")	<del>VM-C-38</del>
XXXIX	Reserves for Variable Annuities With Guaranteed Living Benefits	<del>VM-C-39</del>
XL	Guideline for Valuation Rate of Interest for Funding Agreements and Guaranteed Interest Contracts (GICS) With Bail-Out Provisions	<del>VM C 40</del>
XLI	Projection of Guaranteed Nonforfeiture Benefits under CARVM	<del>VM-C-41</del>
XLII	The Application of the Model Regulation Permitting the Recognition of Preferred Mortality Tables for Use in Determining Minimum Reserve Liabilities	<del>VM-C-42</del>
XLIV	Group Term Life Waiver of Premium Disabled Life Reserves	<u>VM-C-44</u>
AG App	Appendix to Guidelines – New York State Insurance Department – Maximum Reserve Valuation and Maximum Life Policy Nonforfeiture Interest Rates	VM-C-Interest

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VM-C\_080228\_02

# **Amendment Proposal Form\***

(NAIC Research Division)

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Mike Boerner, Texas Department of Insurance Issue referencing the Accounting Practices and Procedures Manual.

2. Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

VM-C, Draft 2/28/08

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attachment.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

Copy the applicable sections of Appendix C of the APPM.

\* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated. NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
11/13/09	JLE		Deferred 12/409
Notes:			

# VALUATION MANUAL APPENDIX C – VM-C

Draft: 2/28/08

### VM-C VALUATION MANUAL APPENDIX C

**Drafting Note:** The following INDEX contains the Valuation Manual reference, "VM-Reference" to reserve requirements to be used for products within the scope of the Valuation Manual unless otherwise provided for in VM-0. These reserve requirements are to be copied from the Accounting Practices and Procedures Manual (APPM) as of the operative date of the Valuation Manual. Each specific requirement to be copied is found under "Guideline No" which represents the APPM. Appendix C requirement as of the VM operative date. Thereafter the Valuation Manual may change such requirements as appropriate or as needed for policies issued on and after the VM operative date. "Guideline No." contains the APPM Appendix C reference. APPM Appendix C Actuarial Guidelines which are copied to the Valuation Manual will contain the reference under "VM-Reference" below.

Guideline No.	TITLE	VM Reference
Ι	Interpretation of the Standard Valuation Law With Respect to the Valuation of Policies Whose Valuation Net Premiums Exceed the Actual Gross Premium Collected	VM-C-1
II	Reserve Requirements With Respect to Interest Rate Guidelines on Active Life Funds Held Relative to Group Annuity Contracts	VM-C-2
Ħ	Interpretation of Minimum Cash Surrender Benefits Under Standard Nonforfeiture Law for Individual Deferred Annuities	N/A
IV	Actuarial Interpretation Regarding Minimum Reserves for Certain Forms of Term Life Insurance	VM-C-4
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# VALUATION MANUAL APPENDIX C – VM-C

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Fred Andersen, NY 11/10/09

From: Fred Andersen (NY) To: Peter Weber (OH) Date: 11/10/2009 cc: Larry Bruning, Katie Campbell, Mike Boerner, William Carmello, Michael Cebula, Amanda Fenwick, Frank Horn Subject: Alternative approach to stochastic CTE testing

Pete, here is our current thinking on stochastic testing.

1. We think CTE-style stochastic testing is not necessary for most, if not all, life products, including those with reserves sensitive to shifts in interest rates.

2. CTE is necessary for fat tail risks where guarantees are triggered in extreme scenarios but in moderate scenarios.

3. Some life products have reserves insensitive to interest rates.

Obviously, stochastic testing is not necessary for these products. For products with reserves that are sensitive to interest rates, we have found that averaging the results from extreme and moderate scenarios gets around the same answer as using a moderately adverse scenario.

4. The key is finding the right moderately adverse scenario. For some products, it will be an up interest rate scenario. For other products (and most life products) it will be a down interest rate scenario. We could use a mix of several low, high, and volatile scenarios to find the one appropriate for a certain product. The New York 7 or the 16 stochastic exclusion test scenarios provide ideas of what these scenarios could look like.

5. It's possible that there may be a product out there now or in the future that is CTE-appropriate. For instance, if a product had a provision such that a death benefit was only paid if the 20-year Treasury rate reached 10%, then the CTE approach (which includes consideration of extreme

scenarios) would be appropriate.

6. The adjustment to VM-20 could be as follows:

- Change the stochastic exclusion test to the following:

a. Using the Academy's 1,000 scenario generator (possibly with a new mean reversion target), get 7 scenarios that, for a down interest rate-affected product, are at the 99th, 95th, 90th, 85th, 80th, 75th, and 70th percentiles.

b. Calculate the reserves for those scenarios.

c. Weight the seven scenarios as follows: 99th: 5% 95th: 10% 90th: 30% 85th: 30% 80th: 10% 75th: 10% 70th: 5%%

d. Take the weighted average of the reserves and compare them to the average of the reserves at the 85th and 90th percentiles.

e. If the weighted average over the 7 scenarios is substantially higher than the average of the 85th & 90th percentile reserves, then stochastic modeling is required. (This shows that the 95th and 99th percentile results have a higher than expected impact on the CTE reserve, and therefore, CTE is relevant vs. just using a deterministic approach at a lower percentile).

f. If stochastic modeling is not required, then the reserve would be calculated based on modeling a limited number of scenarios (perhaps somewhere between 5 and 20). Perhaps once a block is identified as being at risk for low interest rates or high interest rates, in the future, the reserve would be based on one scenario (appropriate for that risk and probably more conservative than the "one-size-fits-all" deterministic scenario).

This would eliminate the need for most companies to do the 1,000 scenario CTE testing. Note that we believe CTE testing is still valuable for modeling VAGLB's because of the fat-tail nature of that risk.

This idea is in the infant's stage so we probably want to decide if this proposal is going in the right direction, and then we can discuss the details. Feel free to pass this around to others you think would be interested and would have insight.

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# AMERICAN ACADEMY of ACTUARIES

#### Memorandum

To:	Fred Andersen, NYID
CC:	Donna Claire, Academy <sup>1</sup> Life Financial Soundness/Risk Management Committee Chair Dianna Pell, Academy Life Policy Analyst
From:	Nancy Bennett, Academy Economic Scenario Implementation Work Group (ESIWG) Chair
Date:	November 2, 2009

#### SUBJECT: Economic Scenario Generator Question

Fred, you requested the following from the Academy's Economic Scenario Implementation Work Group (ESIWG). Our response follows:

**<u>Request:</u>** Create 6 sets of scenarios for 20-year Treasury rates. The difference between the 6 sets would be the "starting curve" 20-year Treasury rate, which would be the following:

1) 2.5% 2) 3.5% 3) 4.5% 4) 5.5% 5) 7.5% 6) 11.5%

The mean reversion parameter would be constant at 5.5% for each of the six sets of scenarios created. Output would be the 5<sup>th</sup>, 15<sup>th</sup>, 85<sup>th</sup>, and 95th percentile 20-year Treasury rates (as generated by the scenarios) at projection years 5, 10, 20, and 30.

#### ESIWG Response:

Based on 10,000 scenarios, the following statistics were developed. Note that the starting yield curve in each case was not flat, but instead assumed a one-year rate 1% less than the 20-year rate.

<sup>&</sup>lt;sup>1</sup> The American Academy of Actuaries is a 16,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

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	Years since scenario start date						
	0	5	10	15	20	25	30
11.5% start							
5%	11.50%	5.83%	4.27%	3.67%	3.43%	3.29%	3.19%
15%	11.50%	6.91%	5.26%	4.54%	4.21%	4.05%	3.92%
85%	11.50%	12.34%	11.25%	10.01%	9.25%	8.80%	8.45%
95%	11.50%	14.77%	14.24%	13.25%	12.43%	11.68%	11.19%
2.5% start							
5%	2.50%	2.23%	2.44%	2.65%	2.84%	2.93%	2.97%
15%	2.50%	2.56%	2.93%	3.20%	3.43%	3.58%	3.63%
85%	2.50%	4.01%	5.15%	6.02%	6.68%	7.13%	7.42%
95%	2.50%	4.66%	6.22%	7.52%	8.47%	9.12%	9.51%

Although you requested six sets of scenarios, we only produced two sets of scenarios for the highest and lowest starting rate. The other four sets of scenarios will fall in between these two extremes.

## **Observations:**

In producing these statistics, we have made several observations:

1. Starting rates influence the distribution of generated scenarios, as evidenced by the scenarios produced in the tails. As you can see, even after 30 years, you can distinguish between whether you started high or low. Higher rates will be generated from a low starting yield curve and lower rates will be generated from a higher starting yield curve, with the overall distribution being highly influenced by that starting yield curve.

Mean reversion models similar to the Academy's generator model have a "stationary distribution" such that if the starting rates come from that stationary distribution, the next time period has the exact same distribution. Over time, the distribution of projected scenarios will be "attracted to" that stationary distribution. Rates will not remain constant, but the distribution of rates at year N and year N+1 will be the same.

- 2. Mean reversion process is not very strong, with limited influence on the distribution of scenarios. This observation is demonstrated by looking at the scenarios that are generated from a starting rate of 11.5%. The starting rate is very far away from the mean reversion target of 5.5%. For the first 20 years, the rates falling in the 95th percentile are even farther away. In the near term, the high scenario becomes even more extreme in the tails; with a stronger mean reversion assumption, these results would not be produced.
- 3. The farther away the rates are from the mean target, the faster the generator will revert to the mean.
- 4. The mean reversion process moves the center of the distribution to the target mean rate over time. The "speed to reversion" parameter influences how quickly the rates will revert to the mean. To demonstrate the reversion speed, observe how far the percentiles move on the 11.5% vs. 2.5%; the high scenario is farther away from the mean reversion target and the percentiles move more than the low scenario.

Please contact me with any further questions.

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- TO: Thomas Sullivan (CT), Chair, Life Insurance and Annuities (A) Committee
- FROM: Larry Bruning (KS), Chair, Life and Health Actuarial Task Force
- DATE: December 3, 2009
- RE: Valuation Manual

The amendments to the Standard Valuation Law that authorize a principle-based valuation approach for life insurance, annuities, and accident and health insurance was adopted by the Life Insurance and Annuities (A) Committee on a September 9 conference call with two conditions: 1) the valuation manual be completed by the end of 2009; and 2) the valuation manual include minimum formulaic reserves. The amendments were then adopted by the NAIC at the 2009 Fall National Meeting.

These amendments also authorize the use of a valuation manual which will contain the minimum valuation standards for all newly issued policies. For the initial version of the valuation manual, these standards will be identical to those in the Accounting Practices and Procedures Manual except for products specifically identified in the valuation manual to use principle-based reserving.

The valuation manual will not be operational until the amendments to the Standard Valuation Law are adopted by 42 of the 55 jurisdictions of the NAIC and the manual itself is adopted by a vote of 75% of the NAIC holding 75% of the total direct premium written. Plenary has expressed a need for presenting to the legislatures as they consider the Standard Valuation Law amendments a copy of the valuation manual. Because the valuation framework is dynamic, there will continue to be modifications to the valuation manual.

On Friday, LHATF adopted a valuation manual that is composed of the following sections: VM-0, VM-1, VM-21, VM-26 and VM-30. VM-21 defines the principle-based approach to valuation for variable annuities. This section is a rewrite of Actuarial Guideline XLIII, CARVM for variable annuities which becomes effective on December 31, 2009. VM-26 provides for a uniform valuation basis for credit life and disability insurance.

The valuation manual adopted by LHATF contains minimum formulaic reserves. VM-21 has the standard scenario reserve that is a seriatim reserve that cannot be less than the cash surrender value. VM-26 which provides for a uniform valuation basis for credit life and disability insurance is a formulaic reserve.

Work is nearing completion on other valuation manual sections that will become part of the valuation manual through the NAIC revision process. These sections are VM-20 and VM-25. VM-20 is the principle-based valuation approach for Life Insurance Products and VM-25 provides for a uniform valuation basis for health insurance.

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While VM-20 currently contains a minimum reserve floor, work is being done by the American Council of Life Insurers on a net premium reserve which will serve as a formulaic floor in VM-20. This floor would also serve as the reserve for federal income tax purposes and allow insurers with low risk insurance guarantees to avoid the extensive calculations of a principle-based valuation provided certain exclusion tests are met. To date, the Task Force has reviewed some concepts, but the details of the proposal are still being developed by the ACLI. The American Council of Life Insurers has indicated they would present those details by January 1, 2010.

If it is the desire of the A-Committee to wait until VM-20 and VM-25 are complete, prior to sending the amendments to the Standard Valuation Law and valuation manual to State Legislatures, then the Task Force requests that the date for completion of the valuation manual be extended to no later than the August, 2010 National Meeting.

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Draft: 12/4/09 Adopted by Life and Health Actuarial Task Force, 12/4/09

# VALUATION MANUAL

December, 2009

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## I. <u>INTRODUCTION</u>

## AUTHORITY AND APPLICABILITY

The Valuation Manual sets forth the minimum reserve and related requirements for jurisdictions where the Standard Valuation Law, as amended by the NAIC in 2009, or legislation including substantially similar terms and provisions has been enacted by jurisdictions, and this Valuation Manual (VM) are operative. The NAIC Model Standard Valuation Law (SVL) is provided in VM-5 of this Valuation Manual. The reserve requirements in the Valuation Manual satisfy the minimum valuation requirements of the Standard Valuation Law.

Requirements in the Valuation Manual are applicable to life insurance contracts, accident and health insurance contracts and deposit-type contracts as provided in the Valuation Manual. These contracts include the meaning provided by Statutory Statement of Accounting Principle (SSAP) 50 as found in the NAIC Accounting Practices and Procedures Manual (APPM). Annuity contracts are therefore included within the term life insurance contracts unless specifically indicated otherwise in this Valuation Manual.

Minimum reserve requirements are provided in this Valuation Manual for contracts issued on or after the Valuation Manual operative date of [insert the initial VM operative date]. Other requirements are applicable as provided pursuant to the SVL and this Valuation Manual.

## BACKGROUND

As insurance products have increased in their complexity, and as companies have developed new and innovative product designs that change their risk profile, the need to develop new valuation methodologies or revisions to existing requirements to address these changes has led to the development of the Valuation Manual. In addition, the Valuation Manual addresses the need to develop a valuation standard that enhances uniformity among the principle-based valuation requirements across states and insurance departments. Finally, the Valuation Manual defines a process to facilitate future changes in valuation requirements on a more uniform, timely and efficient basis.

The goals of the National Association of Insurance Commissioners (NAIC) in developing the Valuation Manual are:

- 1. To consolidate into one document the minimum reserve requirements for life insurance contracts, accident and health insurance contracts and deposit-type contracts pursuant to the SVL, including those products subject to principle-based valuation requirements and those not subject to principle-based valuation requirements.
- 2. To promote uniformity among states' valuation requirements.
- 3. To provide for an efficient, consistent, and timely process to update valuation requirements as the need arises.
- 4. To mandate and facilitate the specific reporting requirements of experience data.
- 5. To enhance industry compliance with the MM/DD/20XX revisions to the SVL, as adopted in various states.

## **DESCRIPTION OF VALUATION MANUAL**

The Valuation Manual contains five sections which provide requirements covered in Authority and Applicability above, and which discuss principles and concepts underlying these requirements.

1. Section I is an introductory section that includes the general concepts underlying the reserve requirements in the Valuation Manual.

- 2. Section II summarizes the minimum reserve requirements which apply to a product or type of product including which products or categories of products are subject to principle-based valuation requirements and documentation. As minimum reserve requirements are developed for various products or categories of products, those requirements will be incorporated into this section. The applicability of the minimum reserve requirements to particular products will be clarified in the appropriate subsection. For example, the minimum reserve requirements that apply to a life insurance product will be identified in the subsection addressing life insurance reserve requirements.
- 3. Section III sets forth the requirements for the actuarial opinion and memorandum and the principle-based report.
- 4. Section IV sets forth the experience reporting requirements.
- 5. Section V contains Valuation Manual minimum standards. These standards contain the specific requirements that are referenced in Sections II IV.

## **OPERATIVE DATE OF VALUATION MANUAL**

The requirements in the Valuation Manual become operative pursuant to Section 11 of the SVL.

## PROCESS FOR UPDATING VALUATION MANUAL

The NAIC is responsible for the ongoing maintenance of the Valuation Manual. The Life and Health Actuarial Task Force (LHATF) is charged with developing changes to the Valuation Manual for NAIC adoption.

Any changes must conform to guidelines, which may be provided in a policy statement(s), developed by the NAIC to support joint use of reserve and other requirements as referenced by the *Accounting Practices and Procedures Manual*, the Valuation Manual and the Standard Valuation Law, etc.

Changes must be consistent with existing model laws or with projects which have received Executive Committee approval to develop new model laws and to the extent the actuarial requirements could have an impact on accounting and reporting guidance in the *Accounting Practices and Procedures Manual* proposed changes must be reviewed by the Statutory Accounting Principles Working Group (SAPWG) for consistency with the *Accounting Practices and Procedures Manual*.

The Life and Health Actuarial Task Force is charged with the maintenance of the Valuation Manual. The Task Force or its staff support will prepare a summary recommendation that will include an analysis of the impact of proposed changes on reserves, the consumer and the industry, including any other impact, based on size of company. LHATF staff support will work with SAPWG staff support to provide a summary and (*or that*) will also include an agenda submission form which will recommend changes to the *Accounting Practices and Procedures Manual*, if needed, to be consistent with the proposed change.

If the proposed changes are inconsistent with the authoritative guidance in the *Accounting Practices and Procedures Manual*, the Life and Health Actuarial Task Force shall not adopt such changes until the Statutory Accounting Principles Working Group:

- 1. Indicates support for such change, and
- 2. Adopts corresponding changes to the *Accounting Practices and Procedures Manual*, with a concurrent effective date.

In the event that the Statutory Accounting Principles Working Group and the Life and Health Actuarial Task Force are in dispute regarding a change and are unable to come to a consensus, a joint subgroup will be formed to resolve the particular issue. Both groups shall send an equal number of knowledgeable representatives to the joint subgroup (suggest 3-5 representatives each) and report back on a recommended resolution. The representatives shall be appointed by the Chair of the Life and Health Actuarial Task Force and the Chair of the Statutory Accounting Principles Working Group. The

Subgroup(s) shall provide regular updates on the progress of the specified issue. Neither group should take action, until the subgroup has a recommended resolution.

Both the Statutory Accounting Principles Working Group and the Life and Health Actuarial Task Force will review proposed Valuation Manual changes for conformance with these guidelines and provide written conclusions and approvals. When both the Statutory Accounting Principles Working Group and the Life and Health Actuarial Task Force conclude the proposed Valuation Manual changes are in conformance with these guidelines and provide approval, the Valuation Manual changes must then be adopted by the A, or B (as applicable), and E Committees prior to NAIC adoption by Executive and Plenary.

SAPWG input is not required for changes which are non-substantive or which provide purely actuarial guidance and do not have an accounting impact. These changes should be included in the quarterly summaries, along with a description of the actuarial guidance. Actuarial guidance is expected to be of a nature similar to what has been termed actuarial guidelines.

Guidelines or a policy statement may be developed to expedite the adoption process of LHATF and SAPWG for those Valuation Manual changes where an emergency situation is present as defined by such guidelines.

Valuation Manual changes must be adopted by the NAIC Executive and Plenary at least six months before becoming effective. The following January 1 will generally be the effective date unless otherwise specified in the changes adopted.

## **OVERVIEW OF RESERVE CONCEPTS**

Reserve requirements prescribed in the Valuation Manual are intended to support a statutory objective of conservative valuation to provide protection to policyholders and promote solvency of companies against adverse fluctuations in financial condition or operating results pursuant to requirements of the SVL.

A principle-based valuation is a reserve valuation that uses one or more methods or one or more assumptions determined by the insurer pursuant to requirements of the SVL and the Valuation Manual. This is in contrast to valuation approaches that use only prescribed assumptions and methods. Although a reserve valuation may involve a method or assumption determined by the insurer, such valuation is a principle-based valuation only as specified in the Valuation Manual for a product or category of products.

Drafting Note: Is the Valuation Manual the appropriate place for these concepts?

Requirements specified by the Valuation Manual as principle-based valuation requirements are deemed consistent with the following concepts:

- 1. Captures the benefits and guarantees associated with the contracts and their identifiable, quantifiable and material risks, including the 'tail risk' associated with each product and the funding of the risks.
- 2. Utilizes risk analysis and risk management techniques to quantify the risks and is guided by the evolving practice and expanding knowledge in the measurement and management of risk. This may include, to the extent required by an appropriate assessment of the underlying risks, stochastic models or other means of analysis that properly reflect the risks of the underlying contracts.
- 3. Incorporates assumptions, risk analysis methods and models and management techniques that are consistent with, those utilized within the company's overall risk assessment process. The inclusion of the risk analysis methods and models should consider the original purpose of that analysis. Risk and risk factors explicitly or implicitly included in the company's risk assessment and evaluation processes will be included in the risk analysis and cash flow models used in the principle-based valuation. Examples of company risk assessment processes may include economic valuations, internal capital allocation models, experience analysis, asset adequacy testing, GAAP valuation and pricing.
- 4. Utilizes the company's anticipated experience, based on the availability of relevant company data and its degree of credibility, to establish assumptions for risks specific to the company and over which the company has some degree of control or influence.

- 5. Incorporates assumptions that, when viewed in the aggregate, reflect an appropriate level of conservatism and, together with the methods utilized, recognize the solvency objective of statutory reporting.
- 6. Reflects risks and risk factors in the calculation of the principle-based valuation minimum statutory reserves and statutory RBC that may be different from one another and may change over time as products and risk measurement techniques evolve, both in a general sense and within the company's risk management processes.

## **CORPORATE GOVERNANCE REQUIREMENTS FOR PRINCIPLE-BASED RESERVES**

The requirements found in VM-Appendix G (VM-G) provide corporate governance requirements applicable to products subject to Principle-Based Reserves as specified in this Valuation Manual. VM-G applies to products issued prior to the operative date of the Valuation Manual that are subject to Actuarial Guideline XLIII in VM-Appendix C in addition to those products subject to VM-21 issued on or after the operative date of Valuation Manual.

#### II. <u>RESERVE REQUIREMENTS</u>

This section provides the minimum reserve requirements by type of product. All reserve requirements provided by this section relate to business issued on or after the operative date of the Valuation Manual. All reserves must be developed in a manner consistent with the requirements and concepts stated in the Overview of Reserve Concepts in Section I of the Valuation Manual.

#### LIFE INSURANCE PRODUCTS

- 1. This subsection establishes reserve requirements for all contracts classified as life contracts defined in the *Accounting Practices and Procedures Manual*, Statutory Statement of Accounting Principle 50 (SSAP 50), with the exception of annuity contracts and credit life contracts.
- 2. For life contracts the minimum reserve requirements are those requirements as found in Appendix A and C of the Valuation Manual (VM-A and VM-C) as applicable.

## **ANNUITY PRODUCTS**

- 1. This subsection establishes reserve requirements for all contracts classified as annuity contracts defined in the *Accounting Practices and Procedures Manual*, Statutory Statement of Accounting Principle 50 (SSAP 50).
- 2. Minimum reserve requirements for variable annuity contracts and similar business, specified in VM-21, shall be those provided by VM-21. The minimum reserve requirements of VM-21 are considered "Principle-based Reserve (PBR)" requirements for purposes of the Valuation Manual.
- 3. Minimum reserve requirements for fixed annuity contracts are those requirements as found in Appendix A and C of the Valuation Manual (VM-A and VM-C) as applicable.

# **DEPOSIT-TYPE CONTRACTS**

- 1. This subsection establishes reserve requirements for all contracts classified as deposit-type contracts defined in the *Accounting Practices and Procedures Manual*, Statutory Statement of Accounting Principle 50 (SSAP 50).
- 2. Minimum reserve requirements for deposit-type contracts are those requirements as found in Appendix A and C of the Valuation Manual (VM-A and VM-C) as applicable.

## HEALTH INSURANCE PRODUCTS

- 1. This subsection establishes reserve requirements for all contracts classified as health contracts defined in the *Accounting Practices and Procedures Manual*, Statutory Statement of Accounting Principle 50 (SSAP 50).
- 2. Minimum reserve requirements for accident and health insurance contracts, other than Credit Disability, are those requirements found in Appendix A and C of the Valuation Manual (VM-A and VM-C) as applicable.

## **CREDIT LIFE AND DISABILITY PRODUCTS**

- 1. This subsection establishes reserve requirements for all credit life and credit disability products defined as follows:
- 2. "Credit life insurance" means insurance on a debtor or debtors, pursuant to or in connection with a specific loan or other credit transaction, to provide for satisfaction of a debt, in whole or in part, upon the death of an insured debtor.

Credit life insurance does NOT include:

- a. Insurance written in connection with a credit transaction that is:
  - i. Secured by a first mortgage or deed of trust; and
  - ii. Made to finance the purchase of real property or the construction of a dwelling thereon, or to refinance a prior credit transaction made for such a purpose;
- b. Insurance sold as an isolated transaction on the part of the insurer and not related to an agreement or a plan for insuring debtors of the creditor.
- c. Insurance on accounts receivable.
- 3. "Credit disability insurance" means insurance on a debtor or debtors to or in connection with a specific loan or other credit transaction, to provide for lump sum or periodic payments on a specific loan or other credit transaction due to the disability of the insured debtor.
- 4. Minimum reserve requirements for credit life and credit disability contracts issued on or after the operative date of the Valuation Manual are provided in VM-26.

## **RIDERS AND SUPPLEMENTAL BENEFITS**

- 1. If a rider or supplemental benefit to one of the above types of products has a separate premium, then the following apply:
  - a. If the premium is not paid through a reduction in any value (such as account value) of the base policy, the minimum reserve standard for the rider or supplemental benefit is the minimum reserve standard for the above product or type of product with the most comparable risks and benefits. For example, the minimum reserve standard for a long term care rider to a universal life policy is the minimum reserve standard for long term care in VM-25;
  - b. If the premium is paid through a reduction in any value (such as account value) of the base policy, all cash flows associated with the rider or supplemental benefit must be included in the calculation of the reserve for the base policy. A separate reserve is not determined for the rider or supplemental benefit.

2. If a rider or supplemental benefit does not have a separate premium, all cash flows associated with the rider or supplemental benefit must be included in the calculation of the reserve for the base policy. For example, reserves for a universal life policy with an accelerated benefit for long term care must include cash flows from the long term care policy in determining minimum reserves in compliance with VM-20. A separate reserve is not determined for the rider or supplemental benefit.

## CLAIM RESERVES

Regardless of the requirement for use of the PBR approach to policy reserves, the claim reserves, including waiver of premium claims, are not subject to PBR requirements of the Valuation Manual.

## III. ACTUARIAL OPINION AND REPORT REQUIREMENTS

Requirements regarding the annual actuarial opinion and memorandum pursuant to Section 3 of the NAIC Model Standard Valuation Law (VM-5) are provided in VM-30.

# IV. <u>EXPERIENCE REPORTING REQUIREMENTS</u>

## V. VALUATION MANUAL MINIMUM STANDARDS

This section provides the specific minimum reserve standards as referenced by the preceding sections.

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Draft: 12/4/09 Adopted by Life and Health Actuarial Task Force, 12/4/09

## VM-01: DEFINITIONS FOR TERMS IN REQUIREMENTS

- 1. The term "accumulated deficiency" means the projected working reserve, if any, less the annual statement value of projected assets and measured as of the projection start date and as of the end of each projection year. (This definition applies to life and annuity products only).
- 2. The term "actuarial opinion" means the opinion of an appointed actuary regarding the adequacy of reserves and related actuarial items.
- 3. The term "Actuarial Standards Board" means the board established by the American Academy of Actuaries to develop and promulgate actuarial standards of practice.
- 4. The term "actuary" means a risk professional who meets the qualifications in Section [] of the Valuation Manual to certify that the reserves for the policies subject to these requirements have been calculated in accordance with all applicable laws, regulations, actuarial guidelines and Actuarial Standards of Practice.
- 5. The term "annual statement" means the statutory financial statements a company must file with a state insurance commissioner as required under state insurance law.
- 6. The term "anticipated experience assumption" means an expectation of future experience for a risk factor given available, relevant information pertaining to the assumption being estimated.
- 7. The term "appointed actuary" means a qualified actuary who is appointed or retained to prepare the actuarial opinion and supporting memorandum as required by the Standard Valuation Law and the valuation manual.
- 8. The term "asset adequacy analysis" means an analysis that meets the standards and other requirements referred to in VM-30.
- 9. The term "asset-associated derivative" means a derivative program whose derivative instrument cash flows are combined with asset cash flows in performing the reserve calculations.
- 10. The term "cash flows" means any receipt, disbursement, or transfer of cash or asset equivalents.
- 11. The term "cash flow model" means a model designed to simulate asset and liability cash flows.
- 12. The term "cash surrender value" means the amount available to the contract/policyholder, if any, due to surrender of the contract/policy, prior to any outstanding contract/policy indebtedness and net of any applicable surrender charges. The cash surrender value shall reflect any applicable market value adjustments where the underlying assets are reported at market value, but shall not reflect any market value adjustments where the underlying assets are not reported at market value. (Note: where there is a group certificate and it has a cash value, this applies to the certificate within the group contract/policy).
- 13. The term "clearly defined hedging strategy" means a type of prospective derivative program of the company that:
  - a. is established to hedge risks through the future purchase or sale of derivative instruments or opening or closing of hedging positions;
  - b. may be dynamic, static or a combination thereof; and
  - c. meets the requirements specified in the applicable reserve standard.
- 14. The term "commissioner" means the chief insurance regulator of a state, district or territory of the United States.

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- 15. The term "company" means an entity subject to the provisions of the Valuation Manual.
- 16. The term "conditional tail expectation" means a risk measure that is calculated as the average of all modeled outcomes (ranked from lowest to highest) above a prescribed percentile.
- 17. The term "contract" means an individual annuity policy or group annuity policy or certificate.
- 18. The term "derivative instrument" means 'an agreement, option, instrument or a series or combination thereof:
  - a. To make or take delivery of, or assume or relinquish, a specified amount of one or more underlying interests, or to make a cash settlement in lieu thereof; or
  - b. That has a price, performance, value or cash flow based primarily upon the actual or expected price, level, performance, value or cash flow of one or more underlying interests.' (Source: NAIC Accounting Practices and Procedures Manual)

This includes, but is not limited to, an option, warrant, cap, floor, collar, swap, forward or future, or any other agreement or instrument substantially similar thereto or any series or combination thereof. Each derivative instrument shall be viewed as part of a specific derivative program.

- 19. The term "derivative program" means a program to buy or sell one or more derivative instruments or open or close hedging positions to achieve a specific objective. Both hedging and non-hedging programs (e.g., for replication or income generation objectives) are included in this definition.
- 20. The term "deterministic reserve" means the amount determined on a seriatim basis using one or more specified scenarios. Deterministic reserves include reserves calculated using formula based methods.
- 21. The term "discount rates" means the path of rates used to derive the present value.
- 22. The term "fraternal benefits" means payments made for charitable purposes by a fraternal life insurance company that are consistent with and/or support the fraternal purposes of the company.
- 23. The term "funding of the risks" means the revenue associated with the contracts.
- 24. The term "gross reserve" means the amount of the Reported Reserve that would have been held in the absence of any ceded reinsurance. This includes direct and assumed business.
- 25. The term "gross wealth ratio" means the cumulative equity index return for the indicated time period and percentile (e.g., 1.0 indicates that the index is at its original level).
- 26. The term "industry mortality table" means an NAIC approved mortality table (without the valuation margins) used for credibility weighting purposes to blend with the company's experience mortality rates when the company's experience is less than 100% credible.
- 27. The term "liability-associated derivative" means a derivative program whose derivative instrument cash flows are combined with liability cash flows in performing the reserve calculations.
- 28. The term "margin" means an amount included in the assumptions used to determine the Reported Reserve that incorporates conservatism in the calculated value consistent with the requirements of the various sections of the Valuation Manual. It is intended to provide for estimation error and adverse deviation.
- 29. The term "model segment" means a group of policies and associated assets that are modeled together.

- 30. The term "modified deterministic reserve" means the amount used as a replacement for the portion of the stochastic reserve for those policies falling within the stochastic modeling exclusion.
- 31. The term "mortality segment" means a subset of policies from a credibility segment for which a separate mortality table representing the prudent estimate assumption will be determined.
- 32. The term "mortality experience cell" means a subset of policies from a mortality segment that are grouped together when determining credibility adjusted experience rates.
- 33. The term "NAIC" means the National Association of Insurance Commissioners.
- 34. The term "net asset earned rates" means the path of earned rates reflecting the net general account portfolio rate in each projection interval (net of appropriate default costs and investment expenses).
- 35. The term "non-guaranteed elements (NGE)" means either: (a) dividends under participating policies or contracts; or (b) other elements affecting life insurance or annuity policyholder/contract holder costs or values that are both established and subject to change at the discretion of the insurer.
- 36. The term "path" means a time-indexed sequence of a set of values.
- 37. The term "PBR actuarial report" means the supporting information prepared by the company as required by VM-31.
- 38. The term "per policy reserve" means an amount determined for each policy that equals the greater of the cash surrender value and the seriatim reserve.
- 39. The term "policy" means an individual life insurance policy included in the scope of VM-20.
- 40. The term "policyholder behavior" means any action a policyholder, contract holder or any other person with the right to elect options, such as a certificate holder, may take under a policy or contract subject to this Act including, but not limited to, lapse, withdrawal, transfer, deposit, premium payment, loan, annuitization, or benefit elections prescribed by the policy or contract but excluding events of mortality or morbidity that result in benefits prescribed in their essential aspects by the terms of the policy or contract.
- 41. The term "pretax interest maintenance reserve" (PIMR) means the statutory interest maintenance reserve liability adjusted to a pretax basis for each model segment at the projection start date and at the end of each projection interval. The negative of this amount is treated as an invested asset within these requirements and the amortization of this amount is treated as investment income.
- 42. The term "projection interval" means the time interval used in the cash flow model to project the cash flow amounts (e.g., monthly, quarterly, annually).
- 43. The term "projection period" means the period over which the cash flow model is run. (This definition applies to life and annuity products only).
- 44. The term "projection start date" means the date on which the projection period begins.
- 45. The term "projection year" means a 12-month period starting on the projection start date or an anniversary of the projection start date.
- 46. The term "proprietary scenario set" means a small number of paths of interest rate and equity performance that are not necessarily a representative sample of a larger set of stochastic paths, but are a sample developed by the company for the purpose of calculating the stochastic reserve on a conservative basis.
- 47. The term "prudent estimate assumption" means a deterministic assumption used to represent a risk factor developed by applying a margin to the anticipated experience assumption for that risk factor.

- 48. The term "qualified actuary" means an individual who is qualified to sign the applicable statement of actuarial opinion in accordance with the American Academy of Actuaries qualification standards (as the same may be amended from time to time) for actuaries signing such statements and who meets the requirements specified in the valuation manual.
- 49. The term "reinsurance aggregate cash flows" means the difference between the reinsurance cash flows and reinsurance discrete cash flows, as defined in VM-01.
- 50. The term "reinsurance cash flows" means the amount paid under a reinsurance agreement between a ceding company and an assuming company.
- 51. The term "reinsurance policy cash flows" means reinsurance cash flows that can be directly attributable to each covered policy.
- 52. The term "revenue sharing" means any arrangement or understanding by which an entity responsible for providing investment or other types of services makes payments to the company or to one of its affiliates. Such payments are typically in exchange for administrative services provided by the company or its affiliate, such as marketing, distribution and recordkeeping. Only payments that are attributable to charges or fees taken from the underlying variable funds or mutual funds supporting the policies or contracts that fall under the scope of the given standard shall be included in the definition of "revenue sharing."
- 53. The term "risk factor" means an aspect of future experience that is not fully predictable on the valuation date.
- 54. The term "scenario" means a sequence of outcomes used in the cash flow model, such as a path of future interest rates, equity performance, or separate account fund performance.
- 55. The term "scenario reserve" means the amount determined on an aggregated basis for a given scenario that is used as a step in the calculation of the stochastic reserve.
- 56. The term "seriatim reserve" means the amount determined for a given policy that is used as a step in the calculation of the deterministic reserve.
- 57. The term "stochastic reserve" means the amount determined by applying a prescribed CTE level to the distribution of scenario reserves over a broad range of stochastically generated scenarios and using prudent estimate assumptions for all assumptions not stochastically modeled. The "stochastic reserve" includes a provision for policies subject to a stochastic modeling exclusion.
- 58. The term "valuation date" means the date for which the Reported Reserve is to be valued as required by the Standard Valuation Law.

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#### Draft: 12/4/09 Adopted by Life and Upplth Actuarial Tagle

Adopted by Life and Health Actuarial Task Force, 12/4/09

# VM-21: REQUIREMENTS FOR PRINCIPLE-BASED RESERVES FOR VARIABLE ANNUITIES

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## Section 1. Background

A. Purpose

These requirements constitute the Commissioner's Annuity Reserve Valuation Method (CARVM) for variable annuity contracts by clarifying the assumptions and methodologies that will comply with the Standard Valuation Law (SVL). It also applies similar assumptions and methodologies to contracts that contain characteristics similar to those described in the scope, but that are not directly subject to CARVM.

B. Principles

The projection methodology used to calculate the Conditional Tail Expectation Amount, as well as the approach used to develop the Alternative Methodology, is based on the following set of principles. These principles should be followed when applying the methodology in these requirements and analyzing the resulting reserves.

**Guidance Note:** The principles should be considered in their entirety and it is required that companies meet these principles with respect to only those contracts that fall within the scope of these requirements and are in force as of the valuation date to which these requirements are applied.

**Principle 1.** The objective of the approach used to determine the Conditional Tail Expectation Amount is to quantify the amount of statutory reserves needed by the company to be able to meet contractual obligations in light of the risks to which the company is exposed.

**Principle 2.** The calculation of the Conditional Tail Expectation Amount is based on the results derived from an analysis of asset and liability cash flows produced by the application of a stochastic cash flow model to equity return

and interest rate scenarios. For each scenario the greatest present value of accumulated surplus deficiency is calculated. The analysis reflects Prudent Estimate assumptions for deterministic variables and is performed in aggregate (subject to limitations related to contractual provisions) to allow the natural offset of risks within a given scenario. The methodology utilizes a projected total statutory balance sheet approach by including all projected income, benefit and expense items related to the business in the model and sets the Conditional Tail Expectation Amount at a degree of confidence using the conditional tail expectation measure applied to the set of scenario specific greatest present values of accumulated statutory deficiencies that is deemed to be reasonably conservative over the span of economic cycles.

**Guidance Note:** Examples where full aggregation between contracts may not be possible include experience rated group contracts and the operation of reinsurance treaties.

**Principle 3.** The implementation of a model involves decisions about the experience assumptions and the modeling techniques to be used in measuring the risks to which the company is exposed. Generally, 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 Conditional Tail Expectation Amount at the required Conditional Tail Expectation (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 Conditional Tail Expectation Amount, the actuary should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

**Guidance Note:** The intent of Principle 3 is to describe the conceptual framework for setting assumptions. Section 11 provides the requirements and guidance for setting contractholder behavior and includes alternatives to this framework if the actuary is unable to fully apply this principle.

**Principle 4.** 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 Conditional Tail Expectation Amount 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. Any disconnect between the model and reality should be reflected in setting Prudent Estimate assumptions to the extent not addressed by other means.

**Principle 5.** 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. 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 Conditional Tail Expectation Amount without also reducing risk on scenarios similar to those used in the actual cash flow modeling are inconsistent with these principles. 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.

- C. Risks Reflected
  - 1. The risks reflected in the calculation of reserves under these requirements arise from actual or potential events or activities which are both:
    - a. Directly related to the contracts falling under the scope of these requirements or their supporting assets; and
    - b. Capable of materially affecting the reserve.

- 2. Categories and examples of risks reflected in the reserve calculations include but are not necessarily limited to:
  - a. Asset Risks
    - i. Separate Account fund performance;
    - ii. Credit risks (e.g., default or rating downgrades);
    - iii. Commercial mortgage loan rollover rates (roll-over of bullet loans);
    - iv. Uncertainty in the timing or duration of asset cash flows (e.g., shortening (prepayment risk) and lengthening (extension risk));
    - v. Performance of equities, real estate, and Schedule BA assets;
    - vi. Call risk on callable assets;
    - vii. Risk associated with hedge instrument (includes basis, gap, price, parameter estimation risks, and variation in assumptions); and
    - viii. Currency risk.
  - b. Liability Risks
    - i. Reinsurer default, impairment or rating downgrade known to have occurred before or on the valuation date;
    - ii. Mortality/longevity, persistency/lapse, partial withdrawal and premium payment risks;
    - iii. Utilization risk associated with guaranteed living benefits;
    - iv. Anticipated mortality trends based on observed patterns of mortality improvement or deterioration, where permitted;
    - v. Annuitization risks; and
    - vi. Additional premium dump-ins (high interest rate guarantees in low interest rate environments);
  - c. Combination Risks
    - i. Risks modeled in the company's risk assessment processes that are related to the contracts, as described above;
    - ii. Disintermediation risk (including such risk related to payment of surrender or partial withdrawal benefits); and
    - iii. Risks associated with Revenue Sharing Income.

The risks not necessarily reflected in the calculation of reserves under these requirements are:

a. Those not reflected in the determination of Risk-Based Capital; and

b. Those reflected in the determination of Risk-Based Capital but arising from obligations of the company not directly related to the contracts falling under the scope of these requirements, or their supporting assets, as described above.

Categories and examples of risks not reflected in the reserve calculations include but are not necessarily limited to:

a. Asset Risks

Liquidity risks associated with a "run on the bank."

- b. Liability Risks
  - i. Reinsurer default, impairment or rating downgrade occurring after the valuation date;
  - ii. Catastrophic events (e.g., epidemics or terrorist events);
  - iii. Major breakthroughs in life extension technology that have not yet fundamentally altered recently observed mortality experience; and
  - iv. Significant future reserve increases as an unfavorable scenario is realized.
- c. General Business Risks
  - i. Deterioration of reputation;
  - ii. Future changes in anticipated experience (reparameterization in the case of stochastic processes) which would be triggered if and when adverse modeled outcomes were to actually occur;
  - iii. Poor management performance;
  - iv. The expense risks associated with fluctuating amounts of new business;
  - v. Risks associated with future economic viability of the company;
  - vi. Moral hazards; and
  - vii. Fraud and theft.

# D. Scope

1.

- 1. The following categories of annuities or product features, directly written or assumed through reinsurance, are covered by this Section of the valuation manual:
  - a. Variable deferred annuity contracts subject to the Commissioner's Annuity Reserve Valuation Method (CARVM), whether or not such contracts contain Guaranteed Minimum Death Benefits (GMDBs), or Variable Annuity Guaranteed Living Benefits (VAGLBs);
  - b. Variable immediate annuity contracts, whether or not such contracts contain GMDBs or VAGLBs;
  - c. Group annuity contracts that are not subject to CARVM, but contain guarantees similar in nature to GMDBs, VAGLBs, or any combination thereof; and

**Guidance Note:** The term "similar in nature," as used in this Subsection D.1.c. and D.1.d. is intended to capture current products and benefits as well as product and benefit designs that may emerge in the future. Examples of the currently known designs are listed in Subsection D.1.d. Any product or benefit design that does not clearly fit the Scope should be evaluated on a case-by-case basis taking into consideration factors that include, but are not limited to, the nature of the guarantees, the definitions of GMDB and VAGLB in Subsection E.1.a. and E.1.b. and whether the contractual amounts paid in the absence of the guarantee are based on the investment performance of a market-value fund or market-value index (whether or not part of the company's separate account).

- d. All other products that contain guarantees similar in nature to GMDBs or VAGLBs, even if the insurer does not offer the mutual funds or variable funds to which these guarantees relate, where there is no other explicit reserve requirement. If such a benefit is offered as part of a contract that has an explicit reserve requirement and that benefit does not currently have an explicit reserve requirement:
  - i. These requirements shall be applied to the benefit on a standalone basis (i.e., for purposes of the reserve calculation, the benefit shall be treated as a separate contract);
  - ii. The reserve for the underlying contract is determined according to the explicit reserve requirement; and
  - iii. The reserve held for the contract shall be the sum of i. and ii. Guidance Note: For example, a group life contract that wraps a GMDB around a mutual fund would generally fall under the scope of these requirements since there is not an explicit reserve requirement for this type of group life contract. However, for an individual variable life contract with a GMDB and a benefit similar in nature to a VAGLB, the requirements would generally apply only to the VAGLB-type benefit, since there is an explicit reserve requirement that applies to the variable life contract and the GMDB.
- 2. These requirements do not apply to contracts falling under the scope of the NAIC Model Modified Guaranteed Annuity Regulation (MGAs); however, it does apply to contracts listed above that include one or more subaccounts containing features similar in nature to those contained in MGAs (e.g., market value adjustments).
- 3. Separate account products that guarantee an index and do not offer GMDBs or VAGLBs are excluded from the scope of these requirements.

**Guidance Note:** Current VAGLBs include Guaranteed Minimum Accumulation Benefits, Guaranteed Minimum Income Benefits, Guaranteed Minimum Withdrawal Benefits, Guaranteed Lifetime Withdrawal Benefits, and Guaranteed Payout Annuity Floors. These requirements will be applied to future variations on these designs and to new guarantee designs.

- E. Definitions
  - 1. Definitions of Benefit Guarantees
    - a. The term "Guaranteed Minimum Death Benefit (GMDB)" means a guaranteed benefit providing, or resulting in the provision that, an amount payable on the death of a contractholder, annuitant, participant, or insured will be increased and/or will be at least a minimum amount. Only such guarantees having the potential to produce a contractual total amount payable on death that exceeds the account value, or in the case of an annuity providing income payments, an amount payable on death other than continuation of any guaranteed income payments, are included in this

definition. GMDBs that are based on a portion of the excess of the account value over the net of premiums paid less partial withdrawals made (e.g., an Earnings Enhanced Death Benefit) are also included in this definition.

- b. The term "Variable Annuity Guaranteed Living Benefit (VAGLB)" means a guaranteed benefit providing, or resulting in the provision that, one or more guaranteed benefit amounts payable or accruing to a living contractholder or living annuitant, under contractually specified conditions (e.g., at the end of a specified waiting period, upon annuitization, or upon withdrawal of premium over a period of time), will increase contractual benefits should the contract value referenced by the guarantee (e.g., account value) fall below a given level or fail to achieve certain performance levels. Only such guarantees having the potential to provide benefits with a present value as of the benefit commencement date that exceeds the contract value referenced by the guarantee are included in this definition. Payout annuities without minimum payout or performance guarantees are neither considered to contain nor to be VAGLBs.
- c. The term "Guaranteed Minimum Income Benefit (GMIB)" means a VAGLB design for which the benefit is contingent on annuitization of a variable deferred annuity or similar contract. The benefit is typically expressed as a contractholder option, on one or more option dates, to have a minimum amount applied to provide periodic income using a specified purchase basis.
- d. The term "Guaranteed Payout Annuity Floor (GPAF)" means a VAGLB design guaranteeing that one or more of the periodic payments under a variable immediate annuity will not be less than a minimum amount.
- 2. Definitions of Reserve Methodology Terminology
  - a. The term "Scenario" means a set of asset growth rates and investment returns from which assets and liabilities supporting a set of contracts may be determined for each year of a projection.
  - b. The term "Cash Surrender Value" means, for purposes of these requirements, the amount available to the contractholder upon surrender of the contract. 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. For contracts where all or a portion of the amount available to the contractholder upon surrender is subject to a market value adjustment, however, the Cash Surrender Value shall reflect the market value adjustment consistent with the required treatment of the underlying assets. That is, the Cash Surrender Value shall reflect any market value adjustments where the underlying assets are reported at market value, but shall not reflect any market value adjustments where the underlying assets are reported at book value.
  - c. The term "Scenario Greatest Present Value" means the sum, for a given scenario, of:
    - i. The greatest of the present values, as of the projection start date, of the projected Accumulated Deficiencies for the scenario; and
    - ii. The Starting Asset Amount.
  - d. The term "Conditional Tail Expectation Amount" means an amount equal to the numerical average of the 30 percent largest values of the Scenario Greatest Present Values.
  - e. The term "Working Reserve" means the assumed reserve used in the projections of Accumulated Deficiencies supporting the calculation of the Scenario Greatest Present Values. At any point in the projections, including at the start of the projection, the Working Reserve shall equal the projected Cash Surrender Value.

For a variable payout annuity without a Cash Surrender Value, the Working Reserve shall equal the present value, at the valuation interest rate and the valuation mortality table specified for such a product by the Standard Valuation Law of future income payments projected using a return

based on the valuation interest rate less appropriate asset based charges. For annuitizations that occur during the projection, the valuation interest rate as of the current valuation date may be used in determining the Working Reserve. Alternatively, if an integrated model of equity returns and interest rates is used, a future estimate of valuation interest rates may be incorporated into the Working Reserve.

For contracts not covered above, the actuary shall determine the Working Reserve in a manner that is consistent with the above requirements.

f. The term "Accumulated Deficiency" means an amount measured as of the end of a projection year and equals the projected Working Reserve less the amount of projected assets, both as of the end of the projection year. Accumulated Deficiencies may be positive or negative.

**Guidance Note:** A positive Accumulated Deficiency means there is a cumulative loss and a negative Accumulated Deficiency means there is a cumulative gain.

- g. The term "Starting Asset Amount" means an amount equal to the value of the assets at the start of the projection, as defined in Section 3.D.1.
- h. The term "Anticipated Experience" means the actuary's reasonable estimate of future experience for a risk factor given all available, relevant information pertaining to the contingencies being valued.
- i. The term "Prudent Estimate" means the basis upon which the actuary sets the deterministic assumptions to be used for projections. A Prudent Estimate assumption is 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 Estimate assumption is developed by applying a margin for uncertainty to the Anticipated Experience assumption. The margin for uncertainty shall provide for estimation error and margins for adverse deviation. The resulting Prudent Estimate assumption shall be reasonably conservative over the span of economic cycles and over a plausible range of expected experience, in recognition of the Principles described in Subsection B. Recognizing that assumptions are simply assertions of future unknown experience, the margin 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 Anticipated Experience 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.

This means that valuation assumptions not stochastically modeled are to be consistent with the stated Principles in Subsection B, be based on any relevant and credible experience that is available, and should be set to produce, in concert with other Prudent Estimate assumptions, a Conditional Tail Expectation Amount that is consistent with the stated CTE level.

The actuary shall follow the principles discussed in Section 11 and 12 in determining Prudent Estimate assumptions.

- j. The term "Gross Wealth Ratio" means the cumulative return for the indicated time period and percentile (e.g., 1.0 indicates that the index is at its original level).
- k. The term "Clearly Defined Hedging Strategy" is a designation that applies to strategies undertaken by a company to manage risks through the future purchase or sale of hedging instruments and the

opening and closing of hedging positions. In order to qualify as a Clearly Defined Hedging Strategy, the strategy must meet the principles outlined in the Subsection B (particularly Principle 5) and shall, at a minimum, identify:

- i. The specific risks being hedged (e.g., delta, rho, vega, etc.),
- ii. The hedge objectives,
- iii. The risks not being hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.),
- iv. The financial instruments that will be used to hedge the risks,
- v. The hedge trading rules including the permitted tolerances from hedging objectives,
- vi. The metric(s) for measuring hedging effectiveness,
- vii. The criteria that will be used to measure effectiveness,
- viii. The frequency of measuring hedging effectiveness,
- ix. The conditions under which hedging will not take place, and
- x. The person or persons responsible for implementing the hedging strategy.

The hedge strategy may be dynamic, static, or a combination thereof.

It is important to note that strategies involving the offsetting of the risks associated with variable annuity guarantees with other products outside of the scope of the these requirements (e.g., equity-indexed annuities) do not currently qualify as a Clearly Defined Hedging Strategy under these requirements.

- 1. The term "Revenue Sharing", for purposes of these requirements, means any arrangement or understanding by which an entity responsible for providing investment or other types of services makes payments to the company (or to one of its affiliates). Such payments are typically in exchange for administrative services provided by the company (or its affiliate), such as marketing, distribution and recordkeeping. Only payments that are attributable to charges or fees taken from the underlying variable funds or mutual funds supporting the contracts that fall under the scope of these requirements shall be included in the definition of Revenue Sharing.
- m. The term "Domiciliary Commissioner", for purposes of these requirements, means the chief insurance regulatory official of the state of domicile of the company.
- n. The term "Aggregate Reserve" means the minimum reserve requirement as of the valuation date for the contracts falling within the scope of these requirements.
- o. The term "1994 Variable Annuity MGDB Mortality Table" means the mortality table shown in Appendix 1.

## Section 2. Reserve Methodology

A. <u>General Description</u>. The Aggregate Reserve for contracts falling within the scope of these requirements shall equal the Conditional Tail Expectation Amount but not less than the Standard Scenario Amount, where the Aggregate
Reserve is calculated as the Standard Scenario Amount plus the excess, if any, of the Conditional Tail Expectation Amount over the Standard Scenario Amount.

B. <u>Impact of Reinsurance Ceded</u>. 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 statutory requirements that would allow the treaty to be accounted for as reinsurance.

An Aggregate Reserve before reinsurance shall also be calculated if needed for regulatory reporting or other purposes, using methods described in Section 4.

- C. <u>The Standard Scenario Amount</u>. The Standard Scenario Amount is the aggregate of the reserves determined by applying the Standard Scenario method to each of the contracts falling within the scope of these requirements. The Standard Scenario method is outlined in Section 5.
- D. <u>The Conditional Tail Expectation Amount</u>. The Conditional Tail Expectation Amount shall be determined based on a projection of the contracts falling within the scope of these requirements, and the assets supporting these contracts, over a broad range of stochastically generated projection scenarios and using Prudent Estimate assumptions.

The stochastically generated projection scenarios shall meet the Scenario Calibration Criteria described in Section 7.

The Conditional Tail Expectation Amount may be determined in aggregate for all contracts falling within the scope of these requirements (i.e., a single grouping). At the option of the company, it may be determined by applying the methodology outlined below to sub-groupings of contracts, in which case, the Conditional Tail Expectation Amount shall equal the sum of the amounts computed for each such sub-grouping.

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

- 1. For each scenario, projected aggregate Accumulated Deficiencies are determined at the start of the projection (i.e., "time 0") and at the end of each projection year as the sum of the Accumulated Deficiencies for each contract grouping.
- 2. The Scenario Greatest Present Value is determined for each scenario based on the sum of the aggregate Accumulated Deficiencies and aggregate Starting Asset Amounts for the contracts for which the Aggregate Reserve is being computed.

**Guidance Note:** The Scenario Greatest Present Value is therefore based on the greatest projected Accumulated Deficiency, in aggregate, for all contracts for which the Aggregate Reserve is computed hereunder, rather than based on the sum of the greatest projected Accumulated Deficiency for each grouping of contracts.

3. The Scenario Greatest Present Values for all scenarios are then ranked from smallest to largest and the Conditional Tail Expectation Amount is the average of the largest 30 percent of these ranked values.

The projections shall be performed in accordance with Section 3. The actuary shall document the assumptions and procedures used for the projections and summarize the results obtained as described in Section 4 and Section 10.

E. <u>Alternative Methodology</u>. For variable deferred annuity contracts that contain either no guaranteed benefits or only GMDBs (i.e., no VAGLBs), the Conditional Tail Expectation Amount may be determined using the Alternative Methodology described in Section 6 rather than using the approach described in Subsection D. 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 Conditional Tail Expectation Amount 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 Section 4 and Section 10.

F. <u>Allocation of Results to Contracts</u>. The Aggregate Reserve shall be allocated to the contracts falling within the scope of these requirements using the method outlined in Section 8.

#### Section 3. Determination of Conditional Tail Expectation Amount Based on Projections

- A. Projection of Accumulated Deficiencies
  - 1. <u>General Description of Projection</u>. The projection of Accumulated Deficiencies shall be made ignoring Federal Income Tax and reflect the dynamics of the expected cash flows for the entire group of contracts, reflecting all product features, including the guarantees provided under the contracts. Insurance company expenses (including overhead and investment expense), fund expenses, contractual fees and charges, revenue sharing income received by the company (net of applicable expenses) and cash flows associated with any reinsurance or hedging instruments are to be reflected on a basis consistent with the requirements herein. Cash flows from any fixed account options shall also be included. Any market value adjustment assessed on projected withdrawals or surrenders shall also be included (whether or not the Cash Surrender Value reflects market value adjustments). Throughout the projection, where estimates are used, such estimates shall be on a Prudent Estimate basis.

Federal Income Tax shall not be included in the projection of Accumulated Deficiencies.

2. <u>Grouping of Variable Funds and Subaccounts</u>. The portion of the Starting Asset Amount held in the Separate Account represented by the variable funds and the corresponding account values may be grouped for modeling using an approach that recognizes the investment guidelines and objectives of the funds. In assigning each variable fund and the variable subaccounts to a grouping for projection purposes, the fundamental characteristics of the fund shall be reflected and the parameters shall have the appropriate relationship to the required calibration points of the S&P 500. The grouping shall reflect characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk).

An appropriate proxy for each variable subaccount shall be designed in order to develop the investment return paths. The development of the scenarios for the proxy funds is a fundamental step in the modeling and can have a significant impact on results. As such, the actuary must map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices (or sub-indices).

- 3. <u>Grouping of Contracts</u>. Projections may be performed for each contract inforce on the date of valuation or by grouping contracts into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. Grouping shall be the responsibility of the actuary but may not be done in a manner that intentionally understates the resulting reserve.
- 4. <u>Modeling of Hedges</u>. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the projections. If the company is following a Clearly Defined Hedging Strategy and the hedging strategy meets the requirements of Section 9, the projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of that strategy.

To the degree either the currently held hedge positions or the hedge positions expected to be held in the future introduce basis, gap, price, or assumption risk, a suitable reduction for effectiveness of hedges shall be made. The actuary is responsible for verifying compliance with a Clearly Defined Hedging Strategy and the requirements in Section 9 for all hedge instruments included in the projections.

While hedging strategies may change over time, any change in hedging strategy shall be documented and include an effective date of the change in strategy.

The use of products not falling under the scope of these requirements (e.g., equity-indexed annuities) as a hedge shall not be recognized in the determination of Accumulated Deficiencies.

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

Upon request of the company's domiciliary commissioner and for information purposes to show the effect of including future hedge positions in the projections, the company shall show the results of performing an additional set of projections reflecting only the hedges currently held by the company in support of the contracts falling under the scope of these requirements. Because this additional set of projections excludes some or all of the derivative instruments, the investment strategy used may not be the same as that used in the determination of the Conditional Tail Expectation Amount.

#### 5. <u>Revenue Sharing</u>.

- a. Projections of Accumulated Deficiencies may include income from projected future Revenue Sharing, net of applicable projected expenses ("Net Revenue Sharing Income") if the following requirements are met:
  - i. The Net Revenue Sharing Income is received by the company, Guidance Note: For purposes of this Section, Net Revenue Sharing Income is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the Net Revenue Sharing Income or an affiliated company that receives the Net Revenue Sharing Income. Net Revenue Sharing Income would also be considered to be received, if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case the actuary needs to assess the likelihood that future Net Revenue Sharing Income is reduced due to the reported statutory income of the subsidiary being less than future Net Revenue Sharing Income received.
  - ii. Signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the Net Revenue Sharing Income; and
  - iii. The Net Revenue Sharing Income is not already accounted for directly or indirectly as a company asset.
- b. The amount of Net Revenue Sharing Income to be used shall reflect the actuary's assessment of factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
  - i. The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the Net Revenue Sharing as part of the agreement(s);
  - ii. The relationship between the company and the entity providing the Net Revenue Sharing Income that might affect the likelihood of payment and the level of expenses;
  - iii. The benefits and risks to both the company and the entity paying the Net Revenue Sharing Income of continuing the arrangement.
  - iv. The likelihood that the company will collect the Net Revenue Sharing Income during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended;

- v. The ability of the company to replace the services provided to it by the entity providing the Net Revenue Sharing Income or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide; and
- vi. The ability of the entity providing the Net Revenue Sharing Income to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.
- c. The amount of projected Net Revenue Sharing Income shall also reflect a margin (which decreases the assumed Net Revenue Sharing Income) directly related to the uncertainty of the revenue. The greater the uncertainty, the larger the margin. Such uncertainty is driven by many factors including the potential for changes in the securities laws and regulations, mutual fund board responsibilities and actions, and industry trends. Since it is prudent to assume that uncertainty increases over time, a larger margin shall be applied as time that has elapsed in the projection increases.
- d. All expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the Net Revenue Sharing Income, as well as any expenses assumed to be incurred by the company in conjunction with the assumed replacement of the services provided to it (as discussed in Subsection A.5.b.v.) shall be included in the projections as a company expense under the requirements of Subsection A.1. In addition, expenses incurred by either the entity providing the Net Revenue Sharing Income or an affiliate of the company shall be included in the applicable expenses discussed in Subsections A.1. and A.5.a. that reduce the Net Revenue Sharing Income.
- e. The actuary is responsible for reviewing the revenue sharing agreements, verifying compliance with these requirements, and documenting the rationale for any source of Net Revenue Sharing Income used in the projections.
- f. The amount of Net Revenue Sharing Income assumed in a given scenario shall not exceed the sum of a. and b., where:
  - i. Is the contractually guaranteed Net Revenue Sharing Income projected under the scenario, and
  - ii. Is the actuary's estimate of non-contractually guaranteed Net Revenue Sharing Income before reflecting any margins for uncertainty multiplied by the following factors:
    - a). 1.0 in the first projection year;
    - b). 0.9 in the second projection year;
    - c). 0.8 in the third projection year;
    - d). 0.7 in the fourth projection year;
    - e). 0.6 in the fifth projection year;
    - f). 0.5 in the sixth and all subsequent projection years. The resulting amount of non-contractually guaranteed Net Revenue Sharing Income after application of this factor shall not exceed 0.25% per year on separate account assets in the sixth and all subsequent projection years.
- 6. <u>Length of Projections</u>. Projections of Accumulated Deficiencies shall be run for as many future years as needed so that no materially greater reserve value would result from longer projection periods.

- 7. <u>AVR/IMR</u>. The AVR and the IMR shall be handled consistently with the treatment in the company's cash flow testing.
- B. Determination of Scenario Greatest Present Values
  - 1. <u>Scenario Greatest Present Values</u>. For a given scenario, the Scenario Greatest Present Value is the sum of:
    - a. The greatest present value, as of the projection start date, of the projected Accumulated Deficiencies defined in Section 1.E.2.f.; and
    - b. The Starting Asset Amount.
  - 2. <u>Discount Rates</u>. In determining the Scenario Greatest Present Values, Accumulated Deficiencies shall be discounted using the same interest rates at which positive cash flows are invested, as determined in Subsection D.4. Such interest rates shall be reduced to reflect expected credit losses. Note that the interest rates used do not include a reduction for Federal Income Taxes.
- C. Projection Scenarios
  - 1. <u>Minimum Required Scenarios</u>. The number of scenarios for which projected greatest present values of Accumulated Deficiencies shall be computed shall be the responsibility of the actuary and shall be considered to be sufficient if any resulting understatement in total reserves, as compared with that resulting from running additional scenarios, is not material.
  - 2. <u>Scenario Calibration Criteria</u>. Returns for the groupings of variable funds shall be determined on a stochastic basis such that the resulting distribution of the Gross Wealth Ratios of the scenarios meets the Scenario Calibration Criteria specified in Section 7.
- D. Projection Assets
  - 1. <u>Starting Asset Amount</u>. For the projections of Accumulated Deficiencies, the value of assets at the start of the projection shall be set equal to the approximate value of statutory reserves at the start of the projection. Assets shall be valued consistently with their annual statement values. The amount of such asset values shall equal the sum of the following items, all as of the start of the projection:
    - a. All of the Separate Account assets supporting the contracts;
    - b An amount of assets held in the General Account equal to the approximate value of statutory reserves as of the start of the projections less the amount in a.,.

In many instances the initial General Account assets may be negative, resulting in a projected interest expense. General Account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

Any hedge assets meeting the requirements described in Subsection.A.4. shall be reflected in the projections and included with other General Account assets under item b.. To the extent the sum of the value of such hedge assets and the value of assets in item a. is greater than the approximate value of statutory reserves as of the start of the projections, then item b. may include enough negative General Account assets or cash such that the sum of items a. and b. equals the approximate value of statutory reserves as of the start of the projections.

Guidance Note: Further elaboration on potential practices with regard to this issue may be included in a practice note.

The actuary shall document which assets were used as of the start of the projection, the approach used to determine which assets were chosen and shall verify that the value of the assets equals the approximate value of statutory reserves at the start of the projection.

- 2. <u>Valuation of Projected Assets</u>. For purposes of determining the projected Accumulated Deficiencies, the value of projected assets shall be determined in a manner consistent with their value at the start of the projection. For assets assumed to be purchased during a projection, the value shall be determined in a manner consistent with the value of assets at the start of the projection that have similar investment characteristics.
- 3. <u>Separate Account Assets</u>. For purposes of determining the Starting Asset Amounts in SubsectionD.1. and the valuation of projected assets in Subsection D.2., assets held in a Separate Account shall be summarized into asset categories determined by the actuary as discussed in Subsection.A.2.
- 4. <u>General Account Assets</u>. General Account assets shall be projected, net of projected defaults, using assumed investment returns consistent with their book value and expected to be realized in future periods as of the date of valuation. Initial assets that mature during the projection and positive cash flows projected for future periods shall be invested at interest rates, which, at the option of the actuary, are one of the following:
  - a. The forward interest rates implied by the swap curve in effect as of the valuation date,

**Guidance Note:** The swap curve is based on the Federal Reserve H.15 interest swap rates. The rates are for a Fixed Rate Payer in return for receiving three month LIBOR. One place where these rates can be found is <u>http://www.federalreserve.gov/releases/h15/default.htm</u>

- b. The 200 interest rate scenarios available as prescribed for Phase I, C-3 Risk Based Capital calculation, coupled with the Separate Account return scenarios by mating them up with the first 200 such scenarios and repeating this process until all Separate Account return scenarios have been mated with a Phase I scenario, or
- c. Interest rates developed for this purpose from a stochastic model that integrates the development of interest rates and the Separate Account returns.

When the option described in a. (the forward interest rates implied by the swap curve) is used, an amount shall be subtracted from the interest rates to reflect the current market expectations about future interest rates using the process described in Subsection.E.1.

The actuary may switch from a. to b., from a. to c. or from b. to c. from one valuation date to the next, but may not switch in the other direction without approval from the Domiciliary Commissioner.

- E. Projection of Annuitization Benefits (including GMIBs)
  - 1. <u>Assumed Annuitization Purchase Rates at Election</u>. For purposes of projecting annuitization benefits (including annuitizations stemming from the election of a GMIB), the projected annuitization purchase rates shall be determined assuming that market interest rates available at the time of election are the interest rates used to project General Account Assets, as determined in Subsection .D.4. However, where the interest rates used to project General Account Assets are based upon the forward interest rates implied by the swap curve in effect as of the valuation date (i.e., the option described in Subsection .D.4.a. is used, herein referred to as a point estimate), the margin between the cost to purchase an annuity using the guaranteed purchase basis and the cost using the interest rates prevailing at the time of annuitization shall be adjusted as discussed below.

If a point estimate is being used, it is important that the margin assumed reflects the current market expectations about future interest rates at the time of annuitization, as described more fully below, and a downward adjustment to the interest rate assumed in the purchase rate basis. The latter adjustment is

necessary since a greater proportion of contractholders will select an annuitization benefit when it is worth more than the cash surrender value then when it is not. As a practical matter, this effect can be approximated by using an interest rate assumption in the purchase rate basis that is 0.30 percent below that implied by the forward swap curve, as described below.

To calculate market expectations of future interest rates, the par or current coupon swap curve is used (documented daily in Federal Reserve H.15 with some interpolation needed). Deriving the expected rate curve from this swap curve at a future date involves the following steps:

- a. Calculate the implied zero-coupon rates. This is a well documented "bootstrap" process. For this process we use the equation  $100=C^n * (v + v^2 + ... + v^n) + 100v^n$  where the "v<sup>t</sup>" terms are used to stand for the discount factors applicable to cash flows 1,2,...n years hence and  $C^n$  is the n-year swap rate. Each of these discount factors are based on the forward curve and therefore are based on different rates, however (i.e. "v<sup>2</sup>" does not equal v times v). Given the one year swap rate, one can solve for v. Given v and the two year swap rate one can then back into v<sup>2</sup>, and so on.
- b. Convert the zero coupon rates to one year forward rates by calculating the discount factor needed to get from v<sup>t-1</sup> to v<sup>t</sup>.
- c. Develop the expected rate curve.

This recognizes that, for example, the five-year forward one-year rate is not the rate the market expects on one year instruments five years from now. The reason is that as the bond gets shorter the "risk premium" in the rate diminishes. This is sometimes characterized as "rolling down" the yield curve. Table A shows the historic average risk premium at various durations. From this table, one can see that to get the rate the market expects a 1 year swap to have five years from now; one must subtract the risk premium associated with six year rates (.95%) and add back that associated with 1 year rates (.50%). This results in a net reduction of .45%.

Duration	Risk Premium	Duration	Risk Premium
1	0.500%	6	0.950%
2	0.750%	7	1.000%
3	0.750%	8	1.100%
4	0.850%	9+	1.150%
5	0.900%		

Table A: Risk Premium by Duration

The Exhibit below combines the three steps. Columns A through D convert the swap curve to the implied forward rate for each future payment date. Columns E through H remove the current risk premium, add the risk premium t years in the future (the Exhibit shows the rate curve five years in the future), and uses that to get the discount factors to apply to the 1 year, 2 year,...5 year cash flows 5 years from now.

	А	В	С	D	E	F	G	Н
1						Risk	Expected Forward	PV of Zero
2	Projection	Swap Curve	PV of Zero	Forward 1 Year	Risk	Premium 5 Years	Rate In Five	Coupon In 5
3	Years	Rate	Coupon	Rate	Premium	Out	Years	Years
4	1	2.57%	0.97494	2.5700%	0.50000%			
5	2	3.07%	0.94118	3.5879%	0.75000%			
6	3	3.44%	0.90302	4.2251%	0.75000%			
7	4	3.74%	0.86231	4.7208%	0.85000%			
8	5	3.97%	0.82124	5.0010%	0.90000%			
9	6	4.17%	0.77972	5.3249%	0.95000%	0.50000%	4.8749%	0.95352
10	7	4.34%	0.73868	5.5557%	1.00000%	0.75000%	5.3057%	0.90547
11	8	4.48%	0.69894	5.6860%	1.10000%	0.75000%	5.3360%	0.85961
12	9	4.60%	0.66050	5.8209%	1.15000%	0.85000%	5.5209%	0.81463
13	10	4.71%	0.62303 =(1-B13*	6.0131%	1.15000%	0.90000%	5.7631%	0.77024
	~ 44 -		SUM(\$C\$					
14	Cell form	nulas for	4:Cl2))	=C12/C13-			=D13-	=H12/(1+G1)
14	Projection Y	ear 10:	/(I+BI3)	1		=E8	E13+F13	3)

Exhibit: Derivation of discount rates expected in the future

Where interest rates are projected stochastically using an integrated model, although one would "expect" the interest rate n years hence to be that implied for an appropriate duration asset by the forward swap curve as described above, there is a steadily widening confidence interval about that point estimate with increasing time until the annuitization date. The "expected margin" in the purchase rate is less than that produced by the point estimate based on the expected rate, since a greater proportion of contractholders will have an annuitization benefit whose worth is in excess of cash surrender value when margins are low than when margins are high. As a practical matter, this effect can be approximated by using a purchase rate margin based on an earnings rate .30 percent below that implied by the forward swap curve. If a stochastic model of interest rates is used instead of a point estimate then no such adjustment is needed.

- 2. <u>Projected Election of Guaranteed Minimum Income Benefit and other Annuitization Options</u>. For contracts projected to elect annuitization options (including annuitizations stemming from the election of a GMIB), the projections may assume one of the following at the actuary's option:
  - a. The contract is treated as if surrendered at an amount equal to the statutory reserve that would be required at such time for the payout annuity benefits, or
  - b The contract is assumed to stay inforce, the projected periodic payments are paid, and the Working Reserve is equal to one of the following:
    - i. The statutory reserve required for the payout annuity, if it is a fixed payout annuity, or

ii If it is a variable payout annuity, the Working Reserve for a variable payout annuity.

If the projected payout annuity is a variable payout annuity containing a floor guarantee (such as a GPAF) under a specified contractual option, only option ii. shall be used.

Where mortality improvement is used to project future annuitization purchase rates, as discussed in 1 above, mortality improvement shall also be reflected on a consistent basis in either the determination of the reserve in i. above or the projection of the periodic payments in ii.

- F. Relationship to Risk Based Capital Requirements
  - 1. These requirements anticipate that the projections described herein may be used for the determination of Risk Based Capital (the "RBC requirements") for some or all of the contracts falling within the scope of these requirements. There are several differences between these requirements and the RBC requirements, and among them are two major differences. First, the Conditional Tail Expectation level is different (CTE (70) for these requirements and CTE (90) for the RBC requirements). Second, the projections described in these requirements are performed on a basis that ignores Federal Income Tax. That is, under these requirements, the Accumulated Deficiencies do not include projected Federal Income Tax and the interest rates used to discount the Scenario Greatest Present Value (i.e., the interest rates determined in Subsection.D.4. contain no reduction for Federal Income Tax). Under the RBC requirements, the Projections do include projected Federal Income Tax and the RBC requirements are used in the RBC requirements.
  - 2. To further aid the understanding of these requirements and any instructions relating to the RBC requirement, it is important to note the equivalence in meaning between the following terms, subject to the differences noted above:
    - a. The Accumulated Deficiency, the amount that is added to the Starting Asset Amount in Section 2.D., is similar to the Additional Asset Requirement referenced in the RBC requirement.
    - b The Conditional Tail Expectation Amount referenced in these requirements is similar to the Total Asset Requirement referenced in the RBC requirement.
- G. Compliance with Actuarial Standards of Practice (ASOPs)

When determining the Conditional Tail Expectation Amount using projections, the analysis shall conform to the Actuarial Standards of Practice as promulgated from time to time by the Actuarial Standards Board.

Under these requirements the actuary must make various determinations, verifications and certifications. The company shall provide the actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in these requirements and responsibilities arising from applicable Actuarial Standards of Practice, including ASOP No. 23, *Data Quality*.

H Compliance with Principles

When determining the Conditional Tail Expectation Amount using projections, any interpretation and application of the requirements of these requirements shall follow the principles discussed in Section 1.B.

#### Section 4. Reinsurance and Statutory Reporting Issues

- A. Treatment of Reinsurance Ceded in the Aggregate Reserve
  - 1. <u>Aggregate Reserve Net of and Prior to Reinsurance Ceded</u>. As noted in Section 2.B., the Aggregate Reserve is determined net of reinsurance ceded. Therefore, it is necessary to determine the components

needed to determine the Aggregate Reserve (i.e., the Standard Scenario Amount, and either the Conditional Tail Expectation Amount determined using projections or the Conditional Tail Expectation Amount determined using the Alternative Methodology) on a net of reinsurance basis. In addition, as noted in Section 2.B., it may be necessary to determine the Aggregate Reserve determined on a "direct" basis, or prior to reflection of reinsurance ceded. Where this is needed, each of these components shall be determined prior to reinsurance. Subsections A.2. through A.4. discuss methods necessary to determine these components on both a "net of reinsurance" and a "prior to reinsurance" basis. Note that due allowance for reasonable approximations may be used where appropriate.

2. <u>Conditional Tail Expectation Amount Determined using Projections</u>. In order to determine the Aggregate Reserve net of reinsurance ceded, Accumulated Deficiencies, Scenario Greatest Present Values, and the resulting Conditional Tail Expectation Amount shall be determined reflecting the effects of reinsurance treaties that meet the statutory requirements that would allow the treaty to be accounted for as reinsurance within the projections. This involves including, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries, where both premiums and recoveries are determined by recognizing any limitations in the reinsurance treaties, such as caps on recoveries or floors on premiums.

In order to determine the Conditional Tail Expectation Amount prior to reinsurance ceded, Accumulated Deficiencies, Scenario Greatest Present Values, and the resulting Conditional Tail Expectation Amount shall be determined ignoring the effects of reinsurance within the projections. One acceptable approach involves a projection based on the same Starting Asset Amount as for the Aggregate Reserve net of reinsurance and by ignoring, where appropriate, all anticipated reinsurance premiums or other costs and all reinsurance recoveries in the projections.

- 3. <u>Conditional Tail Expectation Amount Determined using the Alternative Methodology</u>. If a company chooses to use the Alternative Methodology, as allowed in Section 2.E., it is important to note that the methodology produces reserves on a prior to reinsurance ceded basis. Therefore, where reinsurance is ceded, the Alternative Methodology must be modified to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties in the determination of the Aggregate Reserve net of reinsurance. In addition, the Alternative Methodology, unadjusted for reinsurance, shall be applied to the contracts falling under the scope of these requirements to determine the Aggregate Reserve prior to reinsurance.
- 4. <u>Standard Scenario Amount</u>. Where reinsurance is ceded, the Standard Scenario Amount shall be calculated as described in Section 5 to reflect the reinsurance costs and reinsurance recoveries under the reinsurance treaties. If it is necessary, the Standard Scenario Amount shall be calculated prior to reinsurance ceded using the methods described in Section 5, but ignoring the effects of the reinsurance ceded.
- B. Aggregate Reserve to be held in the General Account

The amount of the reserve held in the General Account shall not be less than the excess of the Aggregate Reserve over the sum of the Basic Reserve, as defined in Section 5.B., attributable to the variable portion of all such contracts.

- C. Actuarial Certification and Memorandum
  - 1. <u>Actuarial Certification</u>. Actuarial Certification of the work done to determine the Aggregate Reserve shall be required. A qualified actuary (referred to throughout these requirements as "the actuary") shall certify that the work performed has been done in a way that substantially complies with all applicable Actuarial Standards of Practice. The scope of this certification does not include an opinion on the adequacy of the Aggregate Reserve, the company's surplus or the company's future financial condition. The actuary shall also note any material change in the model or assumptions from that used previously and the estimated impact of such changes.

Section 10 contains more information on the contents of the required Actuarial Certification.

**Guidance Note:** The adequacy of total company reserves, which includes the Aggregate Reserve, is addressed in the company's Actuarial Opinion as required by VM-30.

2. <u>Required Memorandum</u>. An actuarial memorandum shall be constructed documenting the methodology and assumptions upon which the Aggregate Reserve is determined. The memorandum shall also include sensitivity tests that the actuary feels appropriate, given the composition of the company's block of business (i.e., identifying the key assumptions that, if changed, produce the largest changes in the Aggregate Reserve). This memorandum shall have the same confidential status as the actuarial memorandum supporting the actuarial opinion and shall be available to regulators upon request.

Section 10 contains more information on the contents of the required memorandum.

**Guidance Note**: This is consistent with Section 3A(4)(h) of the Standard Valuation Law, which states: "Except as provided in paragraphs (l), (m) and (n), documents, materials or other information in the possession or control of the Department of Insurance that are a memorandum in support of the opinion, and any other material provided by the company to the commissioner in connection with the memorandum, shall be confidential by law and privileged, shall not be subject to [insert open records, freedom of information, sunshine or other appropriate phrase], shall not be subject to subpoena, and shall not be subject to discovery or admissible in evidence in any private civil action. However, the commissioner is authorized to use the documents, materials or other information in the furtherance of any regulatory or legal action brought as a part of the commissioner's official duties."

3. <u>Conditional Tail Expectation Amount Determined using the Alternative Methodology</u>. Where the Alternative Methodology is used, there is no need to discuss the underlying assumptions and model in the required memorandum. Certification that expense, revenue, fund mapping, and product parameters have been properly reflected, however, shall be required.

Section 10 contains more information on the contents of the required Actuarial Certification and memorandum.

4. <u>Material Changes</u>. If there is a material change in results due to a change in assumptions from the previous year, the memorandum shall include a discussion of such change in assumptions and an estimate of the impact it has on the results.

#### Section 5. Standard Scenario Requirements

- A Overview
  - 1. <u>Application to Determine Reserves</u>. A Standard Scenario Reserve shall be determined for each of the contracts falling under the scope of these requirements by applying Subsection C. This includes those contracts to which the Alternative Methodology is applied.

The Standard Scenario Reserve for a contract with guaranteed living benefits or guaranteed death benefits is based on a projection of the account value based on specified returns for supporting assets equal to the account value. An initial drop is applied to the supporting assets and account value on the valuation date. Subsequently, account values are projected at specified rates earned by the supporting assets less contract and fund charges. The assumptions for the projection of account values and margins are prescribed in Subsection C.3. For any contract with guarantees the Standard Scenario Reserve includes the greatest present value of the benefit payments in excess of account values applied over the present value of revenue produced by the margins.

- 2. <u>The Standard Scenario Amount</u>
  - a. The Standard Scenario Amount is defined in Section 2.C. of these requirements as the aggregate of the reserves determined by applying the Standard Scenario Method to each of the contracts

falling under the scope of these requirements. Except as provided in Subsection C.2.a., the Standard Scenario Amount equals the sum over all contracts of the Standard Scenario Reserve determined for each contract as of the statement date as described in Subsection A.2.b.

- b The Standard Scenario Method requires the Standard Scenario Amount to not be less than the sum over all contracts of the Standard Scenario Reserve determined for the contract as of the statement date as described in Subsection C, where the Discount Rate is equal to *DR*, which is defined as the valuation interest rate specified by the Standard Valuation Law for annuities valued on an issue year basis, using Plan Type A and a Guarantee Duration greater than 10 years but not more than 20 years. The presence of guarantees of interest on future premiums and/or cash settlement options is to be determined using the terms of the contracts.
- 3. <u>Illustrative Application of the Standard Scenario to a Projection or Model Office</u>. If the Conditional Tail Expectation Amount is determined based on a projection of an inforce prior to the statement date and/or by the use of a model office, which is a grouping of contracts into representative cells, then additional determinations of Subsection A.2.b. shall be performed on the prior inforce and/or model office. The calculations are for illustrative purposes to assist in validating the reasonableness of the projection and/or the model office.

The following table identifies the illustrative additional determinations required by this Section using the Discount Rate, DR, as defined in Subsection A.2.b. The additional determinations required are based on how the Conditional Tail Expectation projection or Alternative Methodology is applied. For completeness, the table also includes the determinations required by Subsection A.2.b.

- a. Run A in the table is required for all companies by Subsection A.2.b. No additional determinations are required if a company's stochastic or alternative methodology result is calculated on individual contracts as of the statement date.
- b A company that uses a model office as of the statement date to determine its stochastic or alternative methodology result must provide an additional determination for the model office based on the Discount Rate *DR*, run B.
- c. A company that uses a contract by contract listing of a prior inforce to determine its stochastic or alternative methodology with result PS and then projects requirements to the statement date with result S must provide an additional determination for the prior inforce based on the Discount Rate *DR*, run C.
- d A company that uses a model office of a prior inforce to determine its stochastic or alternative methodology requirements with result PM and then projects requirements to the statement date with result S must provide an additional determination for the prior model office based on the Discount Rate *DR*, run D.

		Validation Measures	
Standard Scenario Run	VM-21 Variations	Model Office Projection	Projection of Prior Inforce
A. Valuation on the statement date on inforce contracts with discount rate <i>DR</i>	None	None	None
B. Valuation on the statement date on the model office with discount rate <i>DR</i>	If not material to model office validation	A/B compare to 1.00	None
C. Valuation on a prior inforce date on prior inforce contracts with discount rate <i>DR</i>	If not material to projection validation	None	A/C - S/PS compare to 0
	If not material to model	(A/D – S	S/PM)

D. Valuation on a prior inforce date on a	office or projection	compare to 0
model office with discount rate DR	validation.	

Modification of the requirements in Subsection C when applied to a prior inforce or a model office is permitted if such modification facilitates validating the projection of inforce or the model office. All such modifications should be documented.

- B Basic and Basic Adjusted Reserve Application of Actuarial Guideline XXXIII
  - 1. The Basic Reserve for a given contract shall be determined by applying statutory statement valuation requirements applicable immediately prior to adoption of these requirements to the contract ignoring any guaranteed death benefits in excess of account values or guaranteed living benefits applying proceeds in excess of account values.
  - 2. The calculation of the Basic Reserve shall assume a return on separate account assets based on the year of issue statutory valuation rate less appropriate asset based charges, including charges for any guaranteed death benefits or guaranteed living benefits. It shall also assume a return for any fixed separate account and general account options equal to the rates guaranteed under the contract.
  - 3. The Basic Reserve shall be no less than the Cash Surrender Value on the valuation date.
  - 4. The Basic Adjusted Reserve shall be that determined based on Subsections B.1. and B.2. except that in Subsection B.1., free partial withdrawal provisions shall be disregarded when determining surrender charges in applying the statutory statement valuation requirement prior to adoption of these requirements. Subsection B.3. shall not apply to the Basic Adjusted Reserve.
- C. Standard Scenario Reserve Application of the Standard Scenario Method
  - 1. <u>General</u>. Where not inconsistent with the guidance given here, the process and methods used to determine the Standard Scenario Reserve under the Standard Scenario Method shall be the same as required in the calculation of the Conditional Tail Expectation Amount as described in Section 2 of these requirements. Any additional assumptions needed to determine the Standard Scenario Reserve shall be explicitly documented.
  - 2. <u>Results for the Standard Scenario Method</u>. For each contract, the Standard Scenario Reserve is the reserve based on a. or b. where:
    - a. For contracts without any guaranteed benefits, where not subsequently disapproved by the Domiciliary Commissioner, the Standard Scenario Reserve is the Basic Reserve described in Subsections B.1., B.2. and B.3.
    - b. For all other contracts the Standard Scenario Reserve is equal to the greater of Cash Surrender Value on the valuation date and the quantity i + ii iii, where:
      - i. Is the Basic Adjusted Reserve calculated for the contract, as described in Subsection B.4.;
      - ii. Is the greater of zero and the greatest present value at the Discount Rate measured as of the end of each projection year of the negative of the Accumulated Net Revenue described below using the assumptions described in Subsection C.3. The Accumulated Net Revenue at the end of a projection year is equal to (a) + (b) (c), where:
        - (a) Is the Accumulated Net Revenue at the end of the prior projection year accumulated at the Discount Rate to the end of the current projection year; the Accumulated Net Revenue at the beginning of the projection (i.e., time 0) is zero;

- (b) Are the margins generated during the projection year on account values accumulated at the Discount Rate to the end of the projection year (the factors and assumptions to be used in calculating the margins and account values are in Subsection C.3.; and
- (c) Are the contract benefits in excess of account values applied, Individual reinsurance premiums and Individual reinsurance benefits payable or receivable during the projection year accumulated at the Discount Rate to the end of the projection year. Individual reinsurance is defined in Subsection C.3.b.
- iii. Is the contract's allocation of the value of hedges and Aggregate reinsurance as described in Subsection C.4. Aggregate reinsurance is defined in Subsection C.3.b.

No reinsurance shall be considered in the Standard Scenario Amount if such reinsurance does not meet the statutory requirements that would allow the treaty to be accounted for as reinsurance. The actuary shall determine the projected reinsurance premiums and benefits reflecting all treaty limitations and assuming any options in the treaty to the other party are exercised to decrease the value of reinsurance to the reporting company (e.g., options to increase premiums or terminate coverage). The positive value of any reinsurance treaty that is not guaranteed to the insurer or its successor shall be excluded from the value of reinsurance. The commissioner may require the exclusion of a reinsurance treaty or any portion of a reinsurance treaty if the terms of the reinsurance ) treaty or the portion required to be excluded serves solely to reduce the calculated Standard Scenario Reserve without also reducing risk on scenarios similar to those used to determine the Conditional Tail Expectation Reserve. Any reinsurance reflected in the Standard Scenario Reserve shall be appropriate to the business and not merely constructed to exploit 'foreknowledge' of the components of the Standard Scenario Method.

- 3. Assumptions for use in Subsection C.2.b.ii. for Accumulated Net Revenue and Account Values.
  - a. <u>Account Value Return Assumptions</u>. The bases for return assumptions on assets supporting the Account Value are shown in Table I. The "Initial" returns shall be applied to the account value supported by each asset class on the valuation date as immediate drops, resulting in the Account Value at time 0. The "Year 1," "Years 2 5," and "Year 6+" returns for the equity, bond and balanced classes are gross annual effective rates of return and are used (along with other decrements and/or increases) to produce the Account Value as of the end of each projection interval. For purposes of this Section, money market funds supporting Account Value shall be considered part of the Bond class.

The Fixed Fund rate is the greater of the minimum rate guaranteed in the contract or 4% but not greater than the current rates being credited to Fixed Funds on the valuation date.

Account Values shall be projected using the appropriate gross rates from Table I for equity, bond and balanced classes applied to the supporting assets less all fund and contract charges according to the provisions of the funds and contract and applying the Fixed funds rate from Table I as if it were the resulting net rate after deduction for fund or contract charges.

The annual margins on Account Value are defined as follows:

- i. During the Surrender Charge Amortization Period, as determined following the step outlined in Subsection C.5.:
  - (a) 0.20% of Account Value; plus

- (b) Any Net Revenue Sharing Income, as defined in Section 3.A.5., that is contractually guaranteed to the insurer and its liquidator, receiver, and statutory successor; plus
- (c) For all of the guaranteed living benefits of a given contract combined, the greater of:
  - 0.20% of Account Value; or
  - Explicit and optional contract charges for guaranteed living benefits; plus

**Guidance Note:** This excludes any guaranteed living benefit that is added to the contract simply for the purpose of increasing the revenue allowed under this Section.

- (d) For all guaranteed death benefits of a given contract combined, the greater of:
  - 0.20% of Account Value; or
  - Explicit and optional contract charges for guaranteed death benefits.

**Guidance Note:** This excludes any guaranteed death benefit that is added to the contract simply for the purpose of increasing the revenue allowed under this Section.

ii. After the Surrender Charge Amortization Period:

The amount determined in i. above; plus 50% of the excess, if any, of all contract charges (excluding Net Revenue Sharing Income) over the sum of i.(a), i.(c) and i.(d) above.

However, on fixed funds after the surrender charge period, a margin of up to the amount in i. above plus .4% may be used.

	Initial	Year 1	Years 2 – 5	Year 6+
Equity Class	-13.5%	0%	4.0%	5.50%
Bond Class	0%	0%	4.85%	4.85%
Balanced Class	-8.1%	0%	4.34%	5.24%
Fixed Separate Accounts and General Account (net)	0%	Fixed Fund Rate	Fixed Fund Rate	Fixed Fund Rate

Table I

b. <u>Reinsurance Credit</u>. Individual reinsurance is defined as reinsurance where the total premiums for and benefits of the reinsurance can be determined by applying the terms of the reinsurance to each contract covered without reference to the premiums or benefits of any other contract covered and summing the results over all contracts covered. Reinsurance that is not Individual is Aggregate.

Individual reinsurance premiums projected to be payable on ceded risk and receivable on assumed risk shall be included in the Projected Net Revenue. Similarly, Individual reinsurance benefits projected to be receivable on ceded risk and payable on assumed risk shall be included in the Projected Net Revenue. No Aggregate reinsurance shall be included in Projected Net Revenue.

c. <u>Lapses, Partial Withdrawals, and In-The-Moneyness</u>. Partial withdrawals elected as guaranteed living benefits, see Subsection C.3.g., or required contractually (e.g., a contract operating under an automatic withdrawal provision on the valuation date) are to be deducted from the Account Value in each projection interval consistent with the projection frequency used, as described in Subsection C.3.f., and according to the terms of the contract. No other partial withdrawals, including free partial withdrawals, are to be deducted from Account Value. All lapse rates should be applied as full contract surrenders.

For purposes of determining the dynamic lapse assumptions shown in Table II below, a guaranteed living benefit is in the money (ITM) for any projection interval if the Account Value at the beginning of the projection interval is less than the Current Value of the guaranteed living benefit (as defined below) also at the beginning of that projection interval.

The Current Value of the guaranteed living benefit at the beginning of any projection interval is either the amount of the current lump sum payment (if exercisable) or the present value of future lump sum or income payments. More specific guidance is provided below. For the purpose of determining the present value, the discount rate shall be equal DR as defined in Subsection A.2.b. If future living benefit payments are life contingent (i.e., either the right of future exercise or the right to future income benefits expires with the death of the annuitant or the owner), then the company shall determine the present value of such payments using the mortality table specified in Subsection C.3.e.

If a guaranteed living benefit is exercisable (withdrawal can start or, in the case of a GMWB, has begun) at the beginning of the projection interval, then the Current Value of the guaranteed living benefit shall be determined assuming immediate or continued exercise of that benefit.

If a guaranteed living benefit is not exercisable (e.g., due to minimum age or duration requirements) at the beginning of that projection interval, then the Current Value of the guaranteed living benefit shall be determined assuming exercise of the guaranteed living benefit at the earliest possible future projection interval. If the right to exercise the guaranteed living benefit is contingent on the survival of the annuitant or the owner, then the Current Value of the guaranteed living benefit shall assume survival to the date of exercise using the mortality table specified in Subsection C.3.e.

Determination of the Current Value of a guaranteed living benefit that is exercisable or payable at a future projection interval shall take account of any guaranteed growth in the basis for the guarantee (e.g., where the basis grows according to an index or an interest rate).

For a GMWB, the Current Value shall be determined assuming the earliest penalty-free withdrawal of guaranteed benefits after withdrawals begin and by applying the constraints of any applicable maximum or minimum withdrawal provisions. If the GMWB is currently exercisable and the right to future GMWB payments is contingent upon the survival of the annuitant or owner, then the Current Value shall assume survival using the mortality table specified in Subsection C.3.e. After a GMWB that has payments that are contingent upon the survival of the annuitant or owner has commenced, then the Current Value shall assume survival using the Annuity 2000 Mortality Table.

For an unexercised GMIB, the Current Value shall be determined assuming the option with a reserve closest to the reserve for a 10 year certain and life option. The reserve values and the value of the GMIB on the assumed date of exercise shall be determined using the discount rate DR specified in Subsection A.2.b. and for life contingent payments, the Annuity 2000 Mortality Table. The Current Value of an unexercised GMIB, however, shall be set equal to the Account Value if the contractholder can receive higher income payments on the assumed date of exercise by electing the same option under the normal settlement option provisions of the contract.

For the purpose of applying the lapse assumptions specified in Table II below or contractholder elections rates specified in Subsection C.3.g., the contract shall be considered "out of the money" (OTM) for a projection interval if the Current Value of the guaranteed living benefit at the beginning of the projection interval is less than or equal to the Account Value at the beginning of the same projection interval. If the Current Value of the guaranteed living benefit at the beginning of the projection interval is greater than the Account Value also at the beginning of the projection interval is determined in the money" (ITM) and the percent ITM shall equal:

100 \* ((Current Value of the guaranteed living benefit /Account Value) - 1)

If a contract has multiple living benefit guarantees then the guarantee having the largest Current Value shall be used to determine the percent in the money.

During Surrender Charge Period		After Surrender Charge Period		
Death Benefit Only Contracts	5%	10%		
All Guaranteed Living	5%	10%		
Belletits OTM				
		ITM < 10%	10%<=ITM<20%	20%<=ITM
Any Guaranteed Minimum	2%	2%	0%	0%
Accumulation Benefit ITM				
Any Other Guaranteed Living Benefits ITM	3%	7%	5%	2%

Table II - Lapse Assumptions

d. <u>Account Transfers and Future Deposits</u>. No transfers between funds shall be assumed in the projection used to determine the greatest present value amount required under Subsection C.2.b.ii. unless required by the contract (e.g., transfers from a dollar cost averaging fund or contractual rights given to the insurer to implement a contractually specified portfolio insurance management strategy or a contract operating under an automatic re-balancing option). When transfers must be modeled, to the extent not inconsistent with contract language, the allocation of transfers to funds must be in proportion to the contract's current allocation to funds.

Margins generated during a projection interval on funds supporting account value are transferred to the Accumulation of Net Revenue and are subsequently accumulated at the Discount Rate. Assets for each class supporting account values are to be reduced in proportion to the amount held in each asset classes at the time of transfer of margins or any portion of Account Value applied to the payment of benefits.

No future deposits to Account Value shall be assumed unless required by the terms of the contract to prevent contract or guaranteed benefit lapse, in which case they must be modeled. When future deposits must be modeled, to the extent not inconsistent with contract language, the allocation of the deposit to funds must be in proportion to the contract's current allocation to such funds.

- e. <u>Mortality</u>. Mortality at 70% of the 1994 Variable Annuity MGDB Mortality Tables (1994 MGDB tables) through age 85 increasing by 1% each year to 100% of the 1994 MGDB tables at age 115 shall be assumed in the projection used to the determine the greatest present value amount required under Subsection C.2.b.ii.
- f. <u>Projection Frequency</u>. The projection used to determine the greatest present value amount required under Subsection C.2.b.ii. shall be calculated using an annual or more frequent time step, such as quarterly. For time steps more frequent than annual, assets supporting Account Values at the start

of a year may be retained in such funds until year-end (i.e., margin earned during the year will earn the fund rates instead of the Discount Rate until year end) or removed after each time step. However, the same approach shall be applied for all years. Similarly, projected benefits, lapses, elections and other contractholder activity can be assumed to occur annually or at the end of each time step, but the approach shall be consistent for all years.

g. <u>Contractholder Election Rates</u>. Contractholder election rates for exercisable ITM guaranteed living benefits other than GMWBs shall be 5% per annum in every projection interval where the living benefit is less than 10% ITM, 15% per annum in every projection interval where the living benefit is 10% or more ITM and less than 20% ITM, and 25% per annum in every projection interval where the living benefit is more than 20% ITM. In addition, the election rate for an exercisable ITM guaranteed living benefit shall be 100% at the last model duration to elect such benefit. This 100% election rate shall be used when a Guaranteed Minimum Accumulation Benefit is at the earliest date that the benefit is exercisable and in-the-money. However, the contractholder election rate for any exercisable ITM guaranteed living benefit shall be zero if exercise would cause the extinction of a guaranteed living benefit having a larger Current Value. For this purpose, GMDBs are not benefits subject to election.

For guaranteed minimum withdrawal benefits, a partial withdrawal, if allowed by contract provisions, equal to the applicable percentage in Table III applied to the contract's maximum allowable partial withdrawal shall be assumed. However, if the contract's minimum allowable partial withdrawal exceeds the partial withdrawal from applying the rate in Table III to the contract's maximum allowable partial withdrawal, then the contract's minimum allowable partial withdrawal shall be assumed.

Table III - Guaranteed Withdrawal Assumptions					
	Attained Age less than 50	Attained Age 50 to 59	Attained Age 60 or Greater		
Withdrawals do not reduce other elective Guarantees that are in the money	50%	75%	100%		
Withdrawals reduce elective Guarantees that are in the money	25%	50%	75%		

h. <u>Indices</u>. If an interest index is required to determine projected benefits or reinsurance obligations, the index must assume interest rates have not changed since the last reported rates before the valuation date. If an equity index is required the index shall be consistent with the last reported index before the valuation date, the initial drop in equity returns and the subsequent equity returns in the standard scenario projection. The sources of information and how they are used to determine the indexes shall be documented and, to the extent possible, consistent from year to year.

#### 4. Assumptions for use in Subsection C.2.b.iii.

a. <u>The Value of Aggregate Reinsurance</u>. The value of Aggregate reinsurance shall be calculated separately from the Accumulated Net Revenue. The value of Aggregate reinsurance is the discounted value, using the statutory valuation rate described in the following paragraph, of the excess of (a) the projected benefit payments from the reinsurance; over (b) the projected gross reinsurance premiums, where (a) and (b) are determined under the assumptions described in Subsection C.3. for all applicable contracts in aggregate.

In order for the value of the Aggregate reinsurance to be consistent with the underlying Standard Scenario reserve, the discount rate shall be a weighted average of the valuation rates (DR) of the contracts that are supported by the Aggregate reinsurance treaty. The weights used to determine

this discount rate shall be reasonably related to the risks that are being covered by the Aggregate reinsurance (e.g., account value or values of guaranteed benefits) and shall be applied consistently from year to year. If an appropriate method to determine this discount rate does not exist, the value of the Aggregate reinsurance shall be determined using the statutory valuation rate in effect on the valuation date for annuities valued on an issue year basis using Plan Type A and a Guarantee Duration greater than 10 years but not more than 20 years, determined assuming there are cash settlement options but no interest guarantees on future premiums.

b. <u>The Value of Approved Hedges</u>. The value of approved hedges shall be calculated separately from the Accumulated Net Revenue. The value of approved hedges is the difference between: a) the discounted value at the 1-year CMT as of the valuation date of the pre-tax cash flows from the approved hedges; less b) their statement values on the valuation date.

**Guidance Note**: For purposes of this Section, the term CMT refers to the nominal yields on actively traded non-inflation-indexed issues adjusted to constant maturities, as released daily by the Federal Reserve Board. As of this writing, the current and historical one-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y1.txt</u> and the current and historical five-year rates may be found at <u>http://www.federalreserve.gov/releases/h15/data/Business\_day/H15\_TCMNOM\_Y5.txt</u>

To be an approved hedge for purposes of the Standard Scenario Reserve, a derivative or other investment has to be an actual asset held by the company on the valuation date, be used as a hedge supporting the contracts falling under the scope of these requirements, and comply with any statutes, laws, or regulations (including applicable documentation requirements) of the domiciliary state or jurisdiction related to the use of derivative instruments.

The Domiciliary Commissioner may require the exclusion of any portion of the value of approved hedges upon a finding that the company's documentation, controls, measurement, execution of strategy or historical results are not adequate to support a future expectation of risk reduction commensurate with the value of approved hedges.

The cash flow projection for approved hedges that expire in less than one year from the valuation date should be based on holding the hedges to their expiration. For hedges with an expiration of more than 1 year, the value of hedges should be based on liquidation of the hedges one year from the valuation date. Where applicable, the liquidation value of hedges shall be consistent with the assumed returns in the Standard Scenario from the start of the projection to the date of liquidation, Black-Scholes pricing, a risk free rate equal to the 5-year CMT as of the valuation date and the statement value of hedges are valued with Black-Scholes pricing and a risk-free rate equal to the 5-year CMT as of the valuation date.

**Guidance Note:** Conceptually, the item being hedged, the contract guarantees, and the approved hedges are accounted for at the average present value of the worst 30% of all scenarios, the tail scenarios for a CTE (70) measure. However, the statement value of approved hedges is at market. Therefore, the standard scenario value of approved hedges is a proxy of the adjustment needed to move approved hedges from a market value to a tail value.

There is no credit in the Standard Scenario for dynamic hedging beyond the credit that results from hedges actually held on the valuation date.

c. <u>Allocation of the Value of Hedges and the Value of Aggregate Reinsurance</u>. The value of approved hedges and Aggregate reinsurance shall be allocated to the contracts which are supported by the applicable Aggregate reinsurance agreements and approved hedges. A contract's allocation shall be the lesser of the amount in Subsection C.2.b.ii. for the contract or the product of a) and b) where:

- i. Is the sum of the value of the applicable approved hedges plus the value of the applicable Aggregate reinsurance for all contracts supported by the same hedges and/or the Aggregate reinsurance agreement; and
- ii. Is the ratio of the amount in Subsection C.2.b.ii. for the contract to the sum of the amount in Subsection C.2.b.ii. for all contracts supported by the same hedges and/or the Aggregate reinsurance agreement.
- d. <u>Retention of components</u>. For the seriatim Standard Scenario Reserve on the statement date under each of Subsections A.2.a. and A.2.b., the actuary should have available to the Commissioner the following values for each contract:
  - i. The Standard Scenario Reserve prior to adjustment under Subsection C.4.c.
  - ii. The Standard Scenario Reserve net of the adjustment in SubsectionC.4.c.
- 5. Determination of the Surrender Charge Amortization Period to be used in Subsections C.3.a.i. and C.3.a.ii.

The purpose of the Surrender Charge Amortization Period is to help determine how much of the surrender charge is amortized in the Basic Adjusted Reserve portion of the Standard Scenario Amount and how much needs to be amortized in the Accumulated Net Revenue portion. Once determined, the Surrender Charge Amortization Period determines the duration over which the lower level of margins, as described in Subsection C.3.a.i., is used. After that duration, the higher level of margins, as described in Subsection C.3.a.ii., is used.

A separate Surrender Charge Amortization Period is determined for each contract and is based on amounts determined in the calculation of the Basic Adjusted Reserve for that contract. A key component of the calculation is the amount of the surrender charge that is not amortized in the Basic Adjusted Reserve calculation for that contract. This is represented by the difference between the account value and the cash surrender value projected within the Basic Adjusted Reserve calculation for the contract.

The Surrender Charge Amortization Period for a given contract is determined by following the steps:

- a. <u>Measure the duration of the greatest present value used in the Basic Adjusted Reserve</u>. The Basic Adjusted Reserve is determined for a contract by taking the greatest present value of a stream of projected benefits. The benefit stream that determines the greatest present value typically includes an "ultimate" event (e.g., 100% surrender, 100% annuitization, or maturity). The "BAR Duration" is the length of time between the valuation date and the projected "ultimate" event.
- b. <u>Determine the amount of the surrender charge not amortized in the Basic Adjusted Reserve</u>. The surrender charge not amortized in the Basic Adjusted Reserve is the difference between the projected account value and the projected cash surrender value at the BAR Duration (i.e., at the time of that projected "ultimate" event). This value for a given contract shall not be less than zero.
- c. <u>Determine the Surrender Charge Amortization Period before rounding</u>. This equals i time ii plus iii, where:
  - i. Equals the ratio of the amount determined in step 2 to the Account Value on the valuation date;
  - ii Equals 100; and
  - iii Equals the BAR Duration determined in step 1.

d. <u>Determine the Surrender Charge Amortization Period for the contract</u>. This is the amount determined in step 3, rounded to the nearest number that represents a projection duration, taking into account the projection frequency described in Subsection C.3.f. For example, step 3 produces a value of 2.15 and the projection frequency is quarterly, the Surrender Charge Amortization Period for the contract is 2.25.

#### Section 6. Alternative Methodology

- A. General Methodology
  - 1. <u>General Methodology Description</u>. For variable deferred annuity contracts that either contain no guaranteed benefits or only GMDBs, including "earnings enhanced death benefits," (i.e., no VAGLBs), the Conditional Tail Expectation Amount may be determined by using the method outlined below rather than by using the approach described in Section 2.D. (i.e., based on projections), provided the approach described in Section 2.D. has not been used in prior valuations or else approval has been obtained from the Domiciliary Commissioner.

The Conditional Tail Expectation Amount determined using the Alternative Methodology for a group of contracts with GMDBs shall be determined as the sum of amounts obtained by applying factors to each contract inforce as of a valuation date and adding this to the contract's Cash Surrender Value. The resulting Conditional Tail Expectation Amount shall not be less than the Cash Surrender Value in aggregate for the group of contracts to which the Alternative Methodology is applied.

**Guidance Note:** The amount that is added to a contract's Cash Surrender Value may be negative, zero or positive, thus resulting in a reserve for a given contract that could be less than, equal to, or greater than, the Cash Surrender Value.

The Conditional Tail Expectation Amount determined using the Alternative Methodology for a group of contracts that contain no guaranteed benefits shall be determined using an application of Actuarial Guideline XXXIII, as described below.

Guidance Note: The term "contracts that contain no guaranteed benefits" means that there are no guaranteed benefits at any time during the life of the contract (past, present or future).

For purposes of performing the Alternative Methodology, materially similar contracts within the group may be combined together into subgroups to facilitate application of the factors. Specifically, all contracts comprising a "subgroup" must display substantially similar characteristics for those attributes expected to affect reserves (e.g., definition of guaranteed benefits, attained age, contract duration, years-to-maturity, market-to-guaranteed value, asset mix, etc.). Grouping shall be the responsibility of the actuary but may not be done in a manner that intentionally understates the resulting reserve.

- 2. Definitions of Terms Used in this Section
  - a. <u>Annualized Account Charge Differential</u>. This term is the charge as percentage account value (revenue for the company) minus the expense as percentage of account value.
  - b. <u>Asset Exposure</u>. Asset Exposure refers to the greatest possible loss to the insurance company from the value of assets underlying general or separate account contracts falling to zero.
  - c. <u>Benchmark</u>. Benchmarks have similar risk characteristics to the entity (e.g., asset class, index, or fund) to be modeled.
  - d. <u>Deterministic Calculations</u>. In a Deterministic Calculation, a given event (e.g., asset returns going up by 7% then down by 5%) is assumed to occur with certainty. In a stochastic calculation, events are assigned probabilities.
  - e. <u>Foreign Securities</u>. Securities issued by entities outside the United States and Canada.

- f. <u>Grouped Fund Holdings</u>. Grouped Fund Holdings relate to guarantees that apply across multiple deposits or for an entire contract instead of on a deposit-by-deposit basis.
- g. <u>Guaranteed Value</u>. The Guaranteed Value is the benefit base or a substitute for the account value (if greater than the account value) in the calculation of living benefits or death benefits. The methodology for setting the Guaranteed Value is defined in the variable annuity contract.
- h. <u>High-Yield Bonds</u>. High-Yield Bonds are below investment grade, with NAIC ratings (if assigned) of 3, 4, 5, or 6. Compared to investment grade bonds, these bonds have higher risk of loss due to credit events. Funds containing securities predominately containing securities that are not NAIC rated as 1 or 2 (or similar agency ratings) are considered to be High-Yield.
- i. <u>Investment Grade Fixed Income Securities</u>. Securities with NAIC ratings of 1 or 2 are Investment Grade. Funds containing securities predominately with NAIC ratings of 1 or 2 or with similar agency ratings are considered to be Investment Grade.
- j. <u>Liquid Securities</u>. These securities can be sold and converted into cash at a price close to its true value in a short period of time.
- k. <u>Margin Offset</u>. Margin Offset is the portion of charges plus any Revenue Sharing allowed under Section 3.A.5. available to fund claims and amortization of the unamortized surrender charges allowance.
- 1. <u>Multi-Point Linear Interpolation</u>. This methodology is documented in mathematical literature and calculates factors based on multiple attributes categorized with discrete values where the attributes' actual values may be between the discrete values.
- m. <u>Model Office</u>. A Model Office converts many contracts with similar features into one contract with specific features for modeling purposes.
- n. <u>Pre-Packaged Scenarios</u>. The Pre-Packaged Scenarios are the year-by-year asset returns that may be used (but are not mandated) in projections related to the alternative methodology. These scenarios are available on an American Academy of Actuaries website.
- o. <u>Quota-Share Reinsurance</u>. In this type of reinsurance treaty, the same proportion is ceded on all cessions. The reinsurer assumes a set percentage of risk for the same percentage of the premium, minus an allowance for the ceding company's expenses.
- p. <u>Resets</u>. A Reset benefit results in a future minimum guaranteed benefit being set equal to the contract's account value at previous set date(s) after contract inception.
- q. <u>Risk Mitigation Strategy</u>. A Risk Mitigation Strategy is a device to reduce the probability and/or impact of a risk below an acceptable threshold.
- r. <u>Risk Profile</u>. Risk Profile in these requirements relates to the prescribed asset class categorized by the volatility of returns associated with that class.
- s. <u>Risk Transfer Arrangements</u>. A Risk Transfer Arrangement shifts risk exposures (e.g., the responsibility to pay at least a portion of future contingent claims) away from the original insurer.
- t. <u>Roll-Up</u>. A Roll-Up benefit results in the guaranteed value associated with a minimum contractual guarantee increasing at a contractually defined interest rate.
- u. V<u>olatility</u>. Volatility refers to the annualized standard deviation of asset returns.

3. <u>Contract-by-Contract Application for Contracts that Contain No Guaranteed Living or Death Benefits</u>. The Alternative Methodology reserve for each contract that contains no guaranteed living or death benefits shall be determined by applying Actuarial Guideline XXXIII. The application shall assume a return on separate account assets equal to the year of issue valuation interest rate less appropriate asset based charges. It shall also assume a return for any fixed separate account and general account options equal to the rates guaranteed under the contract.

The reserve for such contracts shall be no less than the Cash Surrender Value on the valuation date, as defined in Section 1.E.2.

- 4. <u>Contract-by-Contract Application for Contracts that Contain GMDBs only</u>. For each contract, factors are used to determine a dollar amount, equal to  $R \times (CA + FE) + GC$  (as described below), that is to be added to that contract's Cash Surrender Value as of the valuation date. The dollar amount to be added for any given contract may be negative, zero, or positive. The factors that are applied to each contract shall reflect the following attributes as of the valuation date:
  - a. The contractual features of the variable annuity product,
  - b. The actual issue age, period since issue, attained age, years-to-maturity, and gender applicable to the contract,
  - c. The account value and composition by type of underlying variable or fixed fund,
  - d. Any surrender charges,
  - e. The GMDB and the type of adjustment made to the GMDB for partial withdrawals (e.g., proportional or dollar-for-dollar adjustment), and
  - f. Expenses to be incurred and revenues to be received by the company as estimated on a Prudent Estimate basis as described in Section 1.E.2.i. and complying with the requirements for Revenue Sharing as described in Section 3.A.5.
- 5. <u>Factor Components</u>. Factors shall be applied to determine each of the following components.

**Guidance Note:** Material to assist in the calculation of the components is available on the American Academy of Actuaries' website, at <u>http://www.actuary.org/life/phase2.asp</u>.

- CA = Provision for amortization of the unamortized surrender charges calculated by the insurer based on each contract's surrender charge schedule, using prescribed assumptions, except that lapse rates shall be based on the insurer's Prudent Estimate, but with no provision for Federal Income Taxes or mortality;
- FE = Provision for fixed dollar expenses less fixed dollar revenue calculated using prescribed assumptions, the contract's actual expense charges, the insurer's anticipated actual expenses and lapse rates, both estimated on a Prudent Estimate basis, and with no provision for Federal Income Taxes or mortality;
- GC = Provision for the costs of providing the GMDB less net available spread-based charges determined by the formula  $F \times GV G \times AV \times R$ , where GV and AV are as defined in Subsection C.1.;

- R = A scaling factor that is a linear function of the ratio of the margin offset to Total Account Charges (*W*) and takes the form  $R(\beta_0, \beta_1) = \beta_0 + \beta_1 \times W$ . The intercept and slope factors for this linear function vary according to:
  - i. Product type,
  - ii. Pro-rata or dollar-for-dollar reductions in guaranteed value following partial withdrawals,
  - iii. Fund class,
  - iv. Attained age,
  - v. Contract duration,
  - vi. Asset-based charges, and
  - vii. 90% of the ratio of account value to guaranteed value, determined in the aggregate for all contracts sharing the same product characteristics.

Tables of factors for *F*, *G*,  $\beta_0$ , and  $\beta_1$  values, reflecting a 65% confidence level and ignoring Federal Income Tax, are available from the National Association of Insurance Commissioners. In calculating  $R(\beta_0, \beta_1)$  directly from the linear function provided above, the margin ratio *W* must be constrained to values greater than or equal to 0.2 and less than or equal to 0.6.

Interpolated values of F, G and R (calculated using the linear function described above) for all contracts having the same product characteristics and asset class shall be derived from the precalculated values using multi-point linear interpolation over the following four contract-level attributes:

- a. Attained age,
- b. Contract duration,
- c. Ratio of account value to GMDB, and
- d. The total of all asset based charges, including any fund management fees or allowances based on the underlying variable annuity funds received by the insurer.

The gross asset-based charges for a product shall equal the sum of all contractual asset-based charges plus fund management fees or allowances based on the underlying variable annuity funds received by the insurer determined by complying with the requirements for Prudent Estimate described in Section 1.E.2.i. and Revenue Sharing described in Section 3.A.5. Net asset-based charges equal gross asset-based charges less any company expenses assumed to be incurred expressed as a percentage of account value. All expenses that would be assumed if the Conditional Tail Expectation Amount were being computed as described in Section 3.A.1. should be reflected either in the calculation of the net asset based charges or in the expenses reflected in the calculation of the amount FE.

No adjustment is made for Federal Income Taxes in any of the components listed above.

For purposes of determining the Conditional Tail Expectation Amount using the Alternative Methodology, any interpretation and application of the requirements of these requirements shall follow the principles discussed in Section 1.B.

B. Calculation of *CA* and *FE* 

1. <u>General Description</u>. Components *CA* and *FE* shall be calculated for each contract, thus reflecting the actual account value and GMDB, as of the valuation date, which is unique to each contract.

Components *CA* and *FE* are defined by deterministic "single-scenario" calculations that account for asset growth, interest and inflation at prescribed rates. Mortality is ignored for these two components. Lapse rates shall be determined on a Prudent Estimate basis as described in Section 1.E.2.i. Lapse rates shall be adjusted by the formula shown below (the Dynamic Lapse Multiplier,  $\lambda$ ), which bases the relationship of the GMDB (denoted as GV in the formula) to the account value (denoted as AV in the formula) on the valuation date. Thus, projected lapse rates are smaller when the GMDB is greater than the account value and larger when the GMDB is less than the account value.

$$\lambda = MIN \left[ U, MAX \left[ L, 1 - M \times \left( \frac{GV}{AV} - D \right) \right] \right],$$

where U=1, L=0.5, M=1.25, and D=1.1.

Present values shall be computed over the period from the valuation date to contract maturity at a discount rate of 5.75%.

Projected fund performance underlying the account values is as shown in the table below. Unlike the GC component, which requires the entire account value to be mapped, using the Fund Categorization Rules set forth in Subsection D, to a single "equivalent" asset class (as described in Subsection D.3., the CA and FE calculation separately projects each variable subaccount (as mapped to the 8 prescribed categories shown in Subsection D using the net asset returns shown in the following table. If surrender charges are based wholly on deposits or premiums as opposed to account value, use of this table may not be necessary.

Asset Class / Fund	Net Annualized Return
Fixed Account	Guaranteed Rate
Money Market	0%
Fixed Income (Bond)	0%
Balanced	-1%
Diversified Equity	-2%
Diversified International Equity	-3%
Intermediate Risk Equity	-5%
Aggressive or Exotic Equity	-8%

2. <u>Component *CA*</u>. Component *CA* is computed as the present value of the projected change in surrender charges plus the present value of an implied borrowing cost of 25 basis points at the beginning of each future period applied to the surrender charge at such time.

This component can be interpreted as the "amount needed to amortize the unamortized surrender charge allowance for the *persisting* policies plus the implied borrowing cost." By definition, the amortization for non-persisting lives in each time period is exactly offset by the collected surrender charge revenue (ignoring timing differences and any waiver upon death). The unamortized balance must be projected to the end of the surrender charge period using the net asset returns and Dynamic Lapse Multiplier,  $\lambda$ , both as described above and the year-by-year amortization discounted also as described above. For simplicity, mortality is ignored in the calculations. Surrender charges and free partial withdrawal provisions are as specified in the contract. Lapse and withdrawal rates are determined on a Prudent Estimate basis, and may

vary according to the attributes of the business being valued, including, but not limited to, attained age, contract duration, etc.

3. <u>Component FE</u>. Component FE establishes a provision for fixed dollar expenses (e.g., allocated costs, including overhead expressed as "per contract" *and* those expenses defined on a "per contract" basis) less any fixed dollar revenue (e.g., annual administrative charges or contract fees) through the earlier of contract maturity or 30 years. FE is computed as the present value of the company's assumed fixed expenses projected at an assumed annual rate of inflation starting in the second projection year. This rate grades uniformly from the current inflation rate ("CIR") into an ultimate inflation rate of 3% per annum in the 8th year after the valuation date. The CIR is the greater of 3% and the inflation rate assumed for expenses in the company's most recent asset adequacy analysis for similar business.

#### C. Calculation of the GC Component

- 1. <u>*GC* Factors.</u> *GC* is calculated as  $F \times GV G \times AV \times R$ , where *GV* is the amount of GMDB and *AV* is the contract account value, both as of the valuation date. *F*, *G* and the slope and intercept for the linear function used to determine *R* (identified symbolically as  $\beta_0$  and  $\beta_1$ ) are pre-calculated factors available from the National Association of Insurance Commissioners and known herein as the "Pre-Calculated Factors." These factors shall be interpolated as described in Subsection C.6., and modified as necessary as described in Subsections C.7. and C.8.
- 2. <u>Five Steps</u>. There are five major steps in determining the *GC* component for a given contract:
  - a. Classifying the asset exposure, as specified in Subsection C.3.;
  - b. Determining the risk attributes, as specified in Subsection C.4. and C.5.;
  - c. Retrieving the appropriate nodal factors from the factor grid, as described in Subsection C.6.;
  - d. Interpolating the nodal factors, where applicable (optional), as described in Subsection C.6.; and
  - e. Applying the factors to the contract values.
- 3. <u>Classifying Asset Exposure</u>. For purposes of calculating *GC* (unlike what is done for components *CA* and *FE*), the entire account value for each contract must be assigned to one of the eight prescribed fund classes shown in Subsection D, using the Fund Categorization rules in Subsection D.
- 4. <u>Product Designs</u>. Factors *F*, *G* and  $R(\beta_1, \beta_2)$  are available within the Pre-Calculated Factors for the following GMDB product designs:
  - a. Return of Premium ("ROP"),
  - b. Premiums less withdrawals accumulated at 3% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 ("ROLL3"),
  - c. Premiums less withdrawals accumulated at 5% per annum, capped at 2.5 times premiums less withdrawals, with no further increase beyond age 80 ("ROLL5"),
  - d. An annual ratchet design (maximum anniversary value), for which the guaranteed benefit never decreases and is increased to equal the previous contract anniversary account value, if larger, with no further increases beyond age 80 ("MAV"),
  - e. A design having a guaranteed benefit equal to the larger of the benefits in designs 3 and 4, above ("HIGH"),

- f. An enhanced death benefit ("EDB") equal to 40% of the net earnings on the account (i.e., 40% of account value less total premiums paid plus withdrawals made) with this latter benefit capped at 40% of premiums less withdrawals ("EDB"),
- 5. <u>Other Attributes</u>. Factors *F*, *G* and  $R(\beta_1, \beta_2)$  are available within the Pre-Calculated Factors for the following set of attributes:
  - a. Two Partial Withdrawal Rules one for contracts having a pro-rata reduction in the GMDB and another for contracts having a dollar-for-dollar reduction,
  - b. The eight asset classes described in Subsection D.2.,
  - c. Eight attained ages, with a 5-year age setback for females,
  - d. Five contract durations,
  - e. Seven values of GV/AV, and
  - f. Three levels of asset-based income.
- 6. Interpolation of *F*, *G* and  $R(\beta_1, \beta_2)$ .
  - a. Values of *F*, *G* and  $R(\beta_1, \beta_2)$  apply to a contract having the product characteristics listed in Subsection E.1. and shall be determined by selecting values for the appropriate partial withdrawal rule and asset class and then using multi-point linear interpolation among published values for the last four attributes shown in Subsection C.5.
  - b. Interpolation over all four dimensions is not required, but if not performed over one or more dimensions, the factor used must result in a conservative (higher) value of *GC*. However, simple linear interpolation using the  $AV \div GV$  ratio is mandatory. In this case, the company must choose nodes for the other three dimensions according to the following rules: next highest attained age, nearest duration, and nearest Annualized Account Charge Differential, as listed in Subsection E.3 (i.e., capped at +100 and floored at -100 bps).
  - c. For  $R(\beta_1, \beta_2)$ , the interpolation should be performed on the Scaling Factors *R* calculated using  $\beta_1$ ,  $\beta_2$ , using the ratio of Margin Offset to Total Asset Charges (*W*), not on the factors  $\beta_1$  and  $\beta_2$  themselves.
  - d. An Excel<sup>®</sup> workbook, Excel<sup>®</sup> add-in and companion dynamic link library (.dll) program is available from the National Association of Insurance Commissioners that can be used to determine the correct values and perform the multi-point linear interpolation.
  - e. Alternatively, published documentation can be referenced on performing multi-point linear interpolation and the required sixteen values determined using a key that is documented in the table "*Components of Key Used for GC Factor Look-Up*" located in Subsection E.3.
- 7. <u>Adjustments to GC for Product Variations & Risk Mitigation/Transfer</u>. In some cases, it may be necessary to make adjustments to the published factors due to:
  - a. A variation in product form wherein the definition of the guaranteed benefit is materially different from those for which factors are available (see Subsection C.8.); and/or
  - b. A risk mitigation or other management strategy, other than a hedging strategy, that cannot be accommodated through a straightforward and direct adjustment to the published values.

Adjustments may not be made to *GC* for hedging strategies.

Any adjustments to the published factors must be fully documented and supported through stochastic analysis. Such analysis may require stochastic simulations, but would not ordinarily be based on full inforce projections. Instead, a representative "model office" should be sufficient. Use of these adjusted factors must be supported by a periodic review of the appropriateness of the assumptions and methods used to perform the adjustments, with changes made to the adjustments when deemed necessary by such review.

Note that minor variations in product design do not necessarily require additional effort. In some cases, it may be reasonable to use the factors/formulas for a different product form (e.g., for a roll-up GMDB near or beyond the maximum reset age or amount, the ROP GMDB factors/formulas shall be used, possibly adjusting the guaranteed value to reflect further resets, if any). In other cases, the reserves may be based on two different guarantee definitions and the results interpolated to obtain an appropriate value for the given contract/cell. Likewise, it may be possible to adjust the Alternative Methodology results for certain risk transfer arrangements without significant additional work (e.g., quota-share reinsurance without caps, floors or sliding scales would normally be reflected by a simple pro-rata adjustment to the "gross" *GC* results).

However, if the contract design is sufficiently different from those provided and/or the risk mitigation strategy is non-linear in its impact on the Conditional Tail Expectation Amount, and there is no practical or obvious way to obtain a good result from the prescribed factors/formulas, any adjustments or approximations must be supported using stochastic modeling. Notably this modeling need not be performed on the whole portfolio, but can be undertaken on an appropriate set of representative policies.

- 8. <u>Adjusting F and G for Product Design Variations</u>. This Subsection describes the typical process for adjusting F and G factors due to a variation in product design. Note that R (as determined by the slope and intercept terms in the factor table) would not be adjusted.
  - a. Select a contract design among those described in Subsection C.4. that is similar to the product being valued. Execute cash flow projections using the documented assumptions (see table of *Liability Modeling Assumptions & Product Characteristics* in Subsection E.1. and table of *Asset Based Fund Charges* in Subsection E.2.) and the pre-packaged scenarios for a set of representative cells (combinations of attained age, contract duration, asset class, AV/GMDB ratio and asset-based charges). These cells should correspond to nodes in the table of pre-calculated factors. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios that comprise CTE (65).

**Guidance Note:** Present value of net cost = PV[ guaranteed benefit claims in excess of account value ] - PV[ margin offset ]. The discounting includes cash flows in all future years (i.e., to the earlier of contract maturity and the end of the horizon).

- b. Using the results from step 1, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the  $J^{th}$  cell, denote this value by  $F_J$ . Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For the  $J^{th}$  cell, denote this value by  $G_J$ .
- c. Extract the corresponding pre-calculated factors. For each cell, calibrate to the published tables by defining a "model adjustment factor" (denoted by asterisk) separately for the "cost" and "margin offset" components:

$$F_J^* = \frac{f(\widetilde{\Theta})}{F_J}$$
 and  $G_J^* = \frac{\hat{g}(\widetilde{\Theta})}{G_J}$ 

- d. Execute "product specific" cash flow projections using the documented assumptions and prepackaged scenarios for the same set of representative cells. Here, the company should model the actual product design. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios that comprise CTE (65).
- e. Using the results from step 4, average the present value of cost for the CTE (65) scenarios and divide by the current guaranteed value. For the  $J^{th}$  cell, denote this value by  $\overline{F}_J$ . Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For the  $J^{th}$  cell, denote this value by  $\overline{G}_J$ .
- f. To calculate the Conditional Tail Expectation Amount for the specific product in question, the company should implement the Alternative Methodology as documented, but use  $\overline{F}_J \times F_J^*$  in place of *F* and  $\overline{G}_J \times G_J^*$  instead of *G*. The same *R* factors as appropriate for the product evaluated in step 1 shall be used for this step (i.e., the product used to calibrate the cash flow model).
- 9. <u>Adjusting *GC* for Mortality Experience</u>. The factors that have been developed for use in determining *GC* assume male mortality at 100% of the 1994 Variable Annuity MGDB ALB Mortality Table. Companies electing to use the Alternative Methodology that have not conducted an evaluation of their mortality experience shall use these factors. Other companies should use the procedure described below to adjust for the actuary's Prudent Estimate of mortality. The development of Prudent Estimate mortality shall follow the requirements and guidance of Section 12. Once a company uses the modified method for a block of business, the option to use the unadjusted factors is no longer available for that part of its business. In applying the factors to actual inforce business, a 5-year age setback should be used for female annuitants.
  - a. Develop a set of mortality assumptions based on Prudent Estimate. In setting these assumptions, the actuary shall be guided by the definition of Prudent Estimate and the principles discussed in Sections 11 and 12.
  - b. Calculate two sets of net single premiums (NSP) at each attained age: one valued using 100% of the 1994 Variable Annuity MGDB ALB Mortality Table (with the aforementioned 5-year age setback for females) and the other using Prudent Estimate mortality. These calculations shall assume an interest rate of 3.75% and a lapse rate of 7% per year.
  - c. The *GC* factor is multiplied by the ratio, for the specific attained age being valued, of the NSP calculated using the Prudent Estimate mortality to the NSP calculated using the 1994 Variable Annuity MGDB ALB Mortality Table (with the aforementioned 5-year age setback for females).
- D. Fund Categorization
  - 1. <u>Criteria</u>. The following criteria should be used to select the appropriate factors, parameters and formulas for the exposure represented by a specified guaranteed benefit. When available, the volatility of the long-term annualized total return for the fund(s) or an appropriate benchmark should conform to the limits presented. For this purpose, "long-term" is defined as twice the average projection period that would be applied to test the product in a stochastic model (generally, at least 30 years).

Where data for the fund or benchmark are too sparse or unreliable, the fund exposure should be moved to the next higher volatility class than otherwise indicated. In reviewing the asset classifications, care should be taken to reflect any additional volatility of returns added by the presence of currency risk, liquidity (bid-ask) effects, short selling and speculative positions.

2. <u>Asset Classes</u>. Variable subaccounts must be categorized into one of the following eight (8) asset classes. For purposes of calculating *CA* or *FE*, each contract will have one or more of the following asset classes represented, whereas for component *GC*, all subaccounts will be mapped into a single asset class.

- a. <u>Fixed Account</u>. This class is credited interest at guaranteed rates for a specified term or according to a 'portfolio rate' or 'benchmark' index. This class offers a minimum positive guaranteed rate that is periodically adjusted according to company policy and market conditions.
- b. <u>Money Market/Short-Term</u>. This class is invested in money market instruments with an average remaining term-to-maturity of less than 365 days.
- c. <u>Fixed Income</u>. This class is invested primarily in investment grade fixed income securities. Up to 25% of the funds within this class may be invested in diversified equities or high-yield bonds. The expected volatility of the returns for this class will be lower than the Balanced fund class.
- d. <u>Balanced</u>. This class is a combination of fixed income securities with a larger equity component. The fixed income component should exceed 25% of the portfolio. Additionally, any aggressive or 'specialized' equity component should not exceed one-third (33.3%) of the total equities held. Should the fund violate either of these constraints, it should be categorized as an equity fund. This class usually has a long-term volatility in the range of 8% 13%.
- e. <u>Diversified Equity</u>. This class is invested in a broad-based mix of U.S. and foreign equities. The foreign equity component (maximum 25% of total holdings) must be comprised of liquid securities in well-developed markets. Funds in this class would exhibit long-term volatility comparable to that of the S&P500. These funds should usually have a long-term volatility in the range of 13% 18%.
- f. <u>Diversified International Equity</u>. This class is similar to the Diversified Equity class, except that the majority of fund holdings are in foreign securities. This class should usually have a long-term volatility in the range of 14% 19%.
- g. <u>Intermediate Risk Equity</u>. This class has a mix of characteristics from both the Diversified and Aggressive Equity Classes. This class has a long-term volatility in the range of 19% 25%.
- h. <u>Aggressive or Exotic Equity</u>. This class comprises more volatile funds where risk can arise from: underdeveloped markets, uncertain markets, high volatility of returns, narrow focus (e.g., specific market sector), etc. This class (or market benchmark) either does not have sufficient history to allow for the calculation of a long-term expected volatility, or the volatility is very high. This class would be used whenever the long-term expected annualized volatility is indeterminable or exceeds 25%.
- 3. <u>Selecting Appropriate Investment Classes</u>. The selection of an appropriate investment type should be done at the level for which the guarantee applies. For guarantees applying on a deposit-by-deposit basis, the fund selection is straightforward. However, where the guarantee applies across deposits or for an entire contract, the approach can be more complicated. In such instances, the approach is to identify for each contract where the "grouped holdings" fit within the categories listed and to classify the associated assets on this basis.

A seriatim process is used to identify the "grouped" fund holdings, to assess the risk profile of the current fund holdings (possibly calculating the expected long-term volatility of the funds held with reference to the indicated market proxies), and to classify the entire 'asset exposure' into one of the specified choices. Here, 'asset exposure' refers to the underlying assets (separate and/or general account investment options) on which the guarantee will be determined. For example, if the guarantee applies separately for each deposit year within the contract, then the classification process would be applied separately for the exposure of each deposit year.

In summary, mapping the benefit exposure (i.e., the asset exposure that applies to the calculation of the guaranteed minimum death benefits) to one of the prescribed asset classes is a multi-step process:

AGGR

0

0

0.05

0.60

0.70

0.60

0.70

1

#### Requirements for Principle-Based Reserves for Variable Annuities - VM-21

- Map each separate and/or general account investment option to one of the prescribed asset classes. a. For some funds, this mapping will be obvious, but for others it will involve a review of the fund's investment policy, performance benchmarks, composition and expected long-term volatility.
- b. Combine the mapped exposure to determine the expected long-term "volatility of current fund holdings." This will require a calculation based on the expected long-term volatility for each fund and the correlations between the prescribed asset classes as given in the table "Correlation Matrix for Prescribed Asset Classes," in Subsection D.4.
- Evaluate the asset composition and expected volatility (as calculated in step b) of current holdings c. to determine the single asset class that best represents the exposure, with due consideration to the constraints and guidelines presented earlier in this Section.

In step a, the company should use the fund's actual experience (i.e., historical performance, inclusive of reinvestment) only as a guide in determining the expected long-term volatility. Due to limited data and changes in investment objectives, style and/or management (e.g., fund mergers, revised investment policy, different fund managers, etc.); the company may need to give more weight to the expected long-term volatility of the fund's benchmarks. In general, the company should exercise caution and not be overly optimistic in assuming that future returns will consistently be less volatile than the underlying markets.

In step b, the company should calculate the "volatility of current fund holdings" (for the exposure being categorized) by the following formula

$$\boldsymbol{\sigma} = \sqrt{\sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \rho_{ij} \sigma_i \sigma_j}$$

using the volatilities and correlations in the following table where  $w_i = \frac{AV_i}{\sum AV_k}$  is the relative value of

fund i expressed as a proportion of total contract value,  $\rho_{ij}$  is the correlation between asset classes i and j and  $\sigma_i$  is the volatility of asset class i. An example is provided after the table.

4. Correlation Matrix for Prescribed Asset Classes. BALANCE ANNUAL FIXED MONEY FIXED DIVERSE INTL INTERM VOLATILITY ACCOUNT MARKET INCOME EQUITY EQUITY EQUITY EQUITY D 1.0% FIXED 1 0.50 0.15 0 0 0 0 ACCOUNT 1.5% MONEY 0.50 1 0.20 0 0 0 0 MARKET 5.0% FIXED 0.15 0.20 1 0.30 0.10 0.10 0.10 INCOME 10.0% BALANCED 0 0 0.30 0.95 0.60 1 0.75 15.5% DIVERSE 0 0 0.10 0.95 1 0.60 0.80 EQUITY 17.5% INTL 0 0 0.10 0.60 0.60 1 0.50 EQUITY 21.5% INTERM 0 0 0.10 0.75 0.80 0.50 1 EQUITY 26.0% AGGR 0 0 0.05 0.60 0.70 0.60 0.70 EQUITY

5. <u>Fund Categorization Example</u>. As an example, suppose three funds (Fixed Income, diversified U.S. Equity and Aggressive Equity) are offered to clients on a product with a contract level guarantee (i.e., across all funds held within the contract). The current fund holdings (in dollars) for five sample contracts are shown in the following table.

	1	2	3	4	5
MV Fund X (Fixed Income):	5,000	4,000	8,000	-	5,000
MV Fund Y (Diversified Equity):	9,000	7,000	2,000	6,000	-
MV Fund Z (Aggressive Equity):	1,000	4,000	-	4,000	5,000
Total Market Value:	15,000	15,000	10,000	10,000	10,000
Total Equity Market Value:	10,000	11,000	2,000	10,000	5,000
Fixed Income % (A):	33%	27%	80%	0%	50%
Fixed Income Test (A>75%):	No	No	Yes	No	No
Aggressive % of Equity (B):	10%	36%	n/a	40%	100%
Balanced Test ( <i>A</i> >25% & <i>B</i> <33.3%):	Yes	No	n/a	No	No
Volatility of Current Fund Holdings:	10.9%	13.2%	5.3%	19.2%	13.4%
Fund Classification:	Balanced	Diversified* <sup>1</sup>	Fixed Income	Intermediate	Diversified

As an example, the "Volatility of Current Fund Holdings" for contract #1 is calculated as  $\sqrt{A+B}$  where:

$$A = \left(\frac{5}{15} \times 0.05\right)^2 + \left(\frac{9}{15} \times 0.155\right)^2 + \left(\frac{1}{15} \times 0.26\right)^2$$
  
$$B = 2 \cdot \left(\frac{5}{1515}\right) (0.1 \times 0.05 \times 0.155) + 2 \cdot \left(\frac{5}{1515}\right) (0.05 \times 0.05 \times 0.26) + 2 \cdot \left(\frac{9}{1515}\right) (0.7 \times 0.155 \times 0.26)$$

So the volatility for contract  $\#1 = \sqrt{0.0092 + 0.0026} = 0.109$  or 10.9%.

#### E. Tables

# 1. Liability Modeling Assumptions & Product Characteristics used for GC Factors.

Asset Based Charges (MER)	Vary by fund class. See Subsection E.2.			
Base Margin Offset	100 basis points per annum.			
GMDB Description	<ol> <li>ROP = return of premium ROP.</li> <li>ROLL3 = 3% roll-up, capped at 2.5 × premium, frozen at age 80.</li> <li>ROLL5 = 5% roll-up, capped at 2.5 × premium, frozen at age 80.</li> <li>MAV = annual ratchet (maximum anniversary value), frozen at age 80.</li> </ol>			

<sup>&</sup>lt;sup>1</sup> Although the volatility suggests "Balanced Fund," the Balanced Fund criteria were not met. Therefore, this 'exposure' is moved "up" to Diversified Equity. For those funds classified as Diversified Equity, additional analysis would be required to assess whether they should be instead designated as "Diversified International Equity."

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	<ul> <li>5. HIGH = Higher of 5% roll-up and annual ratchet.</li> <li>6. EDB = 40% Enhanced Death Benefit (capped at 40% of deposit). Note that the Pre-Calculated Factors were originally calculated with a combined ROP benefit, but they have been adjusted to remove the effect of the ROP. Thus, the factors for this benefit 5 are solely for the Enhanced Death Benefit.</li> </ul>			
Adjustment to GMDB Upon Partial Withdrawal	Separate factors for "Pro-Rata by Market Value" and "Dollar-for-Dollar."			
Surrender Charges	Ignored (i.e., zero). Included in the CA component.			
Single Premium / Deposit	\$100,000. No future deposits; no intra-contract fund rebalancing.			
Base Contract Lapse Rate (Total Surrenders)	<ul> <li>Pro-rata by MV: 10% p.a. at all contact durations (before dynamics)</li> <li>Dollar-for-dollar: 2% p.a. at all contract durations (no dynamics)</li> </ul>			
Partial Withdrawals	<ul> <li>Pro-rata by MV: None (i.e., zero)</li> <li>Dollar-for-dollar: Flat 8% p.a. at all contract durations (as a % of AV). No dynamics or anti-selective behavior.</li> </ul>			
Mortality	100% of the 1994 Variable Annuity MGDB Mortality Table (MGDB 94 ALB). For reference, $1000 \times q_x$ rates at ages 65 and 70 for 100% of MGDB 94 ALB Male are 18.191 and 29.363 respectively. Note that Subsection C.9. allows modification to this assumption.			
Gender /Age Distribution	100% male. Methodology accommodates different attained ages. A 5-year age setback will be used for female annuitants.			
Max. Annuitization Age	All policies terminate at age 95.			
Fixed Expenses	Ignored (i.e., zero). Included in the FE component.			
Annual Fee and Waiver	Ignored (i.e., zero). Included in the FE component.			
Discount Rate	5.75% pre-tax.			
Dynamic Lapse Multiplier (Applies only to policies where GMDB is adjusted "pro-rata by MV" upon withdrawal)	$\lambda = MIN \left[ U, MAX \left[ L, 1 - M \times \left( \frac{GV}{AV} - D \right) \right] \right]$ U=1, L=0.5, M=1.25, D=1.1 • Applied to the 'Base Contract Lapse Rate' • Does not apply to partial withdrawals			

2. <u>Asset-Based Fund Charges (bps per annum)</u>.

Asset Class / Fund	Account Value Charge
Fixed Account	0
Money Market	110
Fixed Income (Bond)	200
Balanced	250
Diversified Equity	250
Diversified International Equity	250

Intermediate Risk Equity	265
Aggressive or Exotic Equity	275

# 3. <u>Components of Key Used for GC Factor Look-Up</u>.

(First Digit Always "1")					
Contract Attribute	Key : Possible Values & Description				
Product Definition, P	0:0	Return-of-premium.			
	1:1	Roll-up (3% per annum).			
	2:2	Roll-up (5% per annum).			
	3:3	Maximum Anniversary Value (MAV).			
	4:4	High of MAV and 5% Roll-up.			
	5:5	Enhanced Death Benefit (excludes the ROP GMDB,			
		which would have to be added separately if the			
		contract in question has an ROP benefit.)			
GV Adjustment Upon Partial	0:0	Pro-rata by market value.			
Withdrawal, A	1:1	Dollar-for-dollar.			
Fund Class, F	0:0	Fixed Account.			
	1:1	Money Market.			
	2:2	Fixed Income (Bond).			
	3:3	Balanced Asset Allocation.			
	4:4	Diversified Equity.			
	5:5	International Equity.			
	6:6	Intermediate Risk Equity.			
	7:7	Aggressive / Exotic Equity.			
Attained Age (Last Birthday), X	0:35	4:65			
	1:45	5:70			
	2:55	6 : 75			
	3:60	7:80			
Contract Duration (years-since-issue),	0:0.5	1:3.5			
D	2:6.5	3:9.5			
	4:12.5				
Account Value-to-Guaranteed Value	0:0.25	4 : 1.25			
Ratio, $\phi$	1:0.50	5 : 1.50			
	2:0.75	6:2.00			
	3:1.00				
Annualized Account Charge	0 : -100 bps				
Differential from A4.5)B)	1:+0				
Assumptions	2:+100				

# Section 7. Scenario Calibration Criteria

#### A. General

This Section outlines the requirements for the stochastic models used to simulate fund performance. Specifically, it sets certain standards that must be satisfied and offers guidance to the actuary in the development and validation of the scenario models. Background material and analysis are presented to support the recommendation. The Section focuses on the S&P 500 as a proxy for returns on a broadly diversified U.S. equity fund, but there is also advice on how the techniques and requirements would apply to other types of funds. General modeling considerations such as the number of scenarios and projection frequency are also discussed.

**Guidance Note:** For more details on the development of these requirements, including the development of the calibration points, see the American Academy of Actuaries recommendation on C-3 Phase II risk-based capital.

The calibration points given in this Section are applicable to gross returns (before the deduction of any fees or charges). To determine the net returns appropriate for the projections required by these requirements, the actuary shall reflect applicable fees and contractholder charges in the development of projected account values. The projections shall also include the costs of managing the investments and converting the assets into cash when necessary.

As a general rule, funds with higher expected returns should have higher expected volatilities and in the absence of well-documented mitigating factors (e.g., a highly reliable and favorable correlation to other fund returns), should lead to higher reserve requirements.

**Guidance Note:** While the model need not strictly adhere to 'mean-variance efficiency,' prudence dictates some form of consistent risk/return relationship between the proxy investment funds. In general, it would be inappropriate to assume consistently 'superior' expected returns (i.e., risk/return point above the frontier).

State or path dependent models are not prohibited, but must be justified by the historic data and meet the calibration criteria. To the degree that the model uses mean-reversion or path-dependent dynamics, this must be well supported by research and clearly documented in the Memorandum supporting the required actuarial certification.

The equity scenarios used to determine reserves must be available in an electronic format to facilitate any regulatory review.

B. Gross Wealth Ratios

Gross Wealth Ratios derived from the stochastic return scenarios for use with a Separate Account variable fund category for diversified U.S. equities must satisfy calibration criteria consistent with that for the S&P 500 shown in the following table. Under these calibration criteria, Gross Wealth Ratios for quantiles less than 50 percent may not exceed the value from the table corresponding to the quantile, while at quantiles greater than 50 percent; Gross Wealth Ratios may not be less than the corresponding value for the quantile from the table. Gross Wealth Ratios must be tested for holding period 1, 5, 10 and 20 years throughout the projections, except as noted in Subsection C.

The "wealth factors" are defined as gross accumulated values (i.e., before the deduction of fees and charges) with complete reinvestment of income and maturities, starting with a unit investment. These can be less than 1, with "1" meaning a zero return over the holding period.

<b>Calibration Point</b>	One Year	Five Year	Ten Year	Twenty Year			
2.5%	0.78	0.72	0.79				
5.0%	0.84	0.81	0.94	1.51			
10.0%	0.90	0.94	1.16	2.10			
90.0%	1.28	2.17	3.63	9.02			
95.0%	1.35	2.45	4.36	11.70			
97.5%	1.42	2.72	5.12				

S&P 500 Total Return Gross Wealth Ratios at the Calibration Points

The scenarios need not strictly satisfy all calibration points, but the actuary should be satisfied that any differences do not materially reduce the resulting reserves. In particular, the actuary should be mindful of which tail most affects the business being valued. If reserves are less dependent on the right (left) tail for all products under consideration (e.g., a return of premium guarantee would primarily depend on the left tail, an enhanced death benefit equal to a

percentage of the gain would be most sensitive to the right tail, etc.), it is not necessary to meet the right (left) calibration points.

Guidance Note: See the Preamble to the Accounting Practices and Procedures Manual for an explanation of materiality.

For models that require starting values for certain state variables, long-term ('average' or 'neutral') values should be used for calibration. The same values should normally be used to initialize the models for generating the actual projection scenarios unless an alternative assumption can be clearly justified. It should be noted that a different set of initialization parameters might produce scenarios that do not satisfy all the calibration points shown in the above table. However, the S&P 500 scenarios used to determine reserves must meet the calibration criteria.

**Guidance Note:** For example, a stochastic log volatility ("SLV") model requires the starting volatility. Also, the regime-switching lognormal model requires an assumption about the starting regime.

**Guidance Note:** A clear justification exists when state variables are observable or "known" to a high degree of certainty and not merely estimated or inferred based on a "balance of probabilities."

#### C. Calibration Requirements Beyond Twenty Years

It is possible to parameterize some path and/or state dependent models to produce higher volatility (and/or lower expected returns) in the first 20 years in order to meet the calibration criteria, but with lower volatility (and/or higher expected returns) for other periods during the forecast horizon. While this property may occur for certain scenarios (e.g., the state variables would evolve over the course of the projection and thereby affect future returns), it would be inappropriate and unacceptable for a company to alter the model parameters and/or its characteristics for periods beyond year 20 in a fashion not contemplated at the start of the projection and primarily for the purpose(s) of reducing the volatility and/or severity of ultimate returns.

Guidance Note: Such adjustments must be clearly documented and justified by the historic data.

D. Other Funds

Calibration of other markets (funds) is left to the judgment of the actuary, but the scenarios so generated must be consistent with the calibration points in the table in Subsection B. This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

The actuary shall document the actual 1-, 5-, 10- and 20-year wealth factors of the scenarios at the same frequencies as in the "S&P 500 Total Return Gross Wealth Ratios at the Calibration Points" table in Subsection B. The annualized mean and standard deviation of the wealth factors for the 1-, 5-, 10- and 20-year holding periods must also be provided. For equity funds, the actuary shall explain the reasonableness of any significant differences from the S&P500 calibration points.

When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing 'consistent' parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk.

Guidance Note: As an example, the standard deviation of log returns is often used as a measure of risk.

Specifically, two return distributions X and Y would satisfy the following relationship:
Market Price of Risk = 
$$\left(\frac{E[R_X] - r}{\sigma_X}\right) = \left(\frac{E[R_Y] - r}{\sigma_Y}\right)$$

where E[R] and  $\sigma$  are respectively the (unconditional) expected returns and volatilities and *r* is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

A closely related method would assume some form of 'mean-variance' efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, 'drift-volatility') frontier could be a constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form, with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a 'corridor' could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Guidance Note: The function forms quadratic polynomials and logarithmic functions tend to work well.

Clearly, there are many other techniques that could be used to establishing consistency between the scenarios. While appealing, the above approaches do have drawbacks and the actuary should not be overly optimistic in constructing the model parameters or the scenarios.

Guidance Note: For example, mean-variance measures ignore the asymmetric and fat-tailed profile of most equity market returns.

Funds can be grouped and projected as a single fund if such grouping is not anticipated to materially reduce reserves. However, care should be taken to avoid exaggerating the benefits of diversification. The actuary must document the development of the investment return scenarios and be able to justify the mapping of the company's variable accounts to the proxy funds used in the modeling.

E. Correlation of Fund Returns

In constructing the scenarios for the proxy funds, the company may require parameter estimates for a number of different market indices. When more than one index is projected, it is generally necessary to allow for correlations in the simulations. It is not necessary to assume that all markets are perfectly positively correlated, but an assumption of independence (zero correlation) between the equity markets would inappropriately exaggerate the benefits of diversification. An examination of the historic data suggests that correlations are not stationary and that they tend to increase during times of high volatility or negative returns. As such, the actuary should take care not to underestimate the correlations in those scenarios used for the reserve calculations.

If the projections include the simulation of interest rates (other than for discounting surplus strain) as well as equity returns, the processes may be independent provided that the actuary can demonstrate that this assumption (i.e., zero correlation) does not materially underestimate the resulting reserves.

F. Number of Scenarios and Efficiency in Estimation

For straight Monte Carlo simulation (with equally probable "paths" of fund returns), the number of scenarios should typically equal or exceed 1000. The appropriate number will depend on how the scenarios will be used and the materiality of the results. The actuary should use a number of scenarios that will provide an acceptable level of precision.

Fewer than 1000 scenarios may be used provided that the actuary has determined through prior testing (perhaps on a subset of the portfolio) that the CTE values so obtained materially reproduce the results from running a larger scenario set.

Variance reduction and other sampling techniques are intended to improve the accuracy of an estimate more efficiently than simply increasing the number of simulations. Such methods can be used provided the actuary can demonstrate that they do not lead to a material understatement of results. Many of the techniques are specifically designed for estimating means, not tail measures, and could in fact reduce accuracy (and efficiency) relative to straight Monte Carlo simulation.

**Guidance Note:** With careful implementation, many variance reduction techniques can work well for CTE estimators. For example, see Manistre, B.J. and Hancock, G. (2003), "Variance of the CTE Estimator," 2003 Stochastic Modeling Symposium, Toronto, ON, September 2003.

The above requirements and warnings are not meant to preclude or discourage the use of valid and appropriate sampling methods, such as Quasi Random Monte Carlo (QRMC), importance sampling or other techniques designed to improve the efficiency of the simulations (relative to pseudo-random Monte Carlo methods). However, the actuary should maintain documentation that adequately describes any such techniques used in the projections. Specifically, the documentation should include the reasons why such methods can be expected not to result in systematic or material under-statement of the resulting reserves compared to using pseudo-random Monte Carlo numbers.

G. Frequency of Projection and Time Horizon

Use of an annual cashflow frequency ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the actuary should determine that the use of a more frequent (i.e., shorter) time step does not materially increase reserves. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.

Care must be taken in simulating fee income and expenses when using an annual time step. For example, recognizing fee income at the end of each period after market movements, but prior to persistency decrements, would normally be an inappropriate assumption. It is also important that the frequency of the investment return model be linked appropriately to the projection horizon in the liability model. In particular, the horizon should be sufficiently long so as to capture the vast majority of costs (on a present value basis) from the scenarios.

Guidance Note: As a general guide, the forecast horizon should not be less than 20 years.

H. Pre-Packaged Scenarios

The American Academy of Actuaries has provided 10,000 scenarios on its website for the following nineteen asset classes.

**Guidance Note:** The pre-packaged scenarios can be found at <u>http://www.actuary.org/life/phase2.asp</u> and are fully documented at <u>http://www.actuary.org/pdf/life/c3supp\_march05.pdf</u>.

**Guidance Note:** Because the reserves calculated using projections involve cash flow projections, the pre-packaged scenarios were developed under the "real world" probability measure (as opposed to a "risk-neutral" basis). Therefore, the pre-packaged scenarios may not be appropriate for purposes of projecting the market value of future hedge instruments within a projection (to the extent such instruments are used in the projections). For this purpose, it may be more appropriate to use risk neutral scenarios to determine the market value of hedge instruments in the cash flow projections that are based on real world scenarios.

- a. 3-month U.S. Treasury yields
- b. 6-month U.S. Treasury yields
- c. 1-year U.S. Treasury yields

- d. 2-year U.S. Treasury yields
- e. 3-year U.S. Treasury yields
- f. 5-year U.S. Treasury yields
- g. 7-year U.S. Treasury yields
- h. 10-year U.S. Treasury yields
- i. 20-year U.S. Treasury yields
- j. 30-year U.S. Treasury yields
- k. Money Market / Short-Term
- 1. U.S. Intermediate Term Government Bonds
- m. U.S. Long Term Corporate Bonds
- n. Diversified Fixed Income
- o. Diversified Balanced Allocation
- p. Diversified Large Capitalized U.S. Equity
- q. Diversified International Equity
- r. Intermediate Risk Equity
- s. Aggressive or Specialized Equity

The scenarios are available as gross monthly accumulation factors (or U.S. Treasury yields) over a 30-year horizon in comma-separated value format (\*.*csv*). These scenarios have been appropriately correlated so that the  $K^{\text{th}}$  scenario for each asset class must be used together and considered one 'future investment return scenario.' Hence, the scenarios can be combined (by blending the accumulation factors) to create additional 'proxy' scenarios for the company's funds.

**Guidance Note:** It is inappropriate to misalign the ordering of scenarios (e.g., scenario J for "Diversified U.S. Equity" cannot be combined with scenario K for "Diversified International Equity," where  $J \neq K$ ).

Guidance Note: It is important to blend the accumulation factors (not the returns) in order to achieve the desired asset mix.

For example, suppose the actuary wanted to construct scenarios for a 'balanced fund' that targets a 60/40 allocation between bonds and U.S. equities. If we denote  $[AF^X]$  as the matrix of accumulation factors for asset class X, then the balanced scenarios would be defined by  $[AF^{BAL}] = 0.60 \times [AF^{BOND}] + 0.40 \times [AF^{S&P500}]$ . Care should be taken to avoid exaggerating the benefits of diversification. The actuary shall document the development of the investment return scenarios and be able to justify the mapping of the company's variable accounts to the proxy funds used in the modeling.

The U.S. Treasury yields are expressed as nominal semi-annual bond equivalent yields in decimal format. All other returns are expressed as periodic (not cumulative) market accumulation factors (i.e., monthly "gross wealth ratios"). Interest rates are assumed to change at the start of each month, hence the value in column T applies for month T-1. The market accumulation factor in column T represents the growth in month T-1.

If all or a portion of these scenarios are used, then the actuary shall verify that the scenario calibration criteria are met.

#### Section 8. Allocation of the Aggregate Reserves to the Contract Level

Section 2 states that the Aggregate Reserve shall be allocated to the contracts falling within the scope of these requirements. When the Conditional Tail Expectation Amount is greater that the Standard Scenario Amount, this allocation requires that the excess be allocated to the contracts falling within the scope of these requirements.

- A. Allocation when the Aggregate Reserve equals the Conditional Tail Expectation Amount
  - 1. <u>Single sub-grouping</u>. When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount and the Conditional Tail Expectation Amount is determined in aggregate for all contracts falling within the scope of these requirements (i.e., a single grouping), as described in Section 2.D., the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount shall be allocated to each contract on the basis of the difference between the Standard Scenario Reserve and the Cash Surrender Value on the valuation date for the contract. If the cash surrender value is not defined or not available, the Standard Scenario Amount will be the basis of allocation.

**Guidance Note:** Note that since the Standard Scenario Reserve for a contract is, by definition, greater than or equal to the Cash Surrender Value, it is understood that the difference between the Standard Scenario Reserve and the Cash Surrender Value for each contract will never be less than zero.

2. <u>Multiple sub-groupings</u>. When the Aggregate Reserve is equal to the Conditional Tail Expectation Amount and the Conditional Tail Expectation Amount is determined using more than one sub-grouping, as described in Section 2.D., the allocation of the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount and shall reflect that sub-grouping of contracts used to determine the Conditional Tail Expectation Amount, as described in Section 2.D.

For example, when the Conditional Tail Expectation Amount is determined using sub-grouping, the excess of the aggregate (i.e., the total for all contracts within the scope of these requirements) Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contribution to the Standard Scenario Amount.

In the case of such sub-groupings, the excess of the aggregate Conditional Tail Expectation Amount over the aggregate Standard Scenario Amount shall be allocated to each sub-grouping in proportion to the difference between the Conditional Tail Expectation and the Standard Scenario Reserve for each sub-grouping for which that excess is positive.

Once the allocation to each sub-grouping is determined, the excess of the reserve allocated to such sub-grouping over the Standard Scenario Amount determined for that sub-grouping shall be allocated to each contract within that sub-grouping on the basis of the difference between the Standard Scenario Reserve and the Cash Surrender Value on the valuation date for the contracts. If the cash surrender value is not defined or not available, the Standard Scenario Amount will be the basis of allocation.

As an example, consider a company with the results of the following three sub-groupings:

Sub-grouping	А	В	С	Total
Conditional Tail Expectation Amount	28	40	52	120
Standard Scenario Amount	20	45	30	95
Aggregate Reserve				120
(1) - (2)	8	-5	22	25
Allocation	6.67	0	18.33	25

In this example, the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount, in aggregate, equals 25 (i.e., the "Total" column of row 1 less row 2, or 120 - 95). This excess of 25 would be allocated only to those contracts that are part of sub-groupings whose contributions to the Conditional Tail Expectation Amount exceed their contributions to the Standard Scenario Amount. In this example, that would be contracts in sub-groupings A and C (since in sub-grouping B, the contribution to the Standard Scenario Amount exceeds the contribution to the Conditional Tail Expectation Amount). Therefore, the excess of 25 would be allocated to the contracts in sub-groupings A and C in proportion to the difference between the Conditional Tail Expectation Amount and the Standard Scenario Reserve for those sub-groupings (i.e. row 4). In this example, the total difference between the Conditional Tail Expectation Amount and the Standard Scenario Reserve for the sub-groupings A and C equals 8 + 22, or 30. This would result in 8/30 of the excess of the Conditional Tail Expectation Amount (or 6.67) to be allocated to the contracts in sub-groupings A and 22/30 of the excess of the Conditional Tail Expectation Amount over the Standard Scenario Amount (or 18.33) to be allocated to the contracts in sub-groupings C as shown on line (5) above.

In this example, the allocation of the Aggregate Reserve to contracts within sub-grouping B would equal the Standard Scenario Reserve for those contracts (as described in Subsection B below). For sub-groupings A and C, the difference between the allocation of the Aggregate Reserve to each of those sub-grouping and the Standard Scenario Amount determined for each of those sub-grouping would be allocated to each contract within each of those sub-groupings based on the difference between the Standard Scenario Reserve and the Cash Surrender Value for each of the contracts within the relevant sub-group. The result would be an allocated Aggregate Reserve for a given contract that would be equal to the Standard Scenario Reserve for that contract plus the amount of the difference between 1) and 2) below that is allocated to that contract, where:

- 1. Equals the allocation of the Aggregate Reserve to that contract's sub-grouping; and
- 2. Equals the Standard Scenario Amount determined for that contract's sub-grouping.
- B. Allocation when the Aggregate Reserve equals the Standard Scenario Amount

The Standard Scenario Amount, as required by Section 2.C., is calculated on a contract-by-contract basis, as described in Section 5. Therefore, when the Aggregate Reserve is equal to the Standard Scenario Amount, the reserve allocated to each contract shall be the reserve calculated for each contract under the Standard Scenario method.

# Section 9. Modeling of Hedges

#### A. Initial Considerations

The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements (excluding those that involve the offsetting of the risks associated with variable annuity guarantees with other products outside of the scope of these requirements, such as equity-indexed annuities) shall be included in the calculation of the Conditional Tail Expectation Amount, determined in accordance with Section 2.D. and Section 3.D. (i.e., Conditional Tail Expectation Amount using projections). If the company is following a Clearly Defined Hedging Strategy ("hedging strategy"), in accordance with an investment policy adopted by the Board of Directors, or a committee of Board members, the company is eligible to reduce the amount of the Conditional Tail Expectation Amount using projections otherwise calculated. The investment policy must clearly articulate the company's hedging objectives, including the metrics that drive rebalancing/trading. This specification could include maximum tolerable values for investment horizons vis-à-vis the chance of occurrence. Company management is responsible for developing, documenting, executing and evaluating the investment strategy, including the hedging strategy, used to implement the investment policy.

For this purpose, the investment assets refer to all the assets including derivatives supporting covered products and guarantees. This is also referred to as the investment portfolio. The investment strategy is the set of all asset holdings

at all points in time in all scenarios. The hedging portfolio, which is also referred to as the hedging assets, is a subset of the investment assets. The hedging strategy is the hedging asset holdings at all points in time in all scenarios. There is no attempt to distinguish what is the hedging portfolio and what is the investment portfolio in this Section. Nor is the distinction between investment strategy and hedging strategy formally made here. Where necessary to give effect to the intent of this Section, the requirements applicable to the hedging portfolio or the hedging strategy are to apply to the overall investment portfolio and investment strategy.

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

The cost and benefits of hedging instruments that are currently held by the company in support of the contracts falling under the scope of these requirements shall be included in the stochastic cash flow model used to calculate the Conditional Tail Expectation Amount in accordance with Section 2.D. (the "model"). If the company is following a Clearly Defined Hedging Strategy, the model shall take into account the cost and benefits of hedge positions expected to be held by the company in the future based on the operation of the hedging strategy.

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

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

#### B. Background

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

The fundamental characteristic of the first method is that all hedging positions, both the currently held positions and those expected to be held in the future, are included in the stochastic cash flow model used to determine the Scenario Greatest Present Value, as discussed in Section 2.D., for each scenario.

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

Regardless of the methodology used by the company, the ultimate effect of the current hedging strategy (including currently held hedge positions), on the Conditional Tail Expectation Amount needs to recognize all risks, associated costs, imperfections in the hedges and hedging mismatch tolerances associated with the hedging strategy. The risks include, but are not limited to: basis, gap, price, parameter estimation, and variation in assumptions (mortality, persistency, withdrawal, annuitization, etc.). Costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. In addition, the reduction to the Conditional Tail Expectation Amount attributable to the hedging strategy may need to be limited due to the uncertainty associated with the company's ability to implement the hedging strategy in a timely and effective manner. The level of

operational uncertainty varies indirectly with the amount of time that the new or revised strategy has been in effect or mock tested.

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

C. Calculation of CTE Amount (reported)

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

Because most models will include at least some approximations or idealistic assumptions, CTE Amount(best efforts) may overstate the impact of the hedging strategy. To compensate for potential overstatement of the impact of the hedging strategy, the company shall recalculate the Conditional Tail Expectation Amount assuming the company has no dynamic hedging strategy (i.e., reflect only hedge positions held by the company on the valuation date. The result so obtained is called "CTE Amount(adjusted)." In some situations the determination of CTE Amount(adjusted) may include both direct and indirect techniques.

Finally, the reported value for the Conditional Tail Expectation Amount is given by: CTE Amount(reported) = E x CTE Amount(best efforts) +  $(1 - E) \times CTE$  Amount(adjusted)

The value for E (an "effectiveness factor") reflects the actuary's view as to the level of sophistication of the stochastic cash flow model and its ability to properly reflect the parameters of the hedging strategy (i.e., the "Greeks" being covered by the strategy) as well as the associated costs, risks, and benefits E will be no greater than 0.70. As the sophistication of the stochastic cash flow model increases, the value for E increases (i.e., the greater the ability of the CTE Amount(best efforts) model to capture all risks and uncertainties, the higher the value of E). If the model used to determine the "CTE Amount(best efforts)" effectively reflects all of the parameters used in the hedging strategy, the value of E may be up to 0.70. If certain economic risks are not hedged, yet the model does not generate scenarios that sufficiently capture those risks, E must be in the lower end of the range. If hedge cash flows are not modeled directly, E will be no greater than 0.30. Simplistic hedge cash flow models will have a value of E in the low range between 0.00 and 0.70.

Additionally, the company shall demonstrate that, based on an analysis of at least the most recent 12 months, the model is able to replicate the hedging strategy in a way that justifies the value used for E. A company that does not have 12 months of experience to date shall set E to a value no greater than 0.30.

#### D. Specific Considerations and Requirements

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

A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (commonly referred to as the Greeks) associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets are subject to material discontinuities. This includes, but is not limited to, a hedging strategy where material hedging assets will be obtained when the variable annuity account balances reach a predetermined level in relationship to the guarantees. Any hedging strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed contractholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the Conditional Tail Expectation Amount, the actuary must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

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

The combination of elements of the stochastic cash flow model, including the initial actual market asset prices, prices for trading at future dates, transaction costs, and other assumptions should be analyzed by the actuary as to whether the stochastic cash flow model permits hedging strategies that make money in some scenarios without losing a reasonable amount in some other scenarios. This includes, but is not limited to:

- 1. Hedging strategies with no initial investment that never lose money in any scenario and in some scenarios make money; or
- 2. Hedging strategies that with a given amount of initial money never make less than accumulation at the oneperiod risk free rates in any scenario but make more than this in one or more scenarios.

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

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

E. Certification and Documentation

The actuary must provide a certification that the values for *E*, CTE Amount(adjusted) and CTE Amount(best efforts) were calculated using the process discussed above and the assumptions used in the calculations were reasonable for the purpose of determining the Conditional Tail Expectation Amount. The actuary shall document the method(s) and assumptions (including data) used to determine CTE Amount(adjusted) and CTE Amount(best efforts) and maintain adequate documentation as to the methods, procedures and assumptions used to determine the value of *E*.

The actuary must provide a certification as to whether the Clearly Defined Hedging Strategy is fully incorporated into the stochastic cash flow model and any supplementary analysis of the impact of the hedging strategy on the Conditional Tail Expectation Amount. The actuary must document the extent to which elements of the hedging strategy (e.g., time between portfolio rebalancing) are not fully incorporated into the stochastic cash flow model and any supplementary analysis to determine the impact, if any. In addition, the actuary must provide a certification and maintain documentation to support the certification that the hedging Strategy designated as the Clearly Defined Hedging Strategy meets the requirements of a Clearly Defined Hedging Strategy including that the implementation of the hedging strategy in the stochastic cash flow model and any supplementary analysis does not include knowledge of events that occur after any action dictated by the hedging strategy (i.e. the model cannot use information about the future that would not be known in actual practice).

A financial officer of the company (e.g., Chief Financial Officer, Treasurer or Chief Investment Officer) or a person designated by them who has direct or indirect supervisory authority over the actual trading of assets and derivatives must certify that the hedging strategy meets the definition of a Clearly Defined Hedging Strategy and that the Clearly Defined Hedging Strategy is the hedging strategy being used by the company in its actual day to day risk mitigation efforts.

#### Section 10. Certification Requirements

A. Management Certification

Management must provide signed and dated written representations as part of the valuation documentation that the valuation appropriately reflects management's intent and ability to carry out specific courses of actions on behalf of the entity where such is relevant to the valuation.

- B. Actuarial Certification
  - 1. <u>General Description</u>. The certification shall be provided by a qualified actuary and consist of at least the following:
    - a. A paragraph identifying the actuary and his or her qualifications;
    - b. A scope paragraph identifying the reserves as of the valuation date for contracts included in the certification categorized by the approaches used to determine the reserves (e.g., Alternative Methodology, Projections, Standard Scenario);
    - c. A reliance paragraph describing those areas, if any, where the certifying actuary has relied on other experts;
      - i) A reliance statement from each of those relied on should accompany the certification.
      - ii) The reliance statements should note the information being provided and a statement as to the accuracy, completeness or reasonableness, as applicable, of the information.
    - d. A paragraph certifying that the reserve was calculated in accordance with the principles and these requirements;
    - e. A paragraph certifying that the assumptions used for these calculations are Prudent Estimate assumptions for the products, scenarios, and purpose being tested; and
    - f. A paragraph stating that the qualified actuary is not opining on the adequacy of the company's surplus or its future financial condition.
- C. Supporting Memorandum

- 1. <u>General Description</u>. A supporting memorandum shall be created to document the methodology and assumptions used to determine the Aggregate Reserve. The information shall include the comparison of the Standard Scenario Amount to the Conditional Tail Expectation Amount required by Section 2.A. in the determination of the Aggregate Reserve.
- 2. <u>Alternative Methodology using Published Factors</u>.
  - a. If a seriatim approach was not used, disclose how contracts were grouped.
  - b. Disclosure of assumptions to include:
    - i Component CA
      - (a) Mapping to prescribed asset categories
      - (b) Lapse and withdrawal rates
    - ii. Component FE
      - (a) Determination of fixed dollar costs and revenues
      - (b) Lapse and withdrawal rates
      - (c) Inflation rates

### iii. Component GC

- (a) Disclosure of contract features and how the company mapped the contract form to those forms covered by the Alternative Methodology factors
  - Product Definition If not conservatively assigned to a published factor, company specific factors or stochastic modeling is required.
  - Partial Withdrawal Provision
  - Fund Class Disclose the process used to determine the single asset class that best represents the exposure for a contract. If individual funds are mapped into prescribed categories, the process used to map the individual funds should be disclosed.
  - Attained Age
  - Contract Duration
  - Ratio of Account Value to Guaranteed Value
  - Annualized Account Charge Differential from Base Assumption
- (b) Derivation of Equivalent Account Charges
- (c) Derivation of margin offset
- (d) Disclosure of interpolation procedures and confirmation of node determination

- c. Disclosure, if applicable, of reinsurance that exists and how it was handled in applying published factors (For some reinsurance, creation of company-specific factors or stochastic modeling may be required.) and Discuss how reserves before reinsurance were determined.
- 3. <u>Alternative Factors based on Company-Specific Factors</u>.
  - a. Disclosure of requirements consistent with Published Factors, as noted in Subsection C.2.
  - b. Stochastic analysis supporting adjustments to published factors should be fully documented. This analysis needs to be submitted when initially used and be available upon request in subsequent years. Adjustments may include:
    - i. Contract design;
    - ii. Risk mitigation strategy (excluding hedging); and
    - iii. Reinsurance.
- 4. <u>Stochastic Modeling</u>.
  - a. Assets
    - i. Description including type and quality
    - ii. Investment & disinvestment assumptions
    - iii. Describe assets used at the start of the projection
    - iv. Source of asset data
    - v. Asset valuation basis
    - vi. Documentation of assumptions
      - (a) Default costs
      - (b) Prepayment functions
      - (c) Market value determination
      - (d) Yield on assets acquired
      - (e) Mapping and grouping of funds to modeled asset classes

### vii. Hedging Strategy

- (a) Documentation of strategy
- (b) Identification of current positions
- (c) Description on how strategy was incorporated into modeling
  - Basis risk, gap risk, price risk, assumption risk

- Document the methods and criterion used to estimate the a priori effectiveness of the hedging strategy
- (d) Documentation required for specific consideration raised in Section 9.D.
- (e) Documentation and certification required by Section 9.E.
- b. Liabilities
  - i. Product descriptions
  - ii. Source of Liabilities
  - iii. Grouping of contracts
  - iv. Reserve method and modeling (e.g., Working Reserves were set to CSV)
  - v. Investment Reserves
  - vi. Describe how reinsurance was handled in the models, including how reserves gross of reinsurance were modeled.
  - vii. Documentation of assumptions (i.e., list assumptions, discuss the sources and the rationale for using the assumptions).
    - (a) Premiums and subsequent deposits
    - (b) Withdrawal, Lapse and Termination Rates
      - Partial Withdrawal (including treatment of dollar-for-dollar offsets on GMDBs and VAGLBs, and Required Minimum Distributions
      - Lapses / Surrenders
    - (c) Crediting Strategy
    - (d) Mortality
    - (e) Annuitization rates
    - (f) Income Purchase rates
    - (g) GMIB and GMWB Utilization rates
    - (h) Commissions
    - (i) Expenses
    - (j) Persistency Bonuses
    - (k) Investment / Fund Choice
    - (l) Revenue Sharing
    - (m) Asset Allocation, Rebalancing and Transfer Assumptions

- Dollar Cost Averaging
- viii. The Section showing the assumptions used for lapse and utilization assumptions for contracts with guaranteed living benefits in the development of the Conditional Tail Expectation Amount, as described in Section 11.G.

### c. Scenarios

- i. Description of scenario generation for interest rates and equity returns
  - (a) Disclose the number "n" of scenarios used and the methods used to determine the sampling error of the CTE(70) statistic when using "n" scenarios.
  - (b) Time step of model (e.g., monthly, quarterly, annual)
  - (c) Correlation of fund returns
- ii. Calibration
  - (a) Gross Wealth Ratios for equity funds
    - Disclosure of adjustments to model parameters, if any.
    - Disclosure of 1-year, 5-year and 10-year wealth factors, as well as mean and standard deviation.
  - (b) Consistency of other funds to equity funds
  - (c) Correlation between all funds
  - (d) Estimate of market return volatility assumptions underlying the generated scenarios compared to actual observed volatility underlying market values.
- iii. Extent of use of pre-packaged scenarios and support for mapping variable accounts to proxy funds
- d. Description and results of sensitivity tests performed. At the request of the domiciliary commissioner, the company shall provide a sensitivity test showing an estimate of the impact of the market return volatility assumption when market volatility is materially higher than assumed in the generated scenarios.
- e. Documentation of all material changes in the model or assumptions from that used previously and the estimated impact of such changes. This documentation, or a summary of this documentation, shall be included in an executive summary or some other prominent place in the memorandum.
- f. A description of the methods used to validate the model and a summary of the results of the validation testing.
- 5. <u>Standard Scenario</u>.
  - a. For the amounts in b, c and d below report the Basic Reserve in Section 5.C.2.b.i., the projection requirements in Section 5.C.2.b.ii., the value of Aggregate reinsurance in Section 5.C.4.a., the value of hedges in Section 5.C.4.b., the total allocation of the value of hedges and Aggregate reinsurance in Section 5.C.2.b.iii. and the Standard Scenario Reserve.

- b. Report the Standard Scenario Amount as of the valuation date.
- c. If applicable, report the Standard Scenario Amount on the inforce prior to the valuation date that was used to project the reserve requirements to the valuation date.
- d. If applicable, report the Standard Scenario Amount on the model office used to represent the inforce.
- e. Discuss modifications, if any, in the application of the standard scenario requirements to produce the amounts in b, c and d above.
- f. Document any assumptions, judgments or procedures not prescribed in the Standard Scenario Method or in these requirements that are used to produce the Standard Scenario Amount.
- g. If applicable, documentation of approval by the commissioner to use the Basic Reserve as the Standard Scenario Amount.
  - h. Document the company's calculation of *DR*.
  - i. Document the allocation of funds to Equity, Bond, Balanced and Fixed classes.
- j. A statement by the actuary that none of the reinsurance treaties included in the Standard Scenario serve solely to reduce the calculated Standard Scenario Reserve without also reducing risk on scenarios similar to those used to determine the Conditional Tail Expectation Reserve. This should be accompanied by a description of any reinsurance treaties that have been excluded from the Standard Scenario along with an explanation of why the treaty was excluded.

#### Section 11. Contractholder Behavior Assumptions

#### A. General

Contractholder behavior assumptions encompass actions such as lapses, withdrawals, transfers, recurring deposits, benefit utilization, option election, etc. Contractholder behavior is difficult to predict and behavior assumptions can significantly impact the results. In the absence of relevant and fully credible empirical data, the actuary should set behavior assumptions on the conservative end of the plausible spectrum (consistent with the definition of Prudent Estimate).

In setting behavior assumptions, the actuary should examine, but not be limited by, the following considerations:

- 1. Behavior can vary by product, market, distribution channel, fund performance, time/product duration, etc.
- 2. Options embedded in the product may impact behavior.
- 3. Options may be elective or non-elective in nature. Living benefits are often elective and death benefit options are generally non-elective.
- 4. Elective contractholder options may be more driven by economic conditions than non-elective options.
- 5. As the value of a product option increases, there is an increased likelihood that contractholders will behave in a manner that maximizes their financial interest (e.g., lower lapses, higher benefit utilization, etc.).
- 6. Behavior formulas may have both rational and irrational components (irrational behavior is defined as situations where some contractholders may not always act in their best financial interest). The rational component should be dynamic but the concept of rationality need not be interpreted in strict financial terms

and might change over time in response to observed trends in contractholder behavior based on increased or decreased financial efficiency in exercising their contractual options.

- 7. Options that are ancillary to the primary product features may not be significant drivers of behavior. Whether an option is ancillary to the primary product features depends on many things such as:
  - a. For what purpose was the product purchased?
  - b. Is the option elective or non-elective?
  - c. Is the value of the option well known?
- 8. External influences, including emergence of viatical / life settlement companies, may impact behavior.
- B. Aggregate vs. Individual Margins

As noted in Section 1.E.2.i., Prudent Estimate assumptions are developed by applying a margin for uncertainty to the Anticipated Experience assumption. The issue of whether the level of the margin applied to the Anticipated Experience assumption is determined in aggregate or independently for each and every behavior assumption is discussed in Principle 3 in Section 1.B., which states:

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 Conditional Tail Expectation Amount 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 Conditional Tail Expectation Amount, the actuary should be guided by evolving practice and expanding knowledge base in the measurement and management of risk.

Although this Principle discusses the concept of determining the level of margins in aggregate, it notes that the application of this concept shall be guided by evolving practice and expanding knowledge. From a practical standpoint, it may not always be possible to completely apply this concept to determine the level of margins in aggregate for all behavior assumptions.

Therefore, the actuary shall determine Prudent Estimate assumptions independently for each behavior (e.g., mortality lapses, and benefit utilization), using the requirements and guidance in this Section and throughout these requirements, unless the actuary can demonstrate that an appropriate method was used to determine the level of margin in aggregate for two or more behaviors.

C. Sensitivity Testing

The impact of behavior can vary by product, time period, etc. Sensitivity testing of assumptions is required and shall be more complex than e.g., base lapse assumption minus 1% across all contracts. A more appropriate sensitivity test in this example might be to devise parameters in a dynamic lapse formula to reflect more out-of-the-money contracts lapsing and/or more holders of in-the-money contracts persisting and eventually utilizing the guarantee. The actuary should apply more caution in setting assumptions for behaviors where testing suggests that stochastic modeling results are sensitive to small changes in such assumptions. For such sensitive behaviors, the actuary shall use higher margins when the underlying experience is less than fully relevant and credible.

D. Specific Considerations and Requirements

Within materiality considerations, the actuary should consider all relevant forms of contractholder behavior and persistency, including but not limited to the following:

1. Mortality (additional guidance and requirements regarding mortality is contained in Section 12)

- 2. Surrenders
- 3. Partial Withdrawals (Systematic and Elective)
- 4. Fund Transfers (Switching/Exchanges)
- 5. Resets/Ratchets of the Guaranteed Amounts (Automatic and Elective)
- 6. Future Deposits

It may be acceptable to ignore certain items that might otherwise be explicitly modeled in an ideal world, particularly if the inclusion of such items reduces the calculated provisions. For example:

- 1. The impact of fund transfers (intra-contract fund "switching") might be ignored, unless required under the terms of the contract (e.g., automatic asset re-allocation/rebalancing, dollar cost averaging accounts, etc.)
- 2. Future deposits might be excluded from the model, unless required by the terms of the contracts under consideration and then only in such cases where future premiums can reasonably be anticipated (e.g., with respect to timing and amount).

However, the actuary should exercise caution in assuming that current behavior will be indefinitely maintained. For example, it might be appropriate to test the impact of a shifting asset mix and/or consider future deposits to the extent they can reasonably be anticipated and increase the calculated amounts.

Normally, the underlying model assumptions would differ according to the attributes of the contract being valued. This would typically mean that contractholder behavior and persistency may be expected to vary according to such characteristics as (this is not an exhaustive list):

- 1. Gender
- 2. Attained age
- 3. Issue age
- 4. Contract duration
- 5. Time to maturity
- 6. Tax status
- 7. Fund value
- 8. Investment option
- 9. Guaranteed benefit amounts
- 10. Surrender charges, transaction fees or other contract charges
- 11. Distribution channel

Unless there is clear evidence to the contrary, behavior assumptions should be no less conservative than past experience. Margins for contractholder behavior assumptions shall assume, without relevant and credible experience or clear evidence to the contrary, that contractholders' efficiency will increase over time.

In determining contractholder behavior assumptions, the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that are similar to the business segment (i.e., other than direct experience), whether or not the segment is directly written by the company. If data from a similar business segment are used, the assumption shall be adjusted to reflect differences between the two segments. Margins shall reflect the data uncertainty associated with using data from a similar but not identical business segment. The actuary shall document any significant similarities or differences between the two business segments, the data quality of the similar business segment and the adjustments and the margins applied.

Where relevant and fully credible empirical data do not exist for a given contractholder behavior assumption, the actuary shall set the contractholder behavior assumption to reflect the increased uncertainty such that the contractholder behavior assumption is shifted towards the conservative end of the plausible range of expected experience that serves to increase the Aggregate Reserve. If there are no relevant data, the actuary shall set the contractholder behavior assumption to reflect the increased uncertainty such that the contractholder behavior assumption to reflect the increased uncertainty such that the contractholder behavior assumption is at the conservative end of the range. Such adjustments shall be consistent with the definition of Prudent Estimate, with the Principles described in Section 1.B., and with the guidance and requirements in this Section.

Ideally, contractholder behavior would be modeled dynamically according to the simulated economic environment and/or other conditions. It is important to note, however, that contractholder behavior should neither assume that all contractholders act with 100% efficiency in a financially rational manner nor assume that contractholders will always act irrationally.

#### E. Dynamic Assumptions

Consistent with the concept of Prudent Estimate assumptions described earlier, the liability model should incorporate margins for uncertainty for all risk factors which are not dynamic (i.e., the non-scenario tested assumptions) and are assumed not to vary according to the financial interest of the contractholder.

The actuary should exercise care in using static assumptions when it would be more natural and reasonable to use a dynamic model or other scenario-dependent formulation for behavior. With due regard to considerations of materiality and practicality, the use of dynamic models is encouraged, but not mandatory. Risk factors which are not scenario tested, but could reasonably be expected to vary according to a stochastic process, or future states of the world (especially in response to economic drivers) may require higher margins and/or signal a need for higher margins for certain other assumptions.

Risk factors that are modeled dynamically should encompass the plausible range of behavior consistent with the economic scenarios and other variables in the model, including the non-scenario tested assumptions. The actuary shall test the sensitivity of results to understand the materiality of making alternate assumptions and follow the guidance discussed above on setting assumptions for sensitive behaviors.

#### F. Consistency with the CTE Level

All behaviors (i.e., dynamic, formulaic and non-scenario tested) should be consistent with the scenarios used in the CTE calculations (generally, the approximately top 1/3 of the loss distribution). To maintain such consistency, it is not necessary to iterate (i.e., successive runs of the model) in order to determine exactly which scenario results are included in the CTE measure. Rather, in light of the products being valued, the actuary should be mindful of the general characteristics of those scenarios likely to represent the tail of the loss distribution and consequently use Prudent Estimate assumptions for behavior that are reasonable and appropriate in such scenarios. For variable annuities, these "valuation" scenarios would typically display one or more of the following attributes:

- 1. Declining and/or volatile separate account asset values;
- 2. Market index volatility, price gaps and/or liquidity constraints;

### 3. Rapidly changing interest rates.

The behavior assumptions should be logical and consistent both individually and in aggregate, especially in the scenarios that govern the results. In other words, the actuary should not set behavior assumptions in isolation, but give due consideration to other elements of the model. The interdependence of assumptions (particularly those governing customer behaviors) makes this task difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

- 1. Remain logically and internally consistent across the scenarios tested;
- 2. Represent plausible outcomes; and
- 3. Lead to appropriate, but not excessive, asset requirements.

The actuary should remember that the continuum of "plausibility" should not be confined or constrained to the outcomes and events exhibited by historic experience.

Companies should attempt to track experience for all assumptions that materially affect their risk profiles by collecting and maintaining the data required to conduct credible and meaningful studies of contractholder behavior.

G. Additional Considerations and Requirements for Assumptions Applicable to Guaranteed Living Benefits

Experience for contracts without guaranteed living benefits may be of limited use in setting a lapse assumption for contracts with in-the-money or at-the-money guaranteed living benefits. Such experience may only be used if it is appropriate (e.g., lapse experience on contracts without a living benefit may have relevance to the early durations of contracts with living benefits) and relevant to the business and is accompanied by documentation that clearly demonstrates the relevance of the experience, as discussed in the following paragraph.

The supporting memorandum required by Section 10, shall include a separately identifiable Section showing the assumptions used for lapse and utilization assumptions for contracts with guaranteed living benefits in the development of the Conditional Tail Expectation Amount. This Section shall be considered part of the supporting memorandum and shall show the formulas used to set the assumptions and describe the key parameters affecting the level of the assumption (e.g., age, duration, in-the-moneyness, during and after the surrender charge period). The Section shall include a summary that shows the lapse and utilization rates that result from various combinations of the key parameters. The Section shall show any experience data used to develop the assumptions and describe the source, relevance and credibility of that data. If relevant and credible data were not available, the Section should discuss how the assumption is consistent with the requirement that the assumption is to be on the conservative end of the plausible range of expected experience. The Section shall also discuss the sensitivity tests performed to support the assumption. This separately identifiable Section shall be made available on a standalone basis if requested by the Domiciliary Commissioner. If it is requested, the Section shall have the same confidential status as the supporting memorandum and the actuarial memorandum supporting the actuarial opinion, as discussed in Section 4.C.2.

Regarding lapse assumptions for contracts with guaranteed living benefits, the Section shall include, at a minimum, the following:

- 1. Actual to expected lapses on two bases, where "expected" equals one of the following:
  - a. Prudent estimate assumptions used in the development of the Conditional Tail Expectation Amount;
  - b. The assumptions used in the Standard Scenario;
- 2. The lapse assumptions used in the development of Conditional Tail Expectation Amount and corresponding actual experience separated by:

- a. Logical blocks of business (based on company's assessment);
- b. Duration (at a minimum this should show during the surrender charge period vs. after the surrender charge period);
- c. In-the-moneyness (consistent with how dynamic assumptions are determined); and
- d. Age (to the extent age impacts the election of benefits lapse).

This data shall be separated by experience incurred in the following periods:

- a. In the past year;
- b. In the past three years; and
- c. All years.

### Section 12. Specific Guidance and Requirements for Setting Prudent Estimate Mortality Assumptions

- A. Overview
  - 1. <u>Intent</u>. The guidance and requirements in this Section apply for setting Prudent Estimate mortality assumptions when determining the Conditional Tail Expectation Amount (whether using projections or the Alternative Methodology). The intent is for Prudent Estimate mortality assumptions to be based on facts, circumstances and appropriate actuarial practice (where more than one approach to appropriate actuarial practice exists, the actuary should select the practice that the actuary deems most appropriate under the circumstances) with only a limited role for unsupported actuarial judgment.
  - 2. <u>Description</u>. Prudent Estimate mortality assumptions are determined by first developing expected mortality curves based on either available experience or published tables. Where necessary, margins are applied to the experience to reflect data uncertainty. The expected mortality curves are then adjusted based on the credibility of the experience used to determine the expected mortality curve. Subsection B addresses guidance and requirements for determining expected mortality curves and Subsection C addresses guidance and requirements for adjusting the expected mortality curves to determine Prudent Estimate mortality.

Finally, the credibility-adjusted tables shall be adjusted for mortality improvement (where such adjustment is permitted or required) using the guidance and requirements in Subsection D.

- 3. <u>Business Segments</u>. For purposes of setting Prudent Estimate mortality assumptions, the products falling under the scope of these requirements shall be grouped into business segments with different mortality assumptions. The grouping should generally follow the pricing, marketing, management and/or reinsurance programs of the company. Where less refined segments are used for setting the mortality assumption than is used in business management the documentation should address the impact, if material, of the less refined segmentation on the resulting reserves.
- 4. <u>Margin for Data Uncertainty</u>. The expected mortality curves that are determined in Subsection B may need to include a margin for data uncertainty. The margin could be in the form of an increase or a decrease in mortality, depending on the business segment under consideration. The margin shall be applied in a direction (i.e., increase or decrease in mortality) that results in a higher reserve. A sensitivity test may be needed to determine the appropriate direction of the 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 Section, if mortality must be increased (decreased) to provide for uncertainty the business segment is referred to as a plus (minus) segment.

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

## B. Determination of Expected Mortality Curves

- 1. <u>Experience Data</u>. In determining expected mortality curves the company shall use actual experience data directly applicable to the business segment (i.e., direct data) if it is available. In the absence of direct data, the company should then look to use data from a segment that is similar to the business segment (i.e., other than direct experience). See Subsection B.2. for additional considerations. Finally, if there is no data, the company shall use the applicable table, as required in Subsection B.3.
- 2. <u>Data Other than Direct Experience</u>. If expected mortality curves for a segment are being determined using data from a similar business segment (whether or not directly written by the company), the actuary shall document any similarities or differences between the two business segments (e.g., type of underwriting, marketing channel, average policy size, etc.). The actuary shall also document the data quality of the mortality experience of the similar business. Adjustments shall be applied to the data to reflect differences between the business segments and margins shall be applied to the adjusted expected mortality curves to reflect the data uncertainty associated with using data from a similar but not identical business segment. The actuary shall document the adjustments and the margins applied.

To the extent the mortality of a business segment is reinsured, any mortality charges that are consistent with the company's own pricing and applicable to a substantial portion of the mortality risk may also be a reasonable starting point for the determination of the company's expected mortality curves. The actuary shall document the application of such reinsurance charges and how they were used to set the company's expected mortality curves for the segment.

- 3. <u>No Data Requirements</u>. When little or no experience or information is available on a business segment, the company shall use expected mortality curves that would produce expected deaths no less than using 100% of the 1994 Variable Annuity MGDB mortality table for a plus segment and expected deaths no greater than 100% of the Annuity 2000 table for a minus segment. If mortality experience on the business segment is expected to be atypical (e.g., demographics of target markets are known to have higher (lower) mortality than typical), these "no data" mortality requirements may not be adequate.
- 4. <u>Additional Considerations Involving Data</u>. 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 B.1. or other than direct data discussed in Subsection B.2.).
  - a. <u>Underreporting of deaths</u>. Mortality data shall be examined for possible underreporting of deaths. Adjustments shall be made to the data if there is any evidence of underreporting. Alternatively, exposure by lives or amounts on contracts for which death benefits were in the money may be used to determine expected mortality curves. Underreporting on such exposures should be minimal; however, this reduced subset of data will have less credibility.
  - b. <u>Experience by contract duration</u>. Experience of a plus segment shall be examined to determine if mortality by contract duration increases materially due to selection at issue. In the absence of information, the actuary shall assume that expected mortality will increase by contract duration for an appropriate select period. As an alternative, if the actuary determines that mortality is impacted by selection, the actuary could apply margins to the expected mortality in such a way that the actual mortality modeled does not depend on contract duration.

c. <u>Modification and Relevance of data</u>. 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).

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

### 5. <u>Documentation Requirements</u>.

a. <u>All Segments</u>. 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:

- i. 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.
- ii. Describe how each segment was determined to be a plus or minus segment.
- iii. 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.
- iv. Document the age of the experience data used to determine expected mortality curves and comment on the relevance of the data.
- v. Document the mathematics used to adjust mortality based on credibility and summarize the result of applying credibility to the mortality segments.
- vi. Discuss any assumptions made on mortality improvements, the support for such assumptions and how such assumptions adjusted the modeled mortality.
- vii. Describe how the expected mortality curves compare to recent historic experience and comment on any differences.
- viii. 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 #3 and Section 11.

If the study was done on a similar business segment, identify the differences in the business segment on which the data were gathered and the business segment on which the data were used to determine mortality assumptions for the statutory valuation. Describe how these differences were reflected in the mortality used in modeling.

If mortality assumptions for the statutory valuation were based in part on reinsurance rates, document how the rates were used to set expected mortality (e.g., assumptions made on loadings in the rates and/or whether the assuming company provided their expected mortality and the rationale for their assumptions).

- b) <u>Plus Segments</u>. 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.
- c) <u>Minus Segments</u>. 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.
- C. Adjustment for Credibility to Determine Prudent Estimate Mortality
  - 1. <u>Adjustment for Credibility</u>. The expected mortality curves determined in Subsection B shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at Prudent Estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with a mortality table consistent with a statutory valuation mortality table. For a plus segment, the table shall be consistent with 100% of the 1994 Variable Annuity MGDB table (or a more recent mortality table adopted by the NAIC to replace this table). For a minus segment, the table shall be consistent with 100% of the 2000 Annuity table (or a more recent mortality table adopted by the NAIC to replace this table). The approach used to adjust the curves shall suitably account for credibility.

**Guidance Note:** For example, when credibility is zero, an appropriate approach should result in a mortality assumption consistent with 100% of the statutory valuation mortality table used in the blending.

- 2. <u>Adjustment of Statutory Valuation Mortality for Improvement</u>. For purposes of the adjustment for credibility, the statutory valuation mortality table for a plus segment may be and the statutory valuation 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 statutory valuation mortality table to the experience weighted average date underlying the data used to develop the expected mortality curves (discussed in Subsection B).
- 3. <u>Credibility Procedure</u>. The credibility procedure used shall:
  - a. Produce results that are reasonable in the professional judgment of the actuary,
  - b. Not tend to bias the results in any material way,
  - c. Be practical to implement,
  - d. Give consideration to the need to balance responsiveness and stability,
  - e. Take into account not only the level of aggregate claims but the shape of the mortality curve, and
  - f. Contain criteria for full credibility and partial credibility that have a sound statistical basis and be appropriately applied.

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

4. <u>Further Adjustment of the Credibility-adjusted Table for Mortality Improvement</u>. 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.

Any adjustment for mortality improvement beyond the valuation date is discussed in Subsection D.

D. Future Mortality Improvement

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

	FEMALE Age Last Birthday									
Age	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	AGE	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	
1	0.519	24	0.344	47	1.371	70	16.957	93	192.270	
2	0.358	25	0.346	48	1.488	71	18.597	94	210.032	
3	0.268	26	0.352	49	1.619	72	20.599	95	228.712	
4	0.218	27	0.364	50	1.772	73	22.888	96	248.306	
5	0.201	28	0.382	51	1.952	74	25.453	97	268.892	
6	0.188	29	0.403	52	2.153	75	28.372	98	290.564	
7	0.172	30	0.428	53	2.360	76	31.725	99	313.211	
8	0.158	31	0.455	54	2.589	77	35.505	100	336.569	
9	0.154	32	0.484	55	2.871	78	39.635	101	360.379	
10	0.159	33	0.514	56	3.241	79	44.161	102	385.051	
11	0.169	34	0.547	57	3.713	80	49.227	103	411.515	
12	0.185	35	0.585	58	4.270	81	54.980	104	439.065	
13	0.209	36	0.628	59	4.909	82	61.410	105	465.584	
14	0.239	37	0.679	60	5.636	83	68.384	106	488.958	
15	0.271	38	0.739	61	6.460	84	75.973	107	507.867	
16	0.298	39	0.805	62	7.396	85	84.432	108	522.924	
17	0.315	40	0.874	63	8.453	86	94.012	109	534.964	
18	0.326	41	0.943	64	9.611	87	104.874	110	543.622	
19	0.333	42	1.007	65	10.837	88	116.968	111	548.526	
20	0.337	43	1.064	66	12.094	89	130.161	112	550.000	
21	0.340	44	1.121	67	13.318	90	144.357	113	550.000	
22	0.343	45	1.186	68	14.469	91	159.461	114	550.000	
23	0.344	46	1.269	69	15.631	92	175.424	115	1000.000	

#### APPENDIX 1 - 1994 Variable Annuity MGDB Mortality Table FFMALE Age Last Birthday

MALE Age Last Birthday								
1000q <sub>x</sub>	Age	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	AGE	1000q <sub>x</sub>	Age	1000q <sub>x</sub>
0.587	24	0.760	47	2.366	70	29.363	93	243.533
0.433	25	0.803	48	2.618	71	32.169	94	264.171
0.350	26	0.842	49	2.900	72	35.268	95	285.199
0.293	27	0.876	50	3.223	73	38.558	96	305.931
0.274	28	0.907	51	3.598	74	42.106	97	325.849
0.263	29	0.935	52	4.019	75	46.121	98	344.977
0.248	30	0.959	53	4.472	76	50.813	99	363.757
0.234	31	0.981	54	4.969	77	56.327	100	382.606
0.231	32	0.997	55	5.543	78	62.629	101	401.942
0.239	33	1.003	56	6.226	79	69.595	102	422.569
0.256	34	1.005	57	7.025	80	77.114	103	445.282
0.284	35	1.013	58	7.916	81	85.075	104	469.115
0.327	36	1.037	59	8.907	82	93.273	105	491.923
0.380	37	1.082	60	10.029	83	101.578	106	511.560
0.435	38	1.146	61	11.312	84	110.252	107	526.441
0.486	39	1.225	62	12.781	85	119.764	108	536.732
0.526	40	1.317	63	14.431	86	130.583	109	543.602
0.558	41	1.424	64	16.241	87	143.012	110	547.664
0.586	42	1.540	65	18.191	88	156.969	111	549.540
0.613	43	1.662	66	20.259	89	172.199	112	550.000
0.642	44	1.796	67	22.398	90	188.517	113	550.000
0.677	45	1.952	68	24.581	91	205.742	114	550.000
0.717	46	2.141	69	26.869	92	223.978	115	1000.000
	1000q <sub>x</sub> 0.587 0.433 0.350 0.293 0.274 0.263 0.248 0.234 0.231 0.239 0.256 0.284 0.327 0.380 0.435 0.486 0.526 0.558 0.586 0.613 0.642 0.677 0.717	$1000q_x$ AGE $0.587$ 24 $0.433$ 25 $0.350$ 26 $0.293$ 27 $0.274$ 28 $0.263$ 29 $0.248$ 30 $0.234$ 31 $0.231$ 32 $0.239$ 33 $0.256$ 34 $0.284$ 35 $0.327$ 36 $0.380$ 37 $0.435$ 38 $0.486$ 39 $0.526$ 40 $0.558$ 41 $0.586$ 42 $0.613$ 43 $0.642$ 44 $0.677$ 45 $0.717$ 46	$1000q_x$ AGE $1000q_x$ $0.587$ 24 $0.760$ $0.433$ 25 $0.803$ $0.350$ 26 $0.842$ $0.293$ 27 $0.876$ $0.274$ 28 $0.907$ $0.263$ 29 $0.935$ $0.248$ 30 $0.959$ $0.234$ 31 $0.981$ $0.239$ 33 $1.003$ $0.256$ 34 $1.005$ $0.284$ 35 $1.013$ $0.327$ 36 $1.037$ $0.380$ 37 $1.082$ $0.435$ 38 $1.146$ $0.486$ 39 $1.225$ $0.526$ 40 $1.317$ $0.558$ 41 $1.424$ $0.586$ 42 $1.540$ $0.613$ 43 $1.662$ $0.642$ 44 $1.796$ $0.677$ 45 $1.952$ $0.717$ 46 $2.141$	MALE A $1000q_x$ AGE $1000q_x$ AGE $0.587$ 24 $0.760$ 47 $0.433$ 25 $0.803$ 48 $0.350$ 26 $0.842$ 49 $0.293$ 27 $0.876$ 50 $0.274$ 28 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#### APPENDIX 1 - 1994 Variable Annuity MGDB Mortality Table MALE Age Last Birthday

	FEMALE Age Nearest Birthday									
Age	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	AGE	1000q <sub>x</sub>	Age	1000q <sub>x</sub>	
1	0.628	24	0.344	47	1.316	70	16.239	93	184.435	
2	0.409	25	0.344	48	1.427	71	17.687	94	201.876	
3	0.306	26	0.348	49	1.549	72	19.523	95	220.252	
4	0.229	27	0.356	50	1.690	73	21.696	96	239.561	
5	0.207	28	0.372	51	1.855	74	24.107	97	259.807	
6	0.194	29	0.392	52	2.050	75	26.832	98	281.166	
7	0.181	30	0.415	53	2.256	76	29.954	99	303.639	
8	0.162	31	0.441	54	2.465	77	33.551	100	326.956	
9	0.154	32	0.470	55	2.713	78	37.527	101	350.852	
10	0.155	33	0.499	56	3.030	79	41.826	102	375.056	
11	0.163	34	0.530	57	3.453	80	46.597	103	401.045	
12	0.175	35	0.565	58	3.973	81	51.986	104	428.996	
13	0.195	36	0.605	59	4.569	82	58.138	105	456.698	
14	0.223	37	0.652	60	5.250	83	64.885	106	481.939	
15	0.256	38	0.707	61	6.024	84	72.126	107	502.506	
16	0.287	39	0.771	62	6.898	85	80.120	108	518.642	
17	0.309	40	0.839	63	7.897	86	89.120	109	531.820	
18	0.322	41	0.909	64	9.013	87	99.383	110	541.680	
19	0.331	42	0.977	65	10.215	88	110.970	111	547.859	
20	0.335	43	1.037	66	11.465	89	123.714	112	550.000	
21	0.339	44	1.091	67	12.731	90	137.518	113	550.000	
22	0.342	45	1.151	68	13.913	91	152.286	114	550.000	
23	0.344	46	1.222	69	15.032	92	167.926	115	1000.000	

### APPENDIX 1 - 1994 Variable Annuity MGDB Mortality Table FEMALE Age Nearest Birthday

	MALE Age Nearest Birthday								
Age	1000q <sub>x</sub>	Age	$1000q_{\rm x}$	AGE	$1000q_x$	AGE	1000q <sub>x</sub>	Age	$1000q_x$
1	0.701	24	0.738	47	2.246	70	28.068	93	234.658
2	0.473	25	0.782	48	2.486	71	30.696	94	255.130
3	0.393	26	0.824	49	2.751	72	33.688	95	276.308
4	0.306	27	0.860	50	3.050	73	36.904	96	297.485
5	0.280	28	0.892	51	3.397	74	40.275	97	317.953
6	0.268	29	0.922	52	3.800	75	44.013	98	337.425
7	0.257	30	0.948	53	4.239	76	48.326	99	356.374
8	0.238	31	0.971	54	4.706	77	53.427	100	375.228
9	0.230	32	0.992	55	5.234	78	59.390	101	394.416
10	0.233	33	1.003	56	5.854	79	66.073	102	414.369
11	0.245	34	1.004	57	6.601	80	73.366	103	436.572
12	0.267	35	1.006	58	7.451	81	81.158	104	460.741
13	0.302	36	1.020	59	8.385	82	89.339	105	484.644
14	0.352	37	1.054	60	9.434	83	97.593	106	506.047
15	0.408	38	1.111	61	10.629	84	105.994	107	522.720
16	0.463	39	1.182	62	12.002	85	115.015	108	534.237
17	0.509	40	1.268	63	13.569	86	125.131	109	542.088
18	0.544	41	1.367	64	15.305	87	136.815	110	546.908
19	0.573	42	1.481	65	17.192	88	150.191	111	549.333
20	0.599	43	1.599	66	19.208	89	164.944	112	550.000
21	0.627	44	1.725	67	21.330	90	180.886	113	550.000
22	0.658	45	1.867	68	23.489	91	197.834	114	550.000
23	0.696	46	2.037	69	25.700	92	215.601	115	1000.000

#### APPENDIX 1 - 1994 Variable Annuity MGDB Mortality Table MALE Age Nearest Birthday

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Draft: 5/31/08 Adopted by Life and Health Actuarial Task Force, 12/4/09

### VM-26: CREDIT LIFE AND DISABILITY RESERVE REQUIREMENTS

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	В.	Contract Reserves
Section 3.	Minir	mum Standard for Valuation of Credit Disability Insurance
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Section 4.	Addit	tional Reserves for Credit Insurance
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Section 1. Purpose

- A. The purpose of this section is to define the minimum valuation standard for credit life insurance and credit disability insurance.
- B. The method described in this section shall constitute the Commissioners Reserve Valuation Method (CRVM) for contracts for which this section is applicable.

#### Definitions

- A. The term "2001 CSO Mortality Table" means that mortality table, consisting of separate rates of mortality for male and female lives, developed by the American Academy of Actuaries CSO Task Force from the Valuation Basic Mortality Table developed by the Society of Actuaries Individual Life Insurance Valuation Mortality Task Force, and adopted by the NAIC in December 2002. The 2001 CSO Mortality Table is included in the *Proceedings of the NAIC (2nd Quarter 2002)*. Unless the context indicates otherwise, the "2001 CSO Mortality Table" includes both the ultimate form of that table and the select and ultimate form of that table and includes both the smoker and nonsmoker mortality tables and the composite mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality tables.
- B. The term "2001 CSO Male Composite Ultimate Mortality Table" means a specific mortality table, included in the 2001 CSO Mortality Table which contains mortality rates that are composites of smokers and nonsmokers on male lives after the select period, including both the age-nearest-birthday and age-last-birthday bases of the mortality tables.
- C. The term "claim reserve" means a liability established with respect to any incurred contractual benefits not yet paid as of the valuation date.
- D. The term "company" means a licensed insurer.
- E. The term "contract reserve" means a liability established with respect to inforce contracts equal to the excess of the present value of claims expected to be incurred after a valuation date over the present value of future valuation net premiums.
- F. The term "date of disablement" means the earliest date the insured is considered disabled under the definition of disability in the contract. Normally this date will coincide with the start of any elimination period.

- G. The term "elimination period" means a specified number of days, weeks, or months starting at the beginning of each period of loss, during which no benefits are payable.
- H. The term "gross premium" means the amount of premium charged by the company.
- I. The term "net premium refund liability" means the amount of money the insurance company owes to an insured when the insured cancels their loan or insurance prior to its scheduled termination date, net of amounts that the insurer will recover from other parties.
- J. The term "unearned premium reserve" means that portion of the premium paid or due to the company which is applicable to the period of coverage extending beyond the valuation date. Thus, if an annual premium of \$120 was paid on November 1, \$20 would be earned as of December 31 and the remaining \$100 would be unearned. The unearned premium reserve could be on a gross basis as in this example or on a valuation net premium basis.

#### Section 2. Minimum Standard for Valuation of Credit Life Insurance

- A Claim Reserves
  - 1. A company shall hold claim reserves for all incurred but unpaid claims on all credit life insurance policies as of the valuation date, and shall hold appropriate claim expense reserves for the estimated expense of settlement of all incurred but unpaid claims.
  - 2. A company shall test all claim reserves for prior valuation years for adequacy and reasonableness including consideration of any residual unpaid liability.
  - 3. Assumptions used for setting credit life claim reserves shall be based on the company's experience, if such experience is credible, or upon other assumptions designed to place a sound value on the liabilities. Assumptions should be adjusted regularly to maintain reasonable margins.
  - 4. A generally accepted actuarial reserving method or other reasonable method or a combination of methods shall be used to estimate credit life insurance claim liabilities. The methods used for estimating liabilities generally may be aggregate methods, or various reserve items may be separately valued. Approximations based on groupings and averages may also be employed. Adequacy of the claim reserves must be determined in the aggregate.

### B Contract Reserves

- 1. If separate benefits are included in a credit life insurance contract, the reserve for each benefit must comply with these requirements.
- 2. Reserves must be based on actuarial assumptions that produce reserves at least as great as those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions.
- 3. Reserves must be established for all unmatured contractual obligations, which have not matured, of the company arising out of the provisions of the credit life insurance contract and must be computed in accordance with presently accepted Actuarial Standards of Practice.
- 4. The reserve method for use in determining the minimum standard for valuation of credit life insurance is the Commissioners Reserve Valuation Method specified in section VM-5 of this valuation manual. If benefits are guaranteed for less than one year, the method produces a reserve equal to the mortality cost from the valuation date to the end of the coverage period.
- 5. The interest rates for use in determining the minimum standard for valuation of credit life insurance are the calendar year statutory valuation interest rates specified in section VM-5 of this valuation manual.

- 6. The minimum mortality assumptions for use in determining the minimum standard for valuation of credit life insurance for both male and female insured individuals is the 2001 CSO Male Composite Ultimate Mortality Table. If a credit life insurance policy or certificate insures two lives, the minimum standard shall be twice the mortality in the 2001 CSO Male Composite Ultimate Mortality Table based on the age of the older insured.
- 7. Use of approximations are permitted, such as those involving age groupings; average amounts of indemnity; grouping of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of group methods and approximate averages for fractions of a year or otherwise.

### Section 3. Minimum Standard for Valuation of Credit Disability Insurance

- A. Claim Reserves
  - 1. A company shall hold claim reserves for all incurred but unpaid claims on all credit disability insurance policies, which is measured as the present value of future benefits or amounts not yet due as of the valuation date that are expected to arise under claims that have been incurred as of the valuation date, and shall hold appropriate claim expense reserves for the estimated expense of settlement of all incurred but unpaid claims.
  - 2. A company shall test all claim reserves for prior valuation years for adequacy and reasonableness using claim runoff schedules in accordance with the statutory financial statement including consideration of any residual unpaid liability.
  - 3. The maximum interest rate for use in determining the minimum standard for valuation of credit disability insurance claim reserves is the maximum rate allowed in section VM-5 of this valuation manual in the valuation of whole life insurance issued on the date the credit disability claim was incurred.
  - 4. The morbidity assumption for use in determining the minimum standard for valuation of credit disability insurance shall be based on the company's experience, if such experience is credible, or upon other assumptions designed to place a sound value on the liabilities. For claim liabilities and claim reserves to reflect "sound values" and/or reasonable margins, valuation tables based on credible experience should be adjusted regularly to maintain reasonable margins.
  - 5. A generally accepted actuarial reserving method or other reasonable method or a combination of methods shall be used to estimate credit disability insurance claim liabilities. The methods used for estimating liabilities generally may be aggregate methods, or various reserve items may be separately valued. Approximations based on groupings and averages may also be employed. Adequacy of the claim reserves must be determined in the aggregate.
- B. Contract Reserves
  - 1. Contract reserves are required for all contractual obligations, which have not matured, of a company arising out of the provisions of a credit disability insurance contract consistent with claim reserves and unearned premium reserve, if any, held for their respective obligations.
  - 2. The methods and procedures for determining contract reserves for credit disability insurance must be consistent with the methods and procedures for claim reserves for any contract, unless appropriate adjustment is made to assure provision for the aggregate liability. The date of incurral must be the same in both determinations.
  - 3. The morbidity assumptions for use in determining the minimum standard for valuation of single premium credit disability insurance contract reserves are:

- a. For plans having less than a fifteen day elimination period, the 1985 Commissioners Individual Disability Table A (85CIDA) with claim incidence rates increased by twelve percent (12%).
- b. For plans having greater than a fourteen-day elimination period, the 85CIDA for a fourteen-day elimination period with claim incidence rates increased by twelve percent (12%).
- 4. The minimum contract reserve for credit disability insurance, other than single premium credit disability insurance, is the gross pro-rata unearned premium reserve.
- 5. The maximum interest rate for use in determining the minimum standard for valuation of single premium credit disability insurance contract reserves is the maximum rate allowed in section VM-5 of this valuation manual in the valuation of whole life insurance issued on the same date as the credit disability insurance contract.
- 6. A company shall not use a separate mortality assumption for valuation of single premium credit disability insurance contract reserves since premium is refunded upon death of the insured.
- 7. Use of approximations are permitted, such as those involving age groupings, average amounts of indemnity, grouping of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of group methods and approximate averages for fractions of a year or otherwise.
- 8. Annually, a company shall conduct a review of prospective contract liabilities on contracts valued by tabular reserves, to determine the continuing adequacy and reasonableness of the tabular reserves. The company shall make appropriate increments to such tabular reserves if such tests indicate that the basis of such reserves is not adequate.

### Section 4. Additional Reserves for Credit Insurance

A. For all credit life and disability contracts in the aggregate, if the net premium refund liability exceeds the aggregate recorded contract reserve, the company must establish an additional reserve liability. This additional liability is equal to the excess of the net refund liability over the contract reserve recorded. The net refund liability may include consideration of commission, premium tax, and other expenses recoverable. For example, the insurance company may recover amounts from the state for premium taxes and from producers for pre-paid commissions. In all cases, such amounts shall be evaluated for probability of recovery.

#### Section 5. Reinsurance

A. Increases to, or credits against, reserves carried, arising because of reinsurance assumed or reinsurance ceded, must be determined in a manner consistent with these minimum reserve standards and with all applicable provisions of the reinsurance contracts that affect the company's liabilities.

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Draft: 12/4/09 Adopted by Life and Health Actuarial Task Force, 12/4/09

#### VM-30 ACTUARIAL OPINION AND MEMORANDUM REQUIREMENTS

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#### Section 1. Scope

- A. General
  - 1. The following provisions contain the requirements for the actuarial opinion of reserves and for supporting actuarial memoranda in accordance with Section 3 of the Standard Valuation Law, and are collectively referred to as AOM requirements.
  - 2. Actuarial opinion and supporting actuarial memoranda requirements are provided in this VM-30 for companies that file the Life, Accident and Health Annual Statement or the Fraternal Annual Statement. Companies that file the Property and Casualty Annual Statement or the Health Annual Statement will follow the actuarial opinion and supporting actuarial memoranda requirements pursuant to the instructions for those annual statements. Such companies are not subject to actuarial opinion and supporting actuarial memoranda requirements in this VM-30 unless the instructions for the Property and Casualty Annual Statement provide for requirements in VM-30.

**Guidance Note:** It is the intent to allow the annual statement instructions to address all issues relating to the actuarial opinion and memorandum for these two statements (Property and Casualty Annual Statement and the Health Annual Statement), but not preclude the use of requirements as appropriate in VM-30 in the instructions for these two statements.

- 3. The AOM requirements shall be applied in a manner that allows the appointed actuary to utilize his or her professional judgment in performing the actuarial analysis and developing the actuarial opinion and supporting actuarial memoranda, conforming to relevant actuarial standards of practice. However, a state commissioner has the authority to specify methods of analysis and assumptions when, in the commissioner's judgment, these specifications are necessary for the actuary to render an acceptable opinion relative to the adequacy of reserves and related actuarial items.
- 4. These AOM requirements are applicable to all annual statements filed after the operative date of the Valuation Manual. A statement of actuarial opinion on the adequacy of the reserves and related actuarial items and a supporting actuarial memorandum is required each year.
- B. Applicability

- 1. The requirements for an opinion apply to each company filing an annual statement, not to the holding company or group of companies. A single opinion is required for the company.
- 2. The actuarial opinion and memorandum fall under the definition of prescribed actuarial report.

Guidance Note: ASOP 41 has a definition of a prescribed actuarial report.

- A. The term "actuarial opinion" means the opinion of an appointed actuary regarding the adequacy of reserves and related actuarial items.
- B. The term "Actuarial Standards Board" means the board established by the American Academy of Actuaries to develop and promulgate actuarial standards of practice.
- C. The term "annual statement" means the statutory financial statements a company must file using the annual blank with a state insurance commissioner as required under state insurance law.
- D. The term "asset adequacy analysis" means an analysis completed to meet the standards and other requirements of the standard of asset adequacy analysis section referred to in these AOM requirements.
- E. The term "commissioner" means the chief insurance regulator of a state, district or territory of the United States.

## Section 2. General Requirements for Submission of Statement of a Life Actuarial Opinion

- A. General
  - 1. The statement of an appointed actuary, entitled "Statement of Actuarial Opinion," setting forth an opinion relating to reserves and related actuarial items held in support of policies and contracts, in accordance with Section 3.A must be included with an annual statement.
  - 2. An appointed actuary is a qualified actuary who:
    - a. is appointed by the Board of Directors, or its equivalent, or by a committee of the Board, by December 31 of the calendar year for which the opinion is rendered;
    - b. is a member of the American Academy of Actuaries;
    - c. is familiar with the valuation requirements applicable to life and health insurance;
    - d. has not been found by the commissioner (or if so found has subsequently been reinstated as a qualified actuary), following appropriate notice and hearing to have:
      - i. violated any provision of, or any obligation imposed by, the Insurance Law or other law in the course of his or her dealings as a qualified actuary;
      - ii. been found guilty of fraudulent or dishonest practices;
      - iii. demonstrated incompetency, lack of cooperation, or untrustworthiness to act as a qualified actuary;
      - iv. submitted to the commissioner during the past five (5) years, pursuant to these AOM requirements, an actuarial opinion or memorandum that the commissioner rejected because it did not meet the provisions of this regulation including standards set by the Actuarial Standards Board; or

- v. resigned or been removed as an actuary within the past five (5) years as a result of acts or omissions indicated in any adverse report on examination or as a result of failure to adhere to generally acceptable actuarial standards; and
- e. has not failed to notify the commissioner of any action taken by any commissioner of any other state similar to that under Paragraph d above.
- 3. Within five (5) business days of the appointment of an appointed actuary, the company shall notify the domiciliary Commissioner of the name, title (and, in the case of a consulting actuary, the name of the firm) and manner of appointment or retention of each person appointed or retained by the company as an appointed actuary and shall state in the notice that the person meets the requirements of an appointed actuary. Once these notices are furnished, no further notice is required with respect to this person unless the actuary ceases to be appointed or retained or ceases to meet the requirements of an appointed actuary
- 4. If an actuary who was the appointed actuary for the immediately preceding filed Actuarial Opinion is replaced by an action of the Board of Directors, the insurer shall within five (5) business days notify the Insurance Department of the state of domicile of this event. The insurer shall also furnish the domiciliary Commissioner with a separate letter within ten (10) business days of the above notification stating whether in the twenty-four (24) months preceding such event there were any disagreements with the former appointed actuary regarding the content of the opinion on matters of the risk of material adverse deviation, required disclosures, scopes, procedure, or data quality. The disagreements required to be reported in response to this paragraph include both those resolved to the former actuary's satisfaction. The insurer shall also in writing request such former actuary to furnish a letter addressed to the insurer stating whether the actuary agrees with the statements contained in the insurer's letter and, if not, stating the reasons for which he does not agree; and the insurer shall furnish such responsive letter from the former actuary to the domiciliary Commissioner together with its own.
- B. Standards for Asset Adequacy Analysis
  - 1. The asset adequacy analysis must conform to the Standards of Practice as promulgated from time to time by the Actuarial Standards Board and to any additional standards under these AOM requirements, which standards are to form the basis of the statement of actuarial opinion in accordance with these AOM requirements.
  - 2. The asset adequacy analysis must be based on methods of analysis as are deemed appropriate for such purposes by the Actuarial Standards Board.
- C. Liabilities to be Covered
  - 1. The statement of actuarial opinion must apply to all in force business on the annual statement date, whether directly issued or assumed, regardless of when or where issued.
  - 2. If the appointed actuary determines as the result of asset adequacy analysis that a reserve should be held in addition to the aggregate reserve held by the company and calculated in accordance the requirements set forth in the Valuation Manual, the company shall establish the additional reserve.
  - 3. Additional reserves established under subparagraph 2 above and determined not to be necessary by the appointed actuary in subsequent years may be released. Any amounts released shall be disclosed in the actuarial opinion for the applicable year. The release of such reserves would not be deemed an adoption of a lower standard of valuation.

#### Section 3. Requirements Specific to Life Actuarial Opinions

- A. Statement of Actuarial Opinion Based On an Asset Adequacy Analysis
  - 1. The statement of actuarial opinion shall consist of:
    - a. A table of key indicators to alert the reader to any changes from the prescribed language (see Section 3.A.3);
    - b. An identification section identifying the appointed actuary and his or her qualifications (see Section 3.A.4);
    - c. A scope section identifying the subjects on which an opinion is to be expressed and describing the scope of the appointed actuary's work, including a tabulation delineating the reserves and related actuarial items that have been analyzed for asset adequacy and the method of analysis, (see Section 3.A.5) and identifying the reserves and related actuarial items covered by the opinion that have not been so analyzed;
    - d. A reliance section describing those areas, if any, where the appointed actuary has relied upon other experts for data, assumptions, projections, or analysis, (e.g., anticipated cash flows from currently owned assets, including variation in cash flows according to economic scenarios (see Section 3.A.6), supported by a statement of each such expert in the form prescribed by Section 3.A.12;
    - e. An opinion section expressing the appointed actuary's opinion with respect to the adequacy of the supporting assets to mature the liabilities (see Section 3.A.7); and
    - f. A relevant comments section.
    - 2. Each section must be clearly designated. For each section there is prescribed wording described in Section 3.A.3 3.A.7 for that section. If the appointed actuary changes this wording or adds additional wording to clarify the prescribed wording, the appropriate box in the table of key indicators must be checked and the appointed actuary shall provide the following information for that section in the relevant comments section of the opinion:
      - a. a description of the additional or revised wording in the opinion;
      - b. the rationale for using the additional or revised wording; and
      - c. an explanation of the impact, if any, that the additional or revised wording has on the opinion.

The prescribed wording should be modified only if needed to meet the circumstances of a particular case, and the appointed actuary should in any case, use language that clearly expresses the actuary's professional judgment.

3. The table of key indicators is to be at the top of the opinion and is to be completed consistent with the remainder of the opinion. The only options are those presented below:

Identification Section	□ Prescribed Wording with Additional Wording	□ Revised Wording
Scope Section	□ Prescribed Wording with Additional Wording	□ Revised Wording

Reliance Section	□ Prescribed Wording with Additional Wording	□ Revised Wording
Opinion Section	□ Prescribed Wording with Additional Wording	□ Revised Wording
Relevant Comments		

□ Comments are Included

□ The Actuarial Memorandum includes "Deviation from Standard" wording regarding conformity with an Actuarial Standard of Practice

4. The identification section should specifically indicate the appointed actuary's relationship to the company, qualifications for acting as appointed actuary, date of appointment, and specify that the appointment was made by the Board of Directors, or its equivalent, or by a committee of the Board.

This section should contain only one of the following:

For a member of the American Academy of Actuaries who is an employee of the organization the identification section of the opinion should contain all of the following sentences if the appointed actuary is using the prescribed wording:

"I, [name and title], am an employee of [insurance company name] and a member of the American Academy of Actuaries. I was appointed on [date of appointment] in accordance with the requirements of the valuation manual. I meet the Academy qualification standards for rendering the opinion."

For a consultant who is a member of the American Academy of Actuaries, the identification section of the opinion should contain all of the following sentences if the appointed actuary is using the prescribed wording:

"I, [name and title of consultant], am associated with the firm of [name of consulting firm]. I am a member of the American Academy of Actuaries. I was appointed on [date of appointment] in accordance with the requirements of the valuation manual. I meet the Academy qualification standards for rendering the opinion."

5. The scope section should contain only the following statement (including all specified lines even if the value is zero) if the appointed actuary is using the prescribed wording:

"I have examined the assumptions and methods used in determining reserves and related actuarial items listed below, as shown in the annual statement of the company, as prepared for filing with state regulatory officials, as of December 31, 20\_\_. Tabulated below are those reserves and related actuarial items which have been subjected to asset adequacy analysis."
	A	sset Adequacy Teste	ed Amounts—Res	serves and R	elated Actuarial	Items
Statement Item	Formula Reserves (1)	Principle-Based Reserves (2)	Additional Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)
Exhibit 5 A Life Insurance						
B Annuities						
C Supplementary Contracts Involving Life Contingencies						
D Accidental Death Benefit						
E Disability—Active						
F Disability— Disabled						
G Miscellaneous						
Total						
Exhibit 6						
A Active Life Reserve						
B Claim Reserve						
Total						
Exhibit 7						
Premium and Other Deposit Funds						
Guaranteed Interest Contracts						
Supplemental Contracts						
Annuities Certain						

Actuarial O	pinion and	Memorandum	Requirements	- VM-30

	A	sset Adequacy Teste	d Amounts—Res	serves and Re	elated Actuarial	Items
Statement Item	Formula Reserves (1)	Principle-Based Reserves (2)	Additional Reserves (a) (3)	Analysis Method (b)	Other Amount (4)	Total Amount (1)+(2)+(3)+(4) (5)
Dividend Accumulations or Refunds						
Total Exhibit 7						
Exhibit 8 Part 1						
1 Life						
2 Health						
Total Exhibit 8, Part 1						
Separate Accounts (Page 3 of the Annual Statement of the Separate Accounts, Lines 1 and 2)						
Other Reserves and Related Actuarial Items Tested						
< <include a<br="">description and the location of other reserves and related actuarial items tested&gt;&gt;</include>						
TOTAL RESERVES						
IMR (General Account, PageLine)         (Separate Accounts, PageLine)         AVR (PageLine)			(c)	Notes: (a)	The addition	nal reserves are the

Net Deferred and Uncollected Premium

reserves established under Section 2.C.2.

The appointed actuary should indicate the method of analysis, determined in accordance with the standards for asset adequacy analysis (b) referred to in Section 2.B of these AOM requirements, by means of symbols that should be defined in footnotes to the table. If more than one method of analysis is used for any single annual statement line or line from the above table, an additional line for each method of analysis shall be provided with the method of analysis identified for each line.

(c) Allocated amount of Asset Valuation Reserve (AVR).

6. The reliance section should contain only one of the following if the appointed actuary is using the prescribed wording:

If the appointed actuary has not relied upon other experts for data, assumptions, projections, or analysis, the reliance section should include only the following statement:

"My examination included a review of the data, assumptions, projections, and analysis and of the underlying basic asset and liability data and such tests of the assumptions, projections, and analysis I considered necessary. I also reconciled the underlying basic asset and liability data to the extent applicable to [exhibits and schedules listed as applicable] of the company's current annual statement."

If the appointed actuary has relied upon other experts for data, assumptions, projections, or analysis, the reliance section should include only the following statement:

"In forming my opinion on [specify types of reserves], I relied upon data, assumptions, projections, or analysis prepared by [name and title each expert providing the data, assumptions, projections, or analysis] as certified in the attached statements. I evaluated that data, assumptions, projections, or analysis for reasonableness and consistency. I also reconciled data to the extent applicable to [list applicable exhibits and schedules] of the company's current annual statement. In other respects, my examination included review of the assumptions projections, and analysis used and tests of the assumptions, projections, and analysis I considered necessary. I have received documentation from the experts listed above that supports the data, assumptions, projections, and analysis."

The appointed actuary shall attach to their opinion a statement by each expert relied upon in the form prescribed by Section 3.A.12.

7. The opinion section should include only the following statement if the actuary is using prescribed wording:

"In my opinion the reserves and related actuarial items concerning the statement items identified above:

- a. Are computed in accordance with presently accepted Actuarial Standards of Practice consistently applied and are fairly stated, in accordance with sound actuarial principles;
- b. Are based on assumptions and methods that produce reserves at least as great as those called for in any contract provision as to reserve basis and method, and are in accordance with all other contract provisions;
- c. Meet the requirements of the Insurance Laws and regulations of the state of [state of domicile]; and

(Use one of the following phrases as appropriate)

are at least as great as the minimum aggregate amounts required by any state

or

are at least as great as the minimum aggregate amounts required by any state with the exception of the following states [list states]. For each listed state a separate statement of actuarial opinion was submitted to that state that complies with the requirements of that state.

- d. Are computed on the basis of assumptions and methods consistent with those used in computing the corresponding items in the annual statement of the preceding year-end (with any exceptions noted below); and
- e. Include provision for all reserves and related actuarial items which ought to be established.

The reserves and related actuarial items, when considered in light of the assets held by the company with respect to such reserves and related actuarial items including, but not limited to, the investment earnings on the assets, and the considerations anticipated to be received and retained under the policies and contracts, make adequate provision, according to presently accepted actuarial standards of practice, for the anticipated cash flows required by the contractual obligations and related expenses of the company. (At the discretion of the commissioner, this language may be omitted for an opinion filed on behalf of a company doing business only in this state and in no other state.)

The methods, considerations and analyses used in forming my opinion conform to the appropriate actuarial standards of practice as promulgated by the Actuarial Standards Board, which standards form the basis of this statement of opinion.

This opinion is updated annually as required by statute. To the best of my knowledge, there have been no material changes from the applicable date of the annual statement to the date of the rendering of this opinion which should be considered in reviewing this opinion.

The impact of unanticipated events subsequent to the date of this opinion is beyond the scope of this opinion. The analysis of asset adequacy portion of this opinion should be viewed recognizing that the company's future experience may not follow all the assumptions used in the analysis.

8. The opinion may include a Relevant Comments section. The Relevant Comments section should provide a brief description of each item. A detailed analysis of each item should be included in the Actuarial Memorandum.

**Guidance Note:** An example of a relevant comment is if there has been any material change in the assumptions or methods from those previously employed, a portion of the relevant comment section can describe that change in the statement of opinion by including a description of the changes such as "A material change in assumptions or methods was made during the past year but such change accords with accepted actuarial standards." A brief description of the change would follow.

Other examples of items to include in the relevant comments section include topics of regulatory importance, descriptions of the reason for qualifying an opinion, or explanations for an aspect of the annual statement that is not already sufficiently explained in the annual statement.

9. If the appointed actuary is able to form an opinion that is not qualified, adverse or inconclusive as those terms are defined below, the actuary should issue a statement of unqualified opinion. If the opinion is adverse, qualified or inconclusive, the appointed actuary should issue an adverse, qualified or inconclusive opinion explicitly stating the reason for such opinion. In all circumstances the category of opinion should be accurately identified in the TABLE of KEY INDICATORS section of the opinion.

An adverse opinion is an actuarial opinion in which the appointed actuary determines that the reserves and liabilities are not adequate. (An adverse opinion does not meet Section 3.A.7.e).

When in the actuary's opinion the reserves for a certain item/s are in question because they cannot be reasonably estimated or the actuary is unable to render an opinion on those items, the actuary should issue a qualified opinion. Such qualified opinion should state whether the stated reserve amount makes adequate provision for the liabilities associated with the specified reserves, except for the item/s to which the qualification relates. The actuary is not required to issue a qualified opinion if the actuary reasonably believes that the item/s in question are not likely to be material. (A qualified opinion does not meet one or more of the statements in Section 3.A.7.a-Section 3.A.7.d.)

The actuary's ability to give an opinion is dependent upon data, analyses, assumptions and related information that are sufficient to support a conclusion. If the actuary cannot reach a conclusion due to

deficiencies or limitations in the data, analyses, assumptions or related information, then the actuary should issue an inconclusive opinion. An inconclusive opinion shall include a description of the reasons why a conclusion could not be reached.

- 10. The adoption for new issues or new claims or other new liabilities of an assumption that differs from a corresponding assumption used for prior new issues or new claims or other new liabilities is not a change in assumptions within the meaning of this section (i.e. Section 3.A).
- 11. The opinion should conclude with the signature of the appointed actuary responsible for providing the actuarial opinion and the date when the opinion was rendered. The signature and date should appear in the following format

Signature of Appointed Actuary

Printed Name of Appointed Actuary

Address of Appointed Actuary

Telephone Number of Appointed Actuary

Email Address of Appointed Actuary

Date

- 12. If the appointed actuary relies on other experts for data, assumptions, projections, or analysis in forming the actuarial opinion, the actuarial opinion should identify the experts the actuary is relying upon and a precise identification of the information provided by the experts. In addition, the experts on whom the appointed actuary relies shall provide a certification that identifies the specific information provided, states that supporting documentation was provided, opines on the accuracy, completeness or reasonableness of the information provided, and describes their qualifications including professional experience, education and training. This certification shall include the signature, name, title, company, address and telephone number of the person rendering the certification, as well as the date on which it is signed.
- B. Description of Actuarial Memorandum Including an Asset Adequacy Analysis and Regulatory Asset Adequacy Issues Summary
  - 1. The appointed actuary shall prepare a memorandum to the company describing the analysis done in support of his or her opinion regarding the reserves. The memorandum shall be made available for examination by a commissioner upon request but shall be returned to the company after such examination and shall not be considered a record of the insurance department or subject to automatic filing with a commissioner.

- 2. In preparing the memorandum, the appointed actuary may rely on, and include as a part of his or her own memorandum, memoranda prepared and signed by other actuaries who are qualified within the meaning of Section 3.A.2, with respect to the areas covered in such memoranda, and so state in their memoranda.
- 3. Any actuary engaged by the Commissioner under [insert reference to Section 3 of state's Standard Valuation Law] shall have the same status as an examiner for purposes of obtaining data from the company and the work papers and documentation of the actuary shall be retained by the commissioner; provided, however, that any information provided by the company to the actuary and included in the work papers shall be considered as material provided by the company to the commissioner and shall be kept confidential to the same extent as is prescribed by law with respect to other material provided by the company to the actuary shall not be an employee of a consulting firm involved with the preparation of any prior memorandum or opinion for the insurer pursuant to these AOM requirements for any one of the current year or the preceding three (3) years.
- 4. The appointed actuary shall prepare a regulatory asset adequacy issues summary, the contents of which are specified in Section 3.B.10. The regulatory asset adequacy issues summary will be submitted to the domiciliary commissioner no later than April 1 of the year following the year for which a statement of actuarial opinion based on asset adequacy is required, and shall be available to any other commissioners on request. A commissioner shall keep the regulatory asset adequacy issues summary confidential to the same extent and under the same conditions as the actuarial memorandum.
- 5. When an actuarial opinion is provided, the memorandum shall demonstrate that the analysis has been done in accordance with the standards for asset adequacy referred to in Section 2.B and any additional standards specified in these AOM requirements.
- 6. When an actuarial opinion is provided, it shall specify for reserves:
  - a. Product descriptions including market description, underwriting and other aspects of a risk profile and the specific risks the appointed actuary deems significant;
  - b. Source of liability in force;
  - c. Reserve method and basis;
  - d. Investment reserves;
  - e. Reinsurance arrangements;
  - f. Identification of any explicit or implied guarantees made by the general account in support of benefits provided through a separate account or under a separate account policy or contract and the methods used by the appointed actuary to provide for the guarantees in the asset adequacy analysis; and
  - g. Documentation of assumptions used for lapse rates (both base and excess), interest crediting rate strategy, mortality, policyholder dividend strategy, competitor or market interest rate, annuitization rates, commissions and expenses, and morbidity. The documentation of the assumptions shall be such that an actuary reviewing the actuarial memorandum could form a conclusion as to the reasonableness of the assumptions.
- 7. When an actuarial opinion is provided, it shall specify for assets:
  - a. Portfolio descriptions, including a risk profile disclosing the quality, distribution and types of assets;

- b. Investment and disinvestment assumptions;
- c. Source of asset data;
- d. Asset valuation bases; and
- e. Documentation of assumptions made for default costs, bond call function, mortgage prepayment function, determining market value for assets sold due to disinvestment strategy, and determining yield on assets acquired through the investment strategy. The documentation of the assumptions shall be such that an actuary reviewing the actuarial memorandum could form a conclusion as to the reasonableness of the assumptions.
- 8. When an actuarial opinion is provided, it shall specify for the analysis basis:
  - a. Methodology;
  - b. Rationale for inclusion or exclusion of different blocks of business and how pertinent risks were analyzed;
  - c. Rationale for degree of rigor in analyzing different blocks of business (include in the rationale the level of "materiality" that was used in determining how rigorously to analyze different blocks of business);
  - d. Criteria for determining asset adequacy (include in the criteria the precise basis for determining if assets are adequate to cover reserves under "moderately adverse conditions" or other conditions as specified in relevant actuarial standards of practice);
  - e. Whether the impact of federal income taxes was considered and the method of treating reinsurance in the asset adequacy analysis; and
- 9. When an actuarial opinion is provided it shall contain:
  - a. Summary of material changes in methods, procedures, or assumptions from prior year's asset adequacy analysis.
  - b. Summary of results; and
  - c. Conclusions.
- 10. The regulatory asset adequacy issues summary shall include:
  - a. The following key indicator. The only options are those presented below:

This opinion is unqualified:  $\Box$  Yes  $\Box$  No

If the response is "No", the appointed actuary shall explain the reason(s) why the opinion is not unqualified in a manner that is satisfactory to the commissioner.

b. Descriptions of the scenarios tested (including whether those scenarios are stochastic or deterministic) and the sensitivity testing done relative to those scenarios. If negative ending surplus results under certain tests in the aggregate, the actuary should describe those tests and the amount of additional reserve as of the valuation date which, if held, would eliminate the negative aggregate surplus values. Ending surplus values shall be determined by either extending the

projection period until the inforce and associated assets and liabilities at the end of the projection period are immaterial or by adjusting the surplus amount at the end of the projection period by an amount that appropriately estimates the value that can reasonably be expected to arise from the assets and liabilities remaining inforce;

- c. The extent to which the appointed actuary uses assumptions in the asset adequacy analysis that are materially different than the assumptions used in the previous asset adequacy analysis;
- d. The amount of reserves and the identity of the product lines that had been subjected to asset adequacy analysis in the prior opinion but were not subject to analysis for the current opinion;
- e. Comments on any interim results that may be of significant concern to the appointed actuary;
- f. The methods used by the actuary to recognize the impact of reinsurance on the company's cash flows, including both assets and liabilities, under each of the scenarios tested; and
- g. Whether the actuary has been satisfied that all options whether explicit or embedded, in any asset or liability (including but not limited to those affecting cash flows embedded in fixed income securities) and equity-like features in any investments have been appropriately considered in the asset adequacy analysis.
- 11. The regulatory asset adequacy issues summary shall contain the name of the company for which the regulatory asset adequacy issues summary is being supplied and shall be signed and dated by the appointed actuary rendering the actuarial opinion.
- 12. The memorandum shall include the following statement:

"Actuarial methods, considerations and analyses used in the preparation of this memorandum conform to the appropriate Standards of Practice as promulgated by the Actuarial Standards Board, which standards form the basis for this memorandum."

- 13. An appropriate allocation of assets in the amount of the interest maintenance reserve (IMR), whether positive or negative, shall be used in any asset adequacy analysis. Analysis of risks regarding asset default may include an appropriate allocation of assets supporting the asset valuation reserve; these AVR assets may not be applied for any other risks with respect to reserve adequacy. Analysis of these and other risks may include assets supporting other mandatory or voluntary reserves available to the extent not used for risk analysis and reserve support.
- 14. The amount of the assets used for the AVR shall be disclosed in the table of reserves and liabilities of the opinion and in the memorandum. The method used for selecting particular assets or allocated portions of assets shall be disclosed in the memorandum.
- 15. The appointed actuary shall retain on file, for at least seven (7) years, sufficient documentation so that it will be possible to determine the procedures followed, the analyses performed, the bases for assumptions and the results obtained.

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## VALUATION MANUAL APPENDIX A – VM-A

#### Draft: 12/4/09

Adopted by Life and Health Actuarial Task Force, 12/4/09

### VM-A: VALUATION MANUAL APPENDIX A

This appendix references the following reserve requirements from Appendix A of the Accounting Practices and Procedures Manual which are to be used for policies issued on and after the Valuation Manual operative date unless otherwise provided for in VM-0.

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A-200	Separate Accounts Funding Guaranteed Minimum Benefits Under Group Contracts
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A-250	Variable Annuities
A-255	Modified Guaranteed Annuities
A-270	Variable Life Insurance
A-440	Insurance Holding Companies
A-585	Universal Life Insurance
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A-641	Long Term Care Insurance
A-695	Synthetic Guaranteed Investment Contracts
A-785	Credit for Reinsurance
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	Reserve Liabilities
A-820	Minimum Life and Annuities Reserve Standards
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A-822	Asset Adequacy Analysis Requirements
A-830	Valuation of Life Insurance Policies (Including the Introduction and Use
	of New Select Mortality Factors)

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### VALUATION MANUAL APPENDIX C – VM-C

Draft: 12/4/09

Adopted by Life and Health Actuarial Task Force, 12/4/09

### VM-C: VALUATION MANUAL APPENDIX C

**Drafting Note:** This appendix references the following reserve requirements from Appendix C of the Accounting Practices and Procedures Manual which are to be used for policies issued on and after the Valuation Manual operative date unless otherwise provided for in VM-0

Guideline No.	TITLE
Ι	Interpretation of the Standard Valuation Law With Respect to the Valuation of Policies Whose Valuation Net Premiums Exceed the Actual Gross Premium Collected
II	Reserve Requirements With Respect to Interest Rate Guidelines on Active Life Funds Held Relative to Group Annuity Contracts
IV	Actuarial Interpretation Regarding Minimum Reserves for Certain Forms of Term Life Insurance
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VI	Interpretation Regarding Use of Single Life or Joint Life Mortality Tables Draft 20 June 1983
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XL	Guideline for Valuation Rate of Interest for Funding Agreements and Guaranteed
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XLVI	Interpretation of the Calculation of the Segment Length With Respect to the Life
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	Subsequent to Issue
AG App	Appendix to Guidelines - New York State Insurance Department - Maximum
	Reserve Valuation and Maximum Life Policy Nonforfeiture Interest Rates

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The NAIC solicits comments on this draft. Comments should be sent to John Engelhardt, NAIC, at JEngelha@naic.org.

### VM-20: REQUIREMENTS FOR PRINCIPLE-BASED RESERVES FOR LIFE PRODUCTS

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#### Section 1. Purpose

- A. These requirements establish the minimum reserve valuation standard for individual life insurance policies issued on or after the operative date of the valuation manual and subject to a principle-based reserve valuation under the Standard Valuation Law.
- B. These requirements constitute the Commissioner's Reserve Valuation Method (CRVM) for policies of individual life insurance.

#### Definitions (possible move to another section in the valuation manual)

- A. The term "anticipated experience assumption" means the expectation of future experience for a risk factor given available, relevant information pertaining to the assumption being estimated and set in such a manner that it is reasonable to expect that the actual value of the risk factor is as likely to be greater than the assumed value as less that the assumed value.
- B. The term "clearly defined hedging strategy" means a derivative program of the company established to hedge risks through the future purchase or sale or opening and closing of derivative instruments and that meets the requirements described in Section 6.M.
- C. "CTE 70" means the greater of zero and the conditional tail expectation at the 70<sup>th</sup> percentile, which equals the greater of zero and the average of the highest 30% of the scenario reserves.
- D. The term "credibility segment" means a group of policies subject to the same level of underwriting and same risk classification procedures that are grouped together for the purpose of determining whether the policies qualify for the simplified method to determine prudent estimate mortality assumptions in Section 8.C.
- E. The term "deterministic reserve" means the amount determined in Section 3.
- F. The term "margin" means an amount applied to an anticipated experience assumption in order to derive a prudent estimate assumption.
- G. The term "model segment" means a group of policies and associated assets that are modeled together to determine the path of net asset earned rates.
- H. The term "mortality segment" means a subset of policies from a credibility segment for which a separate mortality table representing the prudent estimate assumption will be determined.
- I. The term "mortality experience cell" means a subset of policies from a mortality segment that are grouped together when determining credibility adjusted experience rates.
- J. The term "net asset earned rates" means the path of earned rates reflecting the net general account portfolio rate in each projection interval (net of appropriate default costs and investment expenses) and used in part to determine the amount of benefits, expenses and revenue that depend on the level of interest credited.
- K. The term "non-guaranteed element" means the premium, credited interest rate, bonus, benefit, value, non-interest based credit, charge, or element of a formula used to determine any of these, that are subject to discretion by the insurer and are not guaranteed at issue; "non-guaranteed element" includes a value or amount calculated from at least one nonguaranteed element.
- L. The term "gross reserve" means the minimum reserve held in the absence of any ceded reinsurance.
- M. The term "per policy reserve" means the amount calculated in Section 3.B.

- N. The term "policy" means an individual life insurance policy included in the scope of these requirements.
- O. The term "policyholder behavior assumptions" means assumptions for premium payment patterns, premium persistency, surrenders, withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections.
- P. The term "pretax interest maintenance reserve" or "PIMR" means the statutory interest maintenance reserve liability adjusted to a pre-tax basis for each model segment at the projection start date and at the end of each projection interval. The negative of this amount is treated as an invested asset within these requirements and the amortization of this amount is treated as investment income.
- Q. The term "Principle-Based Reserve Actuarial Report" or "PBR Actuarial Report" means a document prepared by the company that summarizes all of the material decisions, assumptions, and methodologies used to support the calculation of the minimum reserve, as well as the required documentation defined by these requirements and section VM-31 of the Valuation Manual.
- R. The term "prudent estimate assumption" means a risk factor assumption developed by applying a margin to the anticipated experience assumption for that risk factor.
- S. The term "reinsurance cash flows" means the net cash or asset equivalents payable between the company and parties to its reinsurance agreements. Positive reinsurance cash flows shall represent amounts payable from the reinsurance counterparties to the company; negative reinsurance cash flows shall represent amounts payable from the company to its reinsurance counterparties.
- T. The term "reinsurance aggregate cash flows" means the difference between reinsurance cash flows and reinsurance discrete cash flows, as defined below. Examples of reinsurance aggregate cash flows include experience refunds, or the incremental impact of an overall cap on reinsurance discrete cash flows that would otherwise be payable by the reinsurer.
- U. The term "reinsurance discrete cash flows" means reinsurance cash flows determined by applying reinsurance terms to an individual covered policy, without reference to the circumstances and events of other policies. Examples of reinsurance discrete cash flows would be proportional sharing of one or more items of revenue or expense associated with an underlying reinsured policy, without attempting to take into account the potential impact of an overall dollar cap in the reinsurance agreement, for all covered policies, on the total revenues or expenses shared for policies in the covered group.
- V. The term "scenario" means a single path of outcomes used in the cash flow model, such as a path of future interest rates, equity performance, and separate account fund performance. It could also include outcomes related to policyholder behavior (e.g., lapses) and company experience (e.g., mortality).
- W. The term "scenario reserve" means the amount determined in Section 4 for all policies on an aggregated basis for a given scenario that is used as a step in the calculation of the stochastic reserve.
- X. The term "seriatim reserve" means the amount determined in Section 3 for a given policy that is used as a step in the calculation of the deterministic reserve.
- X. The term "stochastic reserve" means the amount determined in Section 4.
- Y. The term "stochastic exclusion test" means a test for dependence of reserves under specified economic scenarios to determine whether a group of policies is required to comply with stochastic modeling requirements.

Z. The term "policyholder efficiency" means the phenomenon that policy holders will act in their best interest with regard to the value of their policy. A policyholder acting with high policyholder efficiency would take actions permitted in their contract which would provide the greatest relative value. Such actions include but are not limited to not lapsing a low value or no value contract, persisting, surrendering, applying additional premium, exercising loan and partial surrender provisions.

### Section 2. Minimum Reserve

- A. The minimum reserve is the deterministic reserve plus the excess, if any, of the stochastic reserve over the deterministic reserve. The company shall calculate the stochastic reserve and deterministic reserve using cash flow models to project premiums and other revenue, benefits, expenses, asset and liability cash flows, net investment earnings, and invested asset balances for each model segment.
- B. The minimum reserve for each contract is equal to the per policy reserve calculated as specified in Section 3.B plus the policy's portion of the excess, if any, of the stochastic reserve over the deterministic reserve.
- C. The company may calculate the minimum reserve as of a date no earlier than 3 months before the valuation date, using relevant company data, provided an appropriate method is used to adjust the minimum reserve to the valuation date. Company data used for experience studies to determine prudent estimate assumptions are not subject to this 3-month limitation.
- D. If a company has separate account business, the company shall allocate the minimum reserve between the general and separate accounts subject to the following:
  - 1. The amount allocated to the general account shall not be less than zero and shall include any liability related to contractual guarantees provided by the general account; and
  - 2. The amount allocated to the separate account shall not be less than the sum of the cash surrender values and not be greater than the sum of the account values attributable to the variable portion of all such contracts.

**Drafting Note:** The reporting requirements for these simplifications and approximations should be revised.

- E. A company may use simplifications and approximations to calculate the minimum reserve required by this section if the company can demonstrate that the impact of such simplifications and approximations does not materially change the resulting reserve.
- F. Reserves for supplemental benefits and riders on policies that are subject to VM-20 shall be determined on a basis that is consistent with the approach and methodologies defined in these requirements. Reserves for supplemental benefits may be calculated separately when calculating the deterministic reserve and the stochastic reserve.

**Drafting Note:** It is the intent of this section to allocate the minimum reserve back to the individual policy that gave rise to the reserve. The allocation to individual policies is needed, among other reasons, to allocate assets under the Life and Health Insurance Guaranty Association Model Act. Further work is needed to determine the method to allocate the excess of the stochastic reserve over the deterministic reserves to each policy.

#### Section 3. Deterministic Reserve

The company shall calculate the deterministic reserve as follows:

- A. Calculate the seriatim reserve for each policy equal to the actuarial present value of benefits, expenses, and related amounts less the actuarial present value of premiums and related amounts where:
  - 1. Cash flows are projected in compliance with the applicable requirements in Sections 6, 7 and 8 over the single economic scenario described in Section 6.E.3.

- 2. Present values are calculated using the path of discount rates for the corresponding model segment determined in compliance with Section 6.H.4.
- 3. The actuarial present value of benefits, expenses and related amount equals the sum of
  - a. Present value of future benefits, but before netting the repayment of any policy loans;

Guidance Note: Future benefits include but are not limited to death and cash surrender benefits.

- b. Present value of future expenses excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes;
- c. Policy account value invested in the separate account at the valuation date; and
- d. Policy loan balance at the valuation date with appropriate reflection of any relevant due, accrued, or unearned loan interest, if policy loans are explicitly modeled under Section 6.E.
- 4. The actuarial present value of premiums and related amounts equals the sum of the present values of
  - a. Future gross premium payments and/or other applicable revenue;
  - b. Future net cash flows to or from the general account, or from or to the separate account;
  - c. Future net policy loan cash flows, if policy loans are explicitly modeled under Section 6.E;

**Guidance Note:** Future net policy loan cash flows include: loan interest paid in cash; additional loan principal; and repayments of principal, including repayments occurring at death or surrender (note that the future benefits in A.3.a of this Section are before consideration of policy loans).

- d. Future net reinsurance discrete cash flows determined in compliance with Section 7;
- e. The future net reinsurance aggregate cash flows allocated to such policy as described in Subsection E of this section; and
- f. The future derivative liability program net cash flows (i.e., cash received minus cash paid) that are allocated to such policy.
- B. Calculate the per policy reserve for each policy as the greater of the seriatim reserve and the cash surrender value for the policy adjusted for reinsurance as described in Subsection D.4 of this Section.
- C. Set the deterministic reserve equal to the sum of the per policy reserves calculated in compliance with Subsection B of this Section over all policies.
- D. The net reinsurance aggregate cash flows allocated to each policy and the cash surrender value adjusted for reinsurance for each policy are defined as follows:
  - 1. For each policy x that the company has reinsured under a given reinsurance agreement, determine the following values:

Hx is the present value of the reinsurance discrete cash flows under the agreement.

Cx is the policy's cash surrender value without taking into account the reinsurance.

Dx is the reinsurance discrete cash flow payable to the company by the reinsurer upon policy surrender.

Px is the greater of Hx and Dx

2. Determine the following values as sums over all policies x covered by the agreement:

 $E = \Sigma Dx$ 

 $Q = \Sigma Px$ 

3. Determine the following value that takes into account all features of the reinsurance agreement for the entire group of policies covered by the agreement:

F = the present value of all future net reinsurance cash flows assuming all covered policies surrender.

4. The cash surrender value adjusted for reinsurance for each policy x is equal to:

$$Cx - \left( Dx + (F - E) \times \frac{Px}{Q} \right)$$

- 5. The future net reinsurance aggregate cash flows allocated to each policy are equal to Px/Q.
- 6. If a policy is covered by more than one reinsurance agreement, the company shall reflect the impacts of all such agreements in the cash surrender value adjusted for reinsurance for each policy and the future net reinsurance aggregate cash flows allocated to each policy in a reasonable, and practical manner that is consistent with the approach described in items 1 through 5 above.
- 7. For assumed reinsurance, the company shall calculate reserves consistent with the allocation procedures in Paragraphs 1 through 6 above.

**Drafting Note:** Additional guidance is needed to address aggregate agreements that do not have reinsurance discrete cash flows.

### Section 4. Stochastic Reserve

The company shall calculate the stochastic reserve as follows:

- A. Calculate the modified deterministic reserve for policies excluded from stochastic modeling as specified in Section 5.A.
- B. For policies that require stochastic modeling, the company shall
  - 1. Project cash flows in compliance with the applicable requirements in Sections 6, 7 and 8 over the stochastically generated scenarios described in Section 6.G.
  - 2. Calculate the scenario reserve for each stochastically generated scenario as follows:
    - a. For each model segment at the end and start of each projection year, calculate the discounted value of the negative of the projected statement value of general account and separate account assets using the path of discount rates for the model segment determined in compliance with Section 6.H.5 from the projection start date to the end of the respective projection year.

**Guidance Note:** The projected statement value of general account and separate account assets for a model segment may be negative or positive.

b. Sum the amounts calculated in Subparagraph a above across all model segments at the end and start of each projection year.

Guidance Note: The amount in Subparagraph b. above may be negative or positive.

- c. Set the scenario reserve equal to the sum of the statement value of the starting assets across all model segments and the maximum of the amounts calculated in Subparagraph b above.
- 3. Rank the scenario reserves from lowest to highest.
- 4. Calculate CTE 70.
- 5. Add an additional amount to CTE 70 to capture any material risk included in the scope of these requirements but not already reflected in CTE 70 using an appropriate and supportable method and supporting rationale.
- C. The stochastic reserve equals the amount determined Subsection 54.A above plus the amount determined in Section 4.B.5 above. If the company defines two or more subgroups for aggregation purposes as described in Section 6.B.2.b, the company shall calculate the stochastic reserve amount determined in Section 4.B above for each subgroup of policies on a standalone basis, sum together those stochastic reserves amounts for each subgroup, and then add the modified deterministic reserve amount determined in Section 4A above to determine the total stochastic reserve.

### Section 5. Stochastic Modeling Exclusion

- A. General Provisions
  - 1. The company may elect to exclude certain groups of policies from the stochastic modeling requirement by
    - a. Annually and within 12 months before the valuation date passing the stochastic exclusion test defined in Subsection B of this section; or
    - b. Demonstrating that the modified deterministic reserve for those groups of policies will meet the exclusion requirements in C of this section.
  - 2. A company may not exclude a group of policies for which there is one or more clearly defined hedging strategies from stochastic modeling requirements.
  - 3 If a group of policies meets the one of the exclusion tests in Section 5.A.1 above, then the stochastic reserve for those policies is the modified deterministic reserve as defined in A.5 of this Section.
  - 4. If a group of policies is excluded from the stochastic modeling requirements, the company may not include future transactions associated with non-hedging derivative programs in determining the modified deterministic reserve for those policies.
  - 5. The modified deterministic reserve for a group of policies is equal to the sum of:
    - a. The greater of:
      - i. The amount calculated in the aggregate for all the policies in the group using the method described in Section 4.B.2, but using a single scenario based on the valuation assumptions and cash flows used to determine the deterministic reserve; and
      - ii. The sum of the per policy reserves described in Section 3.C for these policies; and

- b. Any additional reserve amount that the company decides to include for purposes of demonstrating that the modified deterministic reserve meets the requirements in Subsection C of this section.
- B. Stochastic Exclusion Test
  - 1. The company may exclude a group of policies from the stochastic modeling requirements, if the ratio of (b-a)/c is less than 4% where:
    - a. a = the seriatim reserve described in Section 3.B<u>A</u> using the baseline economic scenario described in Paragraph 2.a below.
    - b. b = the largest seriatim reserve described in Section 3.<u>BA</u> under any of the other 15 economic scenarios described in Paragraph 2.a below.
    - c. c = An amount calculated from the baseline economic scenario described in Paragraph 2.a below that represents the present value of benefits and expenses for the policies, adjusted for reinsurance as appropriate to achieve consistency between the numerator and denominator. For this purpose, the company shall [generally] calculate a seriatim reserve as described in Section 3.BA for the policies, but excluding the gross premium payments and excluding as appropriate the corresponding portion of such gross premium payments reflected in reinsurance cash flows.

**Guidance Note**: As an example of the portion of gross premium payment excluded from reinsurance cash flows, for policies reinsured through a modified coinsurance arrangement where the policy premium is substantially returned to the ceding company through a reserve transfer, the ceding company would not need to reduce this amount for the gross premiums reflected in the reinsurance cash flows.

- 2. In calculating the ratio in Paragraph 1 above, the company
  - a. Shall use the most current available baseline economic scenario and the 15 other economic scenarios published by the NAIC.
  - b. Shall use anticipated experience assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.
  - c. May not group together contract types with significantly different risk profiles for purposes of calculating this ratio.
  - d. Shall use net asset earned rates specific to each scenario to discount the cash flows.

**Drafting Note:** The economic scenarios will be generated using an economic scenario generator and process approved by the NAIC. The economic scenarios will be based on specified patterns of random shocks to the economic conditions on the projection start date with the baseline economic scenario based on random shocks of zero. The American Academy of Actuaries is working on software available to generate the scenarios. The software will likely require input of interest rates on the scenario starting date. The LRWG intends to let the NAIC make this software free and publicly available on the internet.

- C. Exclusion Requirements if the Stochastic Exclusion Test is Not Used
  - 1. If a company chooses to test whether a group of policies may be excluded from the stochastic modeling requirements by providing a demonstration as allowed under Section 5.A.1.b above, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:
    - a. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of policies from the stochastic modeling requirement. If, as of the end of any calendar year, the

company determines the modified deterministic reserve for the group of policies no longer adequately provides for all material risks, the exclusion shall be discontinued and the policies shall be included in the stochastic modeling calculations.

- b. The demonstration may be based on analysis from a date that proceeds the initial or subsequent exclusion period.
- c. The demonstration shall provide a reasonable assurance that the stochastic reserve calculated on a standalone basis for only those polices subject to the stochastic modeling exclusion would not be greater than the modified deterministic reserve for such policies.
- d. The demonstration shall provide an effective evaluation of the residual risk exposure resulting from risk mitigation techniques such as derivative programs and reinsurance.
- 2. The company may use one of the following or another method acceptable to the commissioner to demonstrate compliance with Paragraph 1 above:
  - a. Demonstrate that the modified deterministic reserve is greater than the stochastic reserve calculated on a standalone basis.
  - b. Demonstrate that the modified deterministic reserve is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.
  - c. Demonstrate that the modified deterministic reserve is greater than the stochastic reserve calculated on a standalone basis, but using a representative sample of policies in the stochastic modeling calculations. or
  - d. Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a standalone basis to exceed the modified deterministic reserve are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance, or passing the risk on to the policyholder by contract provision.

#### Section 6. Cash Flow Models

- A. Model Structure
  - 1. The company shall design and use a cash flow model that
    - a. Complies with applicable Actuarial Standards of Practice in develop cash flow models and projecting cash flows.
    - b. Uses model segments consistent with the company's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes.
    - c. Assigns each policy subject to these requirements to only one model segment and shall use a separate cash flow model for each model segment.
    - d. Projects cash flows for a period that extends far enough into the future so that no material amount of business remains at the end of the period no obligations remain.
  - 2. The company may use a simplified approach to developing cash flows, if the company shows that the approach produces reserves that are no less than those produced by a more robust cash flow model.

Guidance Note: For example, it may be reasonable to assume 100% deaths or 100% surrenders after some appropriate period of time.

### B. General Description of Cash Flow Projections

- 1. For the deterministic reserve and for each scenario for the stochastic reserve, the company shall project cash flows ignoring federal income taxes and reflecting the dynamics of the expected cash flows for the entire model segment. The company shall reflect the effect of all material product features, both guaranteed and non-guaranteed. The company shall project cash flows including the following:
  - a. Revenues received by the company including gross premiums received from the policyholder.
  - b. Amounts charged to account values on general accounts business and use those amounts to determine any effects on future policy benefits, and not as revenue.

Guidance Note: Amounts charged to account values on general accounts business examples include cost of insurance and expense charges.

- c. All material benefits paid to policyholders, including but not limited to, death claims, surrender benefits, and withdrawal benefits, reflecting the impact of all material guarantees.
- d. Net cash flows between the general account and separate account for variable products.

**Guidance Note:** Cash flows going out from the general account to the separate account increase the reserve and cash flows coming in to the general account from the separate account decrease the reserve. Examples include allocation of net premiums to the separate account, policyholder-initiated transfers between fixed and variable investment options, transfers of separate account values to pay death or withdrawal benefits, and amounts charged to separate account values for cost of insurance, expense, etc.

- e. Insurance company expenses (including overhead expenses), commissions, fund expenses, contractual fees and charges, and taxes (excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes).
- f. Revenue sharing income received by the company (net of applicable expenses) and other applicable revenue and fees associated with the policies and adjusting the revenue to reflect the uncertainty of revenue sharing income that is not guaranteed.
- g. Net cash flows associated with any reinsurance as described in Section 7.
- h. Cash flows from derivative liability and derivative asset programs, as described in Section 6.L.
- i. Cash receipts or disbursements associated with investment income, realized capital gains and losses, principal repayments, appropriate asset default costs, investment expenses, asset prepayments, and asset sales. Cash flows related to policy loans are handled in the reserve calculation in a manner similar to cash flows to and from separate accounts.

**Guidance Note**: Since the projection of cash flows reflect premium mode directly, deferred premiums are zero under this approach.

- 2. In determining the stochastic reserve the company
  - a. May perform the cash flow projections for each policy in force on the date of valuation or by grouping policies into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. If the company groups policies in representative cells the company shall develop the groups such that the resulting stochastic reserve is greater than or equal to the stochastic reserve that would result with no grouping. The company

shall use a per policy calculation to show compliance with this requirement, unless the company can demonstrate compliance with the requirement using another appropriate method.

b. Shall determine the number and composition of subgroups for aggregation purposes in a manner that is consistent with how the company manages risks across the different product types, and that reflects the likelihood of any change in risk offsets that could arise from shifts between product types. If a company is managing the risks of two or more different product types as part of an integrated risk management process, then the products may be combined into the same subgroup.

**Guidance Note**: Aggregation refers to the number and composition of subgroups of polices that are used to combine cash flows. Aggregating policies into a common subgroup allows the cash flows arising from the policies for a given stochastic scenario to be netted against each other (i.e., allows risk offsets between policies to be recognized).

- C. Non-Guaranteed Element Cash Flows
  - 1. The company shall include non guaranteed elements in the cash flow models used to project future cash flows for both the deterministic reserve and the stochastic reserve. When a non-guaranteed element is based on some aspect of experience, the company shall reflect future changes in the level of non-guaranteed element in the cash flow models based on the experience assumed in each scenario. Except as noted in paragraph 5 below, the company shall include non-guaranteed elements (NGE) in the models to project future cash flows beyond the time the company has authorized their payment or crediting. Future NGE amounts should be adjusted in each scenario to reflect changes in experience in the NGE amounts.
  - 2. The company may not assume that the projected non guaranteed element changes simultaneously with the change in projected experience, but rather only at the date following the recognition of a change in experience on which the company would normally implement a change. The projected NGE shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
    - a. the nature of contractual guarantees;
    - b. the company's past NGE practices and established NGE policies;
    - c. the timing of any change in NGE relative to the date of recognition of a change in experience;
    - d. the benefits and risks to the company of continuing to authorize NGE.
  - 3. When determining the projected non-guaranteed element for each scenario, the company shall take into consideration those factors that affect how the company will modify its current non guaranteed element scale, such as existence of contract guarantees, the company's past non guaranteed element practices and current non-guaranteed element policies. Projected NGE should be established in a way that does not eliminate the margin in the minimum reserve.
  - 4. The company shall establish a margin for the projected non-guaranteed element that increases the minimum reserve. Projected levels of NGE in the cash flow model must be consistent with the experience assumptions used in each scenario. Policyholder behavior assumptions in the model must be consistent with the NGE assumed in the model.
  - 5. The company shall report any liability for dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, the company shall exclude any dividends that are included in the separate liability from the reserve cash flow projection. For any portion of an NGE that is not based on some aspect of the policy's or

contract's experience, that portion should not be included unless it has been authorized for payment by the Board of Directors.

**Drafting Note**: Paragraph 5 needs to be reworded to clarify that it is referring to income that is not included in the model.

6. Report any liability for dividends declared by not yet paid that has been establisted according to statutory accounting principles as of the valuation date separately from the minimum reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the valuation date, exclude any dividends that are included in the separate liability from the reserve cash flow projection.

#### Drafting Note: The reporting requirements for non-guaranteed elements should be reviewed.

**Drafting** Note: The LRWG is considering a procedure whereby the treatment of non guaranteed elements outlined above would apply only to policies that have material tail risk, as defined by a test. A simplified procedure is under development for policies that do not have material tail risk.

- D. Starting and Projected Assets
  - 1. For each model segment, the company shall select starting assets such that the aggregate annual statement value of the assets at the projection start date equals the estimated value of the minimum reserve allocated to the policies in the appropriate model segment subject to the following:
    - a. Starting asset values shall include the relevant balance of any due, accrued or unearned investment income.
    - b. For an asset portfolio that supports both policies that are subject and not subject to these requirements, the company shall determine an equitable method to apportion the total amount of starting assets between the subject and non-subject policies.
    - c. If for all model segments combined, the aggregate annual statement value of starting assets is less than 98% or greater than 102% of the final aggregate minimum reserve, the company shall provide documentation in the PBR Actuarial Report that provides reasonable assurance that the aggregate minimum reserve is not materially understated as a result of the estimate of the amount of starting assets.
  - 2. The company shall select starting assets for each model segment that consists of the following:
    - a. All separate account assets supporting the policies.
    - b. All policy loans supporting the policies that are explicitly modeled under Section 6.E.
    - c. All derivative instruments held at the projection start date that are part of a derivative program and can be appropriately allocated to the model segment.
    - d. The negative of any pretax interest maintenance reserve liability that can be allocated to each model segment at the projection start date subject to the following:
      - i. The amount of PIMR allocable to each model segment is the approximate statutory interest maintenance reserve liability that would have developed for the model segment assuming applicable capital gains taxes are excluded. The allocable PIMR may be either positive or negative, resulting in either a decrease or increase to starting assets.
      - ii. In performing the allocation to each model segment, the company shall use a reasonable approach to allocate any portion of the total company balance that is disallowable under

statutory accounting procedures (i.e., when the total company balance is an asset rather than a liability).

- iii. The company may use a simplified approach to allocate the PIMR, if the impact of the PIMR on the minimum reserve is minimal.
- e. An amount of other general account assets such that the aggregate value of starting assets meets the requirements in Section 6.D.1. These assets shall generally be selected on a consistent basis from one reserve valuation to the next. Any material change in the selection methodology shall be documented in the PBR Actuarial Report.
- 3. The aggregate value of general account starting assets is the sum of the amounts in Paragraphs 2.b through 2.e above.

**Guidance Note**: The aggregate value of general account assets in Paragraph 3 above may be negative. This may occur for example for model segments in which a substantial portion of policyholder funds are allocated to separate accounts. The assets in Paragraph 2.e above may include negative assets or short-term borrowing, resulting in a projected interest expense.

- 4. The company shall calculate the projected values of starting assets in a manner consistent with their values at the start of the projection.
- 5. When calculating the projected statement value of assets at any date, the company shall include the negative of any outstanding PIMR. For purposes of these requirements, the projected PIMR for any model segment and for all model segments combined may be negative.
- E. Cash Flows from Starting Assets

The company shall determine cash flows from starting assets as follows:

- 1. Select assets at the beginning of the projection from the company's actual assets backing the policies associated with each model segment using the method to determine the amount of starting assets described in Section 6.D.
- 2. Determine cash flows for each projection interval for general account fixed income assets including derivative asset programs associated with these assets as follows:
  - a. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario. Grouping of assets is allowed if the company can demonstrate that grouping does not result in materially lower reserves than would have been obtained using a seriatim approach.
  - b. Reflect appropriate asset default costs and investment expenses through a deduction to the gross investment income using prudent estimate assumptions.
  - c. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.

**Guidance Note**: Examples of general account fixed income assets include public bonds, convertible bonds, preferred stocks, private placements, asset backed securities, commercial mortgage loans, residential mortgage loans, mortgage backed securities, and collateralized mortgage obligations.

**Drafting Note**: Additional requirements may be needed to determine projected market values on sales of starting assets using the prescribed net spread on reinvestment assets described in Section 6.F. For instance, it would be inappropriate to use net-after-default spreads in the discounting of pre-default cash flows to determining market values.

- d. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values directly in the projection of asset cash flows.
- 3. Determine cash flows for each projection interval for general account equity assets (i.e., non-fixed income investments having substantial volatility of returns such as common stocks and real estate investments) including derivative programs associated with these assets as follows:
  - a. Determine the grouping for equity asset categories (e.g. large cap stocks, international stocks, owned real estate, etc.) and the allocation of specific assets to each category as described in Section 6.J.
  - b. Project the gross investment return including realized and unrealized capital gains for each investment category in a manner that is consistent with the projected total return on the S&P 500 for the Scenario, reflecting any differences in the total return and risk between the S&P 500 and each equity investment category.

**Guidance Note**: This does not imply a strict functional relationship between the returns on the various investment categories and the return on the S&P 500, but it would generally be inappropriate to assume that an investment category consistently 'outperforms' (i.e. has lower risk, but achieves a higher expected return relative to the efficient frontier) the S&P 500.

- c. For the deterministic reserve use an S&P 500 total return assumption that equals the 10-year U.S. Treasury interest rate curve in Scenario 12 from the prescribed scenarios in Section 5.B plus 4% of U.S. Treasury interest rate curve plus .25%.
- d. For the stochastic reserve use an S&P total return assumption that reflects the equity return of the stochastic economic scenarios in Section 6.G.
- e. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.
- 4. Determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly, or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:
  - a. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution
    - i. Produces reserves that are no less than those produced by modeling existing loan balances explicitly; and
    - ii. Complies with the policyholder behavior requirements stated in Section 8.D.
  - b. If the company models policy loans explicitly, the company shall:
    - i. Treat policy loan activity as an aspect of policyholder behavior and subject to the requirements of Section 8.D.
    - ii. For both the deterministic reserve and the stochastic reserve, assign loan balances either to exactly match each policy's utilization or to reflect average utilization over a model segment or sub-segments.

- iii. Model policy loan interest in a manner consistent with policy provisions and with the scenario. In calculating the deterministic reserve, include interest paid in cash as a loan cash flow in that projection interval, but do not include interest added to the loan balance as a loan cash flow (the increased balance will require increased repayment cash flows in future projection intervals).
- iv. Model principal repayments, including those which occur automatically upon death or surrender.
- v. Model any investment expenses allocated to policy loans and include them either with loan cash flows or insurance expense cash flows.
- 5. Determine cash flows for each projection interval for all other general account assets by modeling asset cash flows on other assets that are not described in Subsections E.2 through E.4 above using methods consistent with the methods described in Subsections E.2 and E.3 above. This includes assets that are a hybrid of fixed income and equity investments.
- 6. Determine cash flows for each projection interval for all fixed income separate account assets as follows:
  - a. For the deterministic reserve, use an economic scenario that reflects the U.S. Treasury interest rate curves in Scenario 12 from the prescribed scenarios in Section 5.B. plus 4% of U.S. Treasury interest rate curve plus .25%.

**Guidance Note:** The Scenario 12 interest rate yield curves are based on a one standard deviation shock to the economic conditions as of the projection start date, where the shock is spread uniformly over the first 20 years of the projection. It is anticipated that Scenario 12 will be updated quarterly and posted on the NAIC website, reflecting the current yield curve at the end of each quarter. The values in Scenario 12 are based on a generator that has not yet been adopted.

b. For the stochastic reserve, use the stochastic economic scenarios in Section 6.G.

Drafting Note: This section needs additional work.

- 7. Determine cash flows for each projection interval for all equity separate account assets using the method described in Subsection E.3 above, but the grouping of funds is described in 6.K below.
- 8. Determine cash flows for each projection interval for all other separate account assets not described in Subsection 6 and 7 above using methods consistent with the methods described in Subsections 6 and 7 above. This includes separate account assets that are a hybrid of fixed income and equity investments.
- F. Cash Flows from Reinvestment Assets

The company shall determine cash flows from reinvestment assets as follows:

- 1. Model any purchase of general account reinvestment assets with available net asset and liability cash flows in a manner that is representative of and consistent with the company's investment policy for each model segment. Determine the value in a manner consistent with the value of starting assets that have similar investment characteristics. Model any disinvestment in a manner consistent with the company's investment policy and that reflects the cost of borrowing.
- 2. Determine cash flows for each projection interval for general account fixed income assets including derivative asset programs associated with these assets as following:
  - a. For fixed income investments including derivative asset programs associated with these assets, at purchase of each asset, determine an appropriate combination of market price and future

contractual cash flow provisions for which the resulting purchase yield appropriately reflects the then-current U.S. Treasury interest rate curve plus 4% of the appropriate U.S. Treasury interest rate curve plus .25%.

**Drafting Note:** The NAIC shall define the structure and levels of the prescribed net spreads over Treasuries. One recommendation being considered is that only the option-adjusted net spreads be prescribed. In such case, the company could add an appropriate option premium to the purchase yield as long as it also fully models the associated cash flow risks such as calls or prepayments.

- b. For fixed income assets including derivative asset programs associated with these assets, after purchase, model the cash flows using the contractual provisions determined in Paragraph 2.a above and following the same methodology as described in Subsection E.2 of this section, except that no deduction for default costs and investment expenses is necessary since they are implicit in the prescribed net spreads.
- 3. Determine cash flows for general account equity assets following the same methodology as described in Subsection E.3 of this section.
- 4. Determine the cash flows for new policy loans following the same methodology as described in Subsection E.4 of this section.
- 5. Determine the cash flows for all other general account assets following the same methodology as described in Subsection E.5 of this section.
- 6. Determine the cash flows for separate account fixed income, equity and other assets following the same methodology as described in Subsections E.6, E.7 and E.8 of this Section.

### G. Stochastic-Economic Scenarios

- 1. Deterministic Economic Scenarios
  - a. The cash flow projections for the deterministic reserve shall reflect a prescribed path of U.S. Treasury yield curves and a prescribed path of S&P 500 returns for general account assets and for separate account assets.
  - b.
     The prescribed path of yield curves for U.S. Treasuries shall equal the interest rate yield curves in

     Scenario 12 from the set of prescribed scenarios used in the stochastic exclusion test defined in

     Section 5.B.

**Guidance Note**: The Scenario 12 interest rate yield curves are based on a one standard deviation shock to the Economic conditions as of the projection start date, where the shock is spread uniformly over the first 20 years of the projection. It is anticipated that Scenario 12 will be updated quarterly and posted on the NAIC website, reflecting the current yield curve at the end of each quarter. The values in Scenario 12 are based on a generator that has not yet been adopted

 <u>c.</u> The prescribed path of S&P 500 returns shall equal the 10-year treasury rate path in Scenario 12 from the prescribed scenarios used in the stochastic exclusion test defined in Section 5.B, plus the prescribed net spread defined in Section 6.F.2.a added to each rate.

### Drafting Note: Work continues on a prescribed path for S & P returns.

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

2. Stochastic Economic Scenarios

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For purposes of calculating the stochastic reserve under Section 4,

- <u>+a</u>. The company shall use
  - ai. U.S. Treasury interest rate curves following a prescribed set of interest rate scenarios; and
  - bii. S&P 500 equity return paths and separate account fund performance following a prescribed, pre-packaged set of equity return scenarios.
- 2<u>b</u>. The company shall use the following for other funds, correlation of funds, number of scenarios and efficiency in estimation, frequency of projection and time horizon:

<<insert requirements>>

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

<u>3c</u>. Integrated Scenarios

<<insert requirements>>

**Guidance Note:** [Currently VM-20 does not permit use of company generated scenarios. Therefore, this guidance is not currently applicable. It is recommended this note be retained for the possibility that company generated scenarios may one day be permitted.] When developing projections for variable products or general account products which are backed in part by equity assets, it will be necessary to project both equity returns and interest rate paths. Ideally, a fully integrated model of interest rates, equity returns, and separate account fund performance would be used. If the company chooses to use a fully integrated interest rate and equity return model, the equity return scenarios must satisfy the equity return calibration criteria adopted by the NAIC and the interest rate scenarios must satisfy the interest rate calibration criteria adopted by the NAIC. The U.S. Treasury Fund scenarios within the 10,000 prepackaged scenarios for the C3P2 requirements qualify as meeting these criteria. Although an integrated modeling approach is desirable, a number of simpler approaches are acceptable. LHATF may wish to define acceptable methods for integrating these two types of scenarios, and may want to consider approaches similar to those allowed in C3P2.

- 4<u>d</u>. The company shall use a large enough number of scenarios such that using a broader or more robust range of additional scenarios does not materially understate the minimum reserve.
- <u>5e</u>. Scenario reduction techniques
  - ai. A scenario reduction technique is a methodology that derives a reduced set of economic scenarios from a larger set while maintaining the characteristics and robustness of the larger set.
  - bii. Scenario reduction techniques may be considered acceptable as long as the larger set of scenarios is produced by the generator prescribed by the NAIC and as long as the scenario reserves of a representative subset of policies, run using the reduced scenario set, are materially consistent with the scenario reserves of the same subset of policies, run using the larger scenario set.

Drafting Note: Other necessary additions include: added documentation and a definition of the calibration criteria

Drafting Note: More guidance is needed on how many scenarios a company should generate.

- H. Determination of Net Asset Earned Rates and Discount Rates
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- 1. In calculating the deterministic reserve the company shall determine a path of net asset earned rates for each model segment that reflects the net general account portfolio rate in each projection interval (i.e., monthly, quarterly, annually) in compliance with Section 6, which will depend primarily on:
  - a. Projected net investment earnings from the portfolio of starting assets.
  - b. Pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets.
  - c. Pattern of net liability cash flows.
  - d. Projected net investment earnings from reinvestment assets.
- 2. The company shall calculate the net asset earned rate as the ratio of net investment earnings divided by invested assets subject to the following:
  - a. The impact of separate accounts and policy loans is excluded.
  - b. The net asset earned rate for each projection interval is calculated in a manner that is consistent with the timing of cash flows and length of the projection interval of the related cash flow model.
  - c. Net investment earnings include:
    - i. Investment income plus capital gains and losses (excluding capital gains and losses that are included in the PIMR), minus appropriate default costs and investment expenses;
    - ii. Income from derivative asset programs; and
    - iii. Amortization of the PIMR.
  - d. Invested assets are determined in a manner that is consistent with the timing of cash flows within the cash flow model and the length of the projection interval of the cash flow model.
  - e. Invested assets are adjusted to reflect the negative of the outstanding PIMR.
  - f. The annual statement value of derivative instruments or a reasonable approximation thereof is in invested assets.
  - g. All items reflected in the ratio are consistent with statutory asset valuation and accrual accounting, including reflection of due, accrued or unearned investment income where appropriate.
- 3. The company may use a grouped liability model to calculate the path of net asset earned rates for the deterministic reserve and then perform the seriatim reserve calculation for each policy based on those net asset earned rates.

**Guidance Note**: Section 6.A.2 permits the use of simplified approaches to calculate the deterministic reserve and stochastic reserve. This availability for simplification includes ways to determine appropriate net asset earned rates. Small to intermediate size companies, or any size company with smaller blocks of business, have options to create net asset earned rates under simplified approaches if they continue to meet the requirement that the approach produces reserves that are no less than those produced by a more robust cash flow model.

4. The company shall use the path of net asset earned rates as the discount rates for each model segment in the deterministic reserve calculations in Section 3, and the stochastic exclusion test in Section 5.

5. The company shall use the path of one-year U.S. Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the stochastic reserve calculations in Section 4 and the modified deterministic reserve in Section 5.

**Guidance Note**: The use of different discount rate paths for the seriatim and scenario reserves is driven by differences in methodology. The seriatim reserve is based on a present value of all liability cash flows, with the discount rates reflecting the investment returns of the assets backing the liabilities. The scenario reserve is based on a starting estimate of the reserve, and assets that support that estimate, plus the greatest present value of accumulated deficiencies. Here, the discount rates are a standard estimate of the investment returns of only the marginal assets needed to eliminate either a positive or negative deficiency.

I. Future Pretax Interest Maintenance Reserve Amounts

The company shall spread realized capital gains and losses arising from changes in interest rates over future projection intervals by establishing a new PIMR amount and future amortization schedule in a manner that is reasonably consistent with statutory accounting procedures under the assumption that capital gains tax is zero.

- J. Grouping of Equity Investments in the General Account
  - 1. The company may group the portion of the general account starting assets that are equity investments (e.g., common stocks, real estate investments) for modeling using an approach that establishes various equity investment categories with each investment category defined to reflect the different types of equity investments in the portfolio.
  - 2. The company shall design a proxy for each equity investment category in order to develop the investment return paths and map each investment category to an appropriately crafted proxy investment category normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.
- K. Grouping of Variable Funds and Subaccounts for Separate Accounts
  - 1. Similar to the approach used for general account equity investments, the company may group the portion of the starting asset amount held in the separate account represented by the variable funds and the corresponding account values for modeling using an approach that recognizes the investment guidelines and objectives of the funds. In assigning each variable fund and the variable subaccounts to a grouping for projection purposes, the company shall reflect the fundamental characteristics of the fund and assure that the parameters have the appropriate relationship to the required calibration points of the S&P 500. The company shall reflect the characteristics of the efficient frontier (i.e., returns generally cannot be increased without assuming additional risk) in the grouping.

Guidance Note: This approach is similar to what is required for the RBC C3 Phase 2 requirements.

- 2. Similar to the approach used for general account equity investments, the company shall design an appropriate proxy for each variable subaccount in order to develop the investment return paths and map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return proxy and the specific variable funds.
- L. Modeling of Derivative Programs
  - 1. When determining the deterministic reserve and the stochastic reserve, the company shall include in the projections the appropriate costs and benefits of derivative instruments that are currently held by the company in support of the policies subject to these requirements. The company shall also include the

appropriate costs and benefits of anticipated future derivative instrument transactions associated with the execution of a clearly defined hedging strategy; and the appropriate costs and benefits of anticipated future derivative instrument transactions associated with non-hedging derivative programs (e.g. replication, income generation) undertaken as part of the investment strategy supporting the policies provided they are normally modeled as part of the company's risk assessment and evaluation processes.

Guidance Note: The prohibition in these minimum reserve requirements against projecting future hedging transactions other than those associated with a clearly defined hedging strategy is intended to address initial concerns expressed by various parties that reserves could be unduly reduced by reflection of programs whose future execution and performance may have greater uncertainty. The prohibition appears however to be in conflict with Principle 2 listed in the valuation manual. Companies may actually execute and reflect in their risk assessment and evaluation processes hedging strategies similar in many ways to clearly defined hedging strategies but lack sufficient clarity in one or more of the qualification criteria. By excluding the associated derivative instruments, the investment strategy that is modeled may also not reflect the investment strategy the company actually uses. Further, since the future hedging transactions may be a net cost to the company in some scenarios and a net benefit in other scenarios, the exclusion of such transactions can result in a minimum reserve that is either lower or higher than it would have been if the transactions were not excluded. The direction of such impact on the reserves could also change from period to period as the actual and projected paths of economic conditions change. A more graded approach to recognition of non-qualifying hedging strategies may be more theoretically consistent with Principle 2. The requirements stated here for handling hedging strategies are essentially consistent with those included in the CTE methodology portion of the September 2006 exposure draft of Actuarial Guideline VACARVM for variable annuity reserving. It is recommended that, as greater experience is gained by actuaries and regulators with the principle-based approach, and as industry hedging programs mature, the various requirements of this section be reviewed

- 2. For each derivative program that is modeled, the company shall reflect the company's established investment policy and procedures for that program, project expected program performance along each Scenario, and recognize all benefits, residual risks, and associated frictional costs. The residual risks include, but are not limited to: basis, gap, price, parameter estimation, and variation in assumptions (mortality, persistency, withdrawal, etc.). Frictional costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. For clearly defined hedging strategies, the company may not assume that residual risks and frictional costs have a value of zero, unless the company demonstrates in the PBR Actuarial Report that "zero" is an appropriate expectation.
- 3. In circumstances where one or more material risk factors related to a derivative program is not fully captured within the cash flow model used to calculate CTE 70, the company shall reflect such risk factors by increasing the stochastic reserve as described in Section 4.B.5.

**Guidance Note:** The previous two paragraphs address a variety of possible situations. Some hedging programs may truly have zero or minimal residual risk exposure, such as when the hedge program exactly replicates the liability being hedged. With dynamic hedging strategies, residual risks are typically expected; however, in some cases the cash flow model supporting the CTE calculation may be able to adequately reflect such risks through margins in program assumptions, adjustments to costs and benefits, etc. In other cases, reference to additional external models or analyses may be necessary where such results cannot be readily expressed in a format directly amenable to a CTE calculation. In such cases, the company will need to combine the results of such models by some method that is consistent with the objectives of these requirements. Emerging actuarial practice will be relied on to provide approaches for a range of situations that may be encountered.

**Guidance Note:** Statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes supersede these provisions and therefore these provisions should not be used to determine whether a company is permitted to use such instruments in any state or jurisdiction.

M. Clearly Defined Hedging Strategy

- 1. A clearly defined hedging strategy must identify:
  - a. The specific risks being hedged (e.g., cash flow, policy interest credits, delta, rho, vega, etc.).
  - b. The hedge objectives.
  - c. The risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).
  - d. The financial instruments used to hedge the risks.
  - e. The hedge trading rules including the permitted tolerances from hedging objectives.
  - f. The metrics for measuring hedging effectiveness.
  - g. The criteria used to measure effectiveness.
  - h. The frequency of measuring hedging effectiveness.
  - i. The conditions under which hedging will not take place.
  - j. The person or persons responsible for implementing the hedging strategy.
  - k. Areas where basis, gap or assumption risk related to the hedging strategy have been identified.
  - 1. The circumstances under which hedging strategy will not be effective in hedging the risks.
- 2. A clearly defined hedging strategy may be dynamic, static or a combination of dynamic and static.
- 3. Hedging strategies involving the offsetting of the risks associated with other products outside of the scope of these requirements is not a clearly defined hedging strategy.

**Guidance Note:** For purposes of the above criteria, "effectiveness" need not be measured in a manner as defined in NAIC Accounting Practices and Procedures.

#### Section 7. Reinsurance

- A. General Considerations
  - 1. In this section reinsurance includes retrocession and assuming company includes retrocessionaire.
  - 2. The company shall use assumptions and margins in developing the minimum reserve and the gross reserve that are appropriate for each company pursuant to a reinsurance agreement. The ceding and assuming companies are not required to use the same assumptions and margins for the reinsured policies and therefore, the credit for reinsurance ceded calculated by the ceding company may not necessarily equal to the minimum reserve developed by the assuming company.

**Guidance Note**: In determining reserves, one party to a reinsurance transaction may make use of reserve calculations of the other party. If the company chooses assumptions that differ from those used by the other party, the company must either rerun the reserve calculation or be prepared to demonstrate that appropriate adjustments to the other party calculation have been made.

3. The company shall assume that the laws and regulations in place as of the valuation date regarding credit for reinsurance remain in effect throughout the projection period.

- 4. A company shall include a reinsurance agreement or amendment in calculating the minimum reserve if:
  - a. The agreement or amendment complies with the Accounting Practices and Procedures Manual, and
  - b. Is not subject to deposit accounting.
- 5. For a reinsurance agreement or amendment that is subject to deposit accounting, if treating the reinsurance agreement or amendment as if it were in compliance with the Accounting Practices and Procedures Manual and not subject to deposit accounting would result in a reduction to the company's surplus, then the company shall increase the minimum reserve by the absolute value of such reductions in surplus.
- 6. To the extent that a single deterministic valuation assumption for risk factors associated with certain provisions of reinsurance agreements will not adequately capture the risk the company shall:
  - a. Stochastically model the risk factors directly in the cash flow model when calculating the stochastic reserve; or
  - b. Perform a separate stochastic analysis outside the cash flow model to quantify the impact on reinsurance cash flows to and from the company. The company shall use the results of this analysis to adjust prudent estimate assumptions or to determine an amount to adjust the stochastic reserve to adequately make provision for the risks of the reinsurance features.

**Guidance Note:** Examples of reinsurance provisions where a single deterministic valuation assumption will not adequately capture the risk are stop-loss reinsurance and maximum limits on benefits receivable.

**Drafting Note:** Additional guidance in an ASOP may be needed to explain further what features give rise to this stochastic modeling requirement.

- B. Reinsurance Ceded
  - 1. The company shall determine cash flows for reinsurance ceded subject to the following:
    - a. The company shall include the effect of projected cash flows received from or paid to assuming companies under the terms of ceded reinsurance agreements in the cash flows used in calculating the deterministic reserve in Section 3 and stochastic reserves in Section 4.
    - b. If cash flows received from or paid to assuming companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to assuming companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.
    - c. The company shall use assumptions to project cash flows to and from assuming companies that are consistent with other assumptions used by the company in calculating the minimum reserve for the reinsured policies, and that reflect the terms of the reinsurance agreements.
  - 2. The company shall calculate a gross reserve using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance. If the group of policies is required to perform stochastic modeling when the reinsurance is excluded, then the stochastic modeling shall be performed for the gross reserve even if not required for the minimum reserve. The company shall determine the credit for reinsurance ceded as the excess, if any, of the gross reserve over the minimum reserve.

3. The company shall use assumptions that represent company experience in the absence of reinsurance and assuming that the business was managed in a manner consistent with the manner that retained business is managed.

**Guidance Note:** The assumptions used to calculate the gross reserve are to some degree hypothetical, since this is not the situation that actually occurs. For example, assets backing ceded reserves may be held by the assuming company, not the ceding company.

- C. Reinsurance Assumed
  - 1. The company shall determine cash flows for reinsurance assumed subject to the following:
    - a. The company shall include the effect of cash flows projected to be received from and paid to ceding companies under the terms of assumed reinsurance agreements in the cash flows used in calculating the deterministic reserve in Section 3 and the stochastic reserve in Section 4.
    - b. If cash flows received from or paid to ceding companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to ceding companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.
  - 2. If a company assumes a policy under more than one reinsurance agreement, then the company shall treat each agreement separately for the purposes of calculating the deterministic reserve.
  - 3. The company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company's experience for the business segment to which the reinsured policies belong, and reflect the terms of the reinsurance agreement.
- D. Reinsurance Assumptions
  - 1. The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the non-guaranteed elements in reinsurance cash flows the company shall include, but not be limited to the following:
    - a. The usual and customary practices associated with such agreements.
    - b. Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.
    - c. Any limits placed upon either party's ability to exercise contractual options in the reinsurance agreement.
    - d. The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.
    - e. Actions that might be taken by a party if the counterparty is in financial difficulty.
  - 2. The company shall account for any actions that the ceding company and, if different, the direct-writing company have taken or are likely to take that could affect the expected cash flows of the reinsured business in determining assumptions for the minimum reserve.

**Guidance Note**: Examples of actions the direct-writing company could take include 1) instituting internal replacement programs or special underwriting programs, both of which could change expected mortality rates, or 2) changing non-guaranteed elements in the reinsured policies, which could affect mortality, policyholder behavior, and possibly expense and investment assumptions. Examples of actions the ceding company could take include: 1) the exercise of contractual options in a reinsurance agreement to influence the setting of non-guaranteed elements in the reinsured policies, or 2) the ability to participate in claim decisions.

- 3. For actions taken by the ceding company, and, if different, the direct-writing company, set assumptions in a manner consistent with Section 8.D. Note that these assumptions are in addition to, rather than in lieu of, assumptions as to the behavior of the underlying policyholders.
- 4. The company shall use assumptions in determining the minimum reserve that account for any actions that the assuming company has taken or is likely to take that could affect the expected cash flows of the reinsured business.

**Guidance Note**: Examples of such actions include, but are not limited to changes to the current scale of reinsurance premiums and changes to expense allowances.

5. The company shall consider all elements of a reinsurance agreement that the assuming company can change and assumptions for those elements are subject to the requirements in Section 6.D. Appropriate assumptions for these elements may depend on the scenario being tested. The company shall take into account all likely consequences of the assuming company changing an element of the reinsurance agreement, including any potential impact on the probability of recapture by the ceding company.

**Guidance Note**: The ability of an assuming company to change elements of reinsurance agreement, such as reinsurance premiums or expense allowances, may be thought of as comparable to the ability of a direct-writing company to change non-guaranteed elements on policies.

6. The company shall set assumptions in a manner consistent with Paragraph 2 above taking into account any ceding company option to recapture reinsured business. Appropriate assumptions may depend on the scenario being tested (analogous to interest-sensitive lapses).

**Guidance Note:** The right of a ceding company to recapture is comparable to policyholder surrender options for a direct-writing company. Cash flows associated with recapture include recapture fees or other termination settlements.

- 7. The company shall set assumptions in a manner consistent with Paragraph 4 above taking into account an assuming company's right to terminate in-force reinsurance business. In the case in which the assuming company's right to terminate is limited to cases of non-payment of amounts due by the ceding company or other specific, limited circumstances, the company may assume that the termination option would be expected to have insignificant value to either party and therefore may exclude recognition of this right to terminate in the cash flow projections. However, if a reinsurance agreement contains other termination provisions with material impact, the company shall set appropriate assumptions for these provisions consistent with the particular scenario being tested.
- 8. If under the terms of the reinsurance agreement, some of the assets supporting the reserve are held by the counterparty or by another party, the company shall
  - a. Consider the following in order to determine whether to model such assets for purposes of projecting cash flows:
    - i. The degree of linkage between the portfolio performance, and the calculation of the reinsurance cash flows.
    - ii. The sensitivity of the valuation result to the asset portfolio performance.

- b. If the company concludes that modeling in unnecessary, document the testing and logic leading to that conclusion.
- c. If the company determines that modeling is necessary, comply with the requirements in Section 3.E and Section 8.F and taking into account:
  - i. The investment strategy of the company holding the assets, as codified in the reinsurance agreement or otherwise based on current documentation provided by that company; and
  - ii. Actions that may be taken by either party that would affect the net reinsurance cash flows (e.g. a conscious decision to alter the investment strategy within the guidelines).

**Guidance Note**: In some situations, it may not be necessary to model the assets held by the other party. An example would be modeling by an assuming company of a reinsurance agreement containing provisions, such as experience refund provisions, under which the cash flows and effective investment return to the assuming company are the same under all Scenarios.

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

- 9. If a ceding company has knowledge that an assuming company is financially impaired, the ceding company shall establish a margin for <u>the risk of</u> default by the assuming company. In the absence of knowledge that the assuming company is financially impaired, the ceding company is not required to establish a margin for <u>the risk of</u> default by the assuming company.
- 10. If an assuming company has knowledge that a ceding company is financially impaired, the assuming company shall establish a margin for <u>the risk of default</u> by the ceding company. Such margin may be reduced or eliminated if the assuming company has a right to terminate the reinsurance upon non-payment by the ceding company. In the absence of knowledge that a ceding company is financially impaired, the assuming company is not required to establish a margin for <u>the risk of default</u> by the ceding company.
- 11. In setting margins to reflect potential uncertainty regarding the receipt of cash flows from a counterparty, the company shall take into account the ratings, risk-based capital ratio or other available information related to the probability of <u>the risk of default</u> by the counterparty, as well as any security or other factor limiting the impact on cash flows.

### Section 8. Assumptions

- A. General Assumption Requirements
  - 1. The company shall <u>determineuse</u> prudent estimate assumptions in compliance with this section for each risk factor that is not prescribed or is not stochastically modeled by applying a margin to the anticipated experience assumption for the risk factor.
- 2. The company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of the Standard Valuation Law and must periodically review and update the assumptions as appropriate in accordance with these requirements.
- 3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 5:
  - a. Interest rate movements (i.e., Treasury interest rate curves) and
  - b. Equity performance (e.g., S&P 500 returns and returns of other equity investments).
- 4. If the company elects to stochastically model risk factors in addition to those listed in A.3 above, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.
- 5. In determining the stochastic reserve the company shall use prudent estimate assumptions that are consistent with those <u>prudent estimate</u> assumptions used for determining the deterministic reserve, modified as appropriate to reflect the effects of each scenario.
- 6. The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.

For each company risk factor (including lapse) that is quantifiable and can be expected to have similar characteristics as an industry risk factor, the relevant company experience would be blended with the industry experience or other data using a blending process and applying a credibility procedure that is consistent with accepted actuarial practice.

The appointed actuary shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the appointed actuary shall set a new, adequate, anticipated experience assumption for the factor.

- 7. The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the minimum reserve and the company shall:
  - a. Perform sensitivity testing using samples of the policies in force and is not required that the entire valuation be done for each alternative assumption set. The company's choice of sample must not have a material impact on the results of the sensitivity testing;
  - b. Perform sensitivity testing using data from prior periods when appropriate; and
  - c. Update the sensitivity tests as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently when the tests show less sensitivity of the minimum reserve to changes in the assumptions being tested or the experience is not changing rapidly.
- 8. The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario dependent risks.

## B. Assumption Margins

The company shall include <u>a</u>-margin<u>s</u> to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor<del>, or combination of risk factors</del> that is not stochastically modeled or prescribed, subject to the following:

**Guidance Note:** Additional guidance via an ASOP may be needed to clarify how the company determines the modifications that may be needed to reflect the circumstances of the company.

- 1. Establishing a margin on each assumption may result in a distorted measure of the actual or expected risk in a product and therefore, the company should, if possible, establish margins such that the total margin in the reserves results in a minimum reserve that would equal the minimum reserve assuming the company was able to calculate the reserve using a multivariate probability distribution that reflects all material risks.
- 2<u>1</u>. If the company is unable to establish margins as described in Paragraph 1 above, tThe company shall determine an explicit set of initial margins for each material assumption independently (i.e., ignoring any correlation among risk factors) in compliance with this section, unless the company can demonstrate that an appropriate method was used to determine the margin for two or more assumptions in combination. Next, if applicable, the level of a particular initial margin may be adjusted to take into account the fact that risk factors are not normally 100% correlated. However, in recognition that risk factors may become more heavily correlated as circumstances become more adverse, the initially determined margin may only be reduced to the extent the company can demonstrate that the method used to justify such a reduction is reasonable considering the range of scenarios contributing to the CTE calculation or considering the scenario used to calculate the deterministic reserve as applicable or considering appropriate adverse circumstances for risk factors not stochastically modeled.

If not stochastically modeled or prescribed, assumptions that are generally considered material include but are not limited to mortality, morbidity, interest, equity returns, expenses, lapses, partial withdrawals, loans, and option elections.

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

- <u>32</u>. The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger minimum reserve than would otherwise result. For example, the company shall use a higher margin when:
  - a. The experience data are either not relevant or not credible have less relevance or lower credibility.
  - b. The experience data are of lower quality, such as incomplete, internally inconsistent, or not current.
  - c. There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to recent changes in circumstances or changes in company policies.
  - d. There are constraints in the modeling that limit an effective reflection of the risk factor.
- 4<u>3</u>. In complying with the sensitivity testing requirements in Subsection A.4<u>7</u> above greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the minimum reserve.
- 54. A margin is not required for assumptions when variations in the assumptions do not have a material impact on the minimum reserve.
- 65. A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.
- 76. The company shall apply the method used to determine the margin consistently on each valuation date.

#### C. Mortality Assumptions

- 1. Procedure for Setting Prudent Estimate Mortality Assumptions
  - a. The company shall determine credibility segments for the purpose of determining which policies will qualify for the simplified method described in Subsection C.1.e. The determination of each credibility segment shall be subject to the following:
    - i. Each credibility segment shall consist of policies with similar underwriting and mortality experience characteristics.
    - ii. The company may group policies with different plans of insurance into the same credibility segment, if underwriting and mortality experience characteristics are similar for all the policies.

**Guidance Note:** It is anticipated that most companies will define a credibility segment to be a block of policies with similar underwriting rules, such as guaranteed issue, or regularly underwritten policies.

- iii. The company shall remove from the credibility segments any policies for which the experience is reflected through adjustments to the prudent estimate mortality rate assumptions under Paragraph f below, including policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.
- b. The company shall determine mortality segments for the purpose of determining separate valuation mortality tables by grouping policies within each credibility segment that the company expects will have similar underwriting characteristics and mortality experience.
- c. The company shall determine the credibility data set subject to the following:
  - i. The credibility data set for each credibility segment includes all in force and claim data pertaining to the last three years prior to the valuation date for all policies currently in the credibility segment or that would have been in the credibility segment at any time during the three- year period.
  - ii. The company shall use actual mortality experience data directly applicable to the credibility segment when available.
  - iii. The company shall use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the credibility segment have underwriting and mortality experience characteristics similar to those of the policies in the pool and the aggregate pool data are available to the company.
  - iv. The company shall update the mortality experience described in subparagraphs I and ii above at least once every three years.
- d. If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall use the following procedure to determine prudent estimate assumption for the credibility segment:
  - i. Select a credibility procedure meeting the requirements in Subsection C.2 below.

- ii. Use the underwriting criteria scoring procedure described in Subsection C.3 below to determine which of the industry basic tables shall serve as the industry table for that mortality segment required by the selected credibility procedure.
- iii. Determine the mortality experience rates and apply the selected credibility procedure to determine credibility adjusted experience rates, as provided in Subsection C.4 below.
- iv. Determine margin as provided in Subsection C.5 below.
- v. Set the prudent estimate mortality assumption equal to the corresponding rates in the industry prudent estimate table for which the seriatim reserve for the mortality segment is nearest to, but not less than, the seriatim reserve using the credibility adjusted experience rates increased by the margin.

**Guidance Note**: Based on a Limited Fluctuation Method calculation which sets the standard for full credibility as being within 3% of the true value with 90% probability, assuming a Poisson distribution for the number of deaths and assuming no variation in net amount at risk, the number of deaths required for 10% credibility is 30 and for 20% credibility it is 120. Note that the credibility data set includes all deaths within the three years prior to the valuation date. Because the purpose of the credibility criterion is to provide a simple test that would improve the efficiency of the principles-based valuation process by exempting small blocks of business, it may be appropriate to determine the level of deaths that is consistent with this goal by, for example, surveying small companies.

- e. If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall use the following simplified method to determine prudent estimate assumption for the credibility segment:
  - i. Determine the applicable industry basic table using the underwriting scoring procedure described in Subsection C.3.
  - ii. Set the prudent estimate mortality assumption for each mortality segment within the credibility segment equal to the mortality rates in the industry prudent estimate table that correspond to the applicable industry basic table determined in Subparagraph e.i. above.
- f. Adjust the prudent estimate mortality assumptions to reflect differences associated with impaired lives, and differences due to policyholder behavior if there is a reasonable expectation that due to conditions such as changes in premiums or other policy provisions, policyholder behavior will lead to mortality results that vary from the mortality results that would otherwise be expected.
  - i. The adjustment for impaired lives shall follow established actuarial practice, including the use of mortality adjustments determined from clinical and other data.
  - ii. The adjustment for policyholder behavior shall follow accepted actuarial practice, including the use of dynamic adjustments to base mortality.
- 2. Selection of Credibility Procedure

If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall select a credibility procedure that describes the method by which the experience data for a mortality segment and appropriate industry experience are used to produce credibility adjusted experience rates subject to the following:

a. The credibility procedure shall be consistent with accepted actuarial practice; and

- b. As the number of claims in the experience data set for a mortality segment or for a cell or group of cells included in a mortality segment increases, the credibility adjusted experience rates produced by the credibility procedure shall approach the actual experience rates.
- 3. Application of the Underwriting Criteria Scoring Procedure
  - a. The company shall apply the underwriting criteria scoring procedure described in Subparagraph b below to determine:
    - i. The applicable industry basic table for mortality segments within those credibility segments that qualify for the simplified method to determine prudent estimate mortality assumptions as described in Paragraph 1.e above.
    - ii. The industry basic table that shall serve as the industry table under the selected credibility procedure for mortality segments within those credibility segments that do not qualify for the simplified method to determine Prudent Estimate mortality assumptions as described in Paragraph 1.e above.
  - b. The underwriting criteria scoring procedure to be applied as directed in Section 8.C.3 is the algorithm described in pages 8 to 27 of the Interim 2007 Report of the Society of Actuaries and American Academy of Actuaries Joint Preferred Mortality Project and embedded in the Underwriting Criteria Score Calculator which is maintained on the Society of Actuaries web site, Uhttp://www.soa.org/research/inidividual-life/2008-score-calc.aspxU.
    - i. In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for a particular mortality segment, the company shall take into account factors that are not recognized in the underwriting scoring algorithm but which are applicable to policies that are issued in that mortality segment.
    - ii. In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for policies that are issued subject to simplified underwriting and policies that are issued without underwriting, the company shall take into account factors not recognized in the underwriting scoring algorithm but which are applicable to such policies. Examples of such factors include the number of underwriting exceptions that are made, the quality and experience level of the underwriters, and characteristics of the distribution system. For example, if a company deviates from its preferred criteria on a regular basis, then it needs to take that into consideration since the underwriting criteria scoring procedure is not designed to quantify that risk.
  - c. If no industry basic table appropriately reflects the risk characteristics of the mortality segment, the company may use any well-established industry table that is based on the experience of policies having the appropriate risk characteristics in lieu of an industry basic table.

**Guidance Note:** Subparagraph c above is intended to provide flexibility needed to handle products based on group-type mortality, etc., for which there might not be an industry basic table.

- 4. Determination of Mortality Experience Rates and Credibility Adjusted Experience Rates
  - a. For each mortality experience cell or group of cells specified by the company's credibility procedure, the company shall calculate mortality experience rates based on the experience data set defined in Subparagraph b below.
  - b. The company shall determine the experience data set used to determine mortality experience rates as follows:

- i. The experience data set shall include, at a minimum, the credibility data set defined in Paragraph 1.c.
- ii. If actual experience data is not available or has limited credibility, the company may include in the experience data set data from other sources if available and appropriate. Data from other sources is appropriate if the source has underwriting and mortality experience characteristics that are similar to policies in the credibility segment and the data is directly measured (as opposed to determined by extrapolation or other indirect procedure).
- iii. The company shall update the mortality experience described in subparagraphs i and ii above, whether based on actual experience or data from other sources, at least every three years; however, whenever updated experience data becomes available, the company shall reflect changes implied by the updated data to the extent such changes are significant and are expected to continue into the future. More frequent updates should result in lower margins under in Paragraph 5 below.
- c. The company may adjust the mortality experience rates for each mortality experience cell or group of cells to reflect the expected incremental change due to the adoption of risk selection and underwriting practices different from those underlying the experience data identified above, provided that:
  - i. The adjustments are supported by published medical or clinical studies; and
  - ii. The rationale and support for the use of the study and for the adjustments are disclosed in the PBR Actuarial Report.

**Guidance Note:** It is anticipated that such adjustments to experience will rarely be made. Since these adjustments are expected to be rare, and since it is difficult to anticipate the nature of these adjustments, the commissioner may wish to determine the level of documentation or analysis that is required to allow such adjustments. The NAIC may want to consider whether approval by a centralized examination office would be preferable to approval by the commissioner.

- d. The company shall determine credibility adjusted experience rates using the credibility procedure selected in accordance with Subsection 2 above.
- e. The company shall use, in conjunction with the credibility method, the industry basic table or appropriate weighted average of industry basic tables determined in Subsection 3 above for the mortality segment or the mortality segments to which the mortality experience cell or cells belong.
- f. If experience data by age and duration only exist for some of the mortality experience cells within a mortality segment, the company shall grade the credibility adjusted experience rates for the cells where data exist into the applicable industry mortality table rates over 10 years (e.g., over 10 attained ages or over 10 durations during the select period, as applicable) to produce credibility adjusted rates for the remainder of the segment. Such grading must be reasonable and consistent with accepted actuarial practice and shall take into account the level of partial credibility, the trend in actual to expected ratios, the shape and level of the resulting mortality rates, and the reasons for differences in mortality results relative to industry mortality rates such as differences in underwriting, market and other factors.
- g. The company may reflect mortality improvement only up to the projection start date based on applicable published industry-wide experience in the credibility adjusted experience rates. Any adjustment made shall be for the period from the experience weighted average date underlying the company experience used in the credibility process to the projection start date.

**Drafting Note:** Because mortality improvement beyond the projection start date is not allowed to be reflected in the prudent estimate assumption, then the lack of using mortality improvement is an implicit margin, and should be included in the disclosure of the total margin (in addition to the explicit margin for mortality defined in Section 8.B).

- 5. Determination of Mortality Margin
  - a. For each credibility segment that qualifies for the simplified method to determine prudent estimate mortality assumptions as defined in Paragraph 1.e above, the company shall use a margin equal to the respective differences between the rates obtained from the applicable industry prudent estimate table and the corresponding rates obtained from the associated industry basic table.
  - b. For each credibility segment that does not qualify for the simplified method to determine prudent estimate mortality assumptions as defined in Paragraph 1.d above, the company shall determine a margin consistent with Sub B of this section to add to the credibility adjusted experience rates determined in Paragraph 4 above and increase the margin to reflect situations involving greater uncertainty, including but not limited to the following:
    - i. The reliability of the company's experience studies is low due to imprecise methodology, length of time since the data was updated or other reasons. The longer the time since the experience data was updated, the larger the margin.
    - ii. The underwriting or risk selection risk criteria associated with the mortality segment have changed since the experience on which the credibility adjusted experience rates are based was collected.
    - iii. The data underlying the credibility adjusted experience rates lack homogeneity.
    - iv. Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.
    - v. The company's marketing or administrative practices or market forces (for example, the secondary market for life insurance policies) expose the policies to the risk of anti-selection.
- D Policyholder Behavior Assumptions
  - 1. General Prudent Estimate Policyholder Behavior Assumption Requirements

The company shall determine prudent estimate policyholder behavior assumptions such that the assumptions

- a. Reflect expectations regarding variations in anticipated policyholder behavior relative to characteristics that have a material impact on the minimum reserve, which, may include gender, attained age, issue age, policy duration, time to maturity, tax status, level of account and cash value, surrender charges, transaction fees or other policy charges; distribution channel, product features and whether the policyholder and insured are the same person or not.
- b. Are appropriate for the block of business being valued, giving due consideration to other assumptions used in conjunction with the cash flow model and to the Scenarios whose results are likely to contribute to the minimum reserve.
- c. Are based on actual experience data directly applicable to the block of business being valued (i.e., direct data) when available. In the absence of directly applicable data, the company should next use available data from any other block of business that is similar to the block of business being valued, whether or not that block of business is directly written by the company. If data from a

similar block of business are used, the company shall adjust the anticipated experience assumption to reflect material differences between the business being valued and the similar block of business.

- d. Reflect the outcomes and events exhibited by historical experience only to the extent such experience are relevant to the risk being modeled.
- e. Reflect the likelihood that policyholder behavior will be affected by any significant increase in the value of a product option, such as term conversion privileges or policy loans.
- f. Are assigned to policies in a manner that provides an appropriate level of granularity.

**Guidance Note:** Anticipated experience policyholder behavior assumptions for policyholder behavior risk factors include, but are not limited to, assumptions for premium payment patterns, premium persistency, surrenders, withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections. For fixed premium products, many of the premium payment patterns, premium persistency and partial withdrawal behavior assumptions may not apply and do not need to be considered.

- 2. Dynamic Modeling
  - a. The company shall use a dynamic model or other scenario-dependent formulation to determine anticipated policyholder behavior unless the behavior can be appropriately represented by static assumptions.
  - b. For risk factors that are modeled dynamically the company shall use a reasonable range of future expected behavior that is consistent with the economic scenarios and other variables in the model.
  - c. The company is not required to model extreme or "catastrophic" forms of behavior in the absence of evidence to the contrary.
- 3. Margins for Prudent Estimate Policyholder Behavior Assumptions

The company shall establish margins for policyholder behavior assumptions in compliance with Subsection B of this section subject to the following:

- a. To the extent that there is an absence of relevant and fully credible data, the company shall determine the margin such that the policyholder behavior assumption is shifted toward the conservative end of the plausible range of behavior which is the end of the range that serves to increase the minimum reserve.
- b. The company must assume that policyholders' efficiency will increase over time unless the company has relevant and credible experience or clear evidence to the contrary.
- c. The company must reflect the data uncertainty associated with using data from a similar but not identical block of business to determine the anticipated experience assumption.
- d. The company shall establish a higher margin for partial withdrawal and surrender assumptions in the case where the company's marketing or administrative practices encourages anti-selection.
- 4. Additional Sensitivity Testing for Policyholder Behavior Assumptions

The company shall examine the sensitivity of assumptions on the minimum reserve as required under Subsection A.3 of this section and shall at a minimum sensitivity test:

- a. Premium payment patterns, premium persistency, surrenders, partial withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections if relevant to the risks in the product;
- b. For policies that give policyholders flexibility in the timing and amount of premium payments
  - i. Minimum premium scenario.
  - ii. No further premium payment scenario.
  - iii. Pre-payment of premiums Single premium scenario.
  - iv. Pre-payment of premiums Level premium scenario.

#### E. Expense Assumptions

1. General Prudent Estimate Expense Assumption Requirements

In determining prudent estimate expense assumptions the company:

- a. Shall use expense assumptions for the deterministic and stochastic scenarios that are the same except for differences arising from application of inflation rates.
- b. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

Guidance Note: Care should be taken with regards to the potential interaction with the considerations above.

- c. Shall assume that the company is a going-concern.
- d. Shall choose an appropriate expense basis 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.
- e. Shall reflect the impact of inflation.
- f. May not assume future expense improvements.
- g. Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.
- h. Shall use assumptions that are consistent with other related assumptions.
- i. Use fully allocated expenses.

**Guidance Note:** 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 allocated to the modeled policies;

j. Shall allocate expenses using an allocation method that is consistent across company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable Actuarial Standards of Practice. Allocations may not be done for the purpose of decreasing the minimum reserve.

k. Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

**Guidance Note:** For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past then there would be no future expenses to reflect in the valuation.

- 1. Shall 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.) including expenses categorized in the annual statement as 'taxes, licenses and fees' (Exhibit 3 of the Annual Statement) in the expense assumption.
- m. Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.
- n.. For policies sold under a new policy form or due to entry into a new product line the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for policies from an existing block of mature policies taking into account:
  - i. Any differences in the expected long term expense levels between the block of new policies and the block of mature policies; and
  - ii. That all expenses must be fully allocated as required under Subparagraph b above.
- 2. Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions according to the requirements given in Subsection B of this section.

#### F. Asset Assumptions

**Guidance Note**: The asset assumptions are related to the projection of asset cash flows and net investment earnings for starting assets and reinvestment assets when determining the stochastic reserve and the deterministic reserve. Modeling of both general account and separate account assets are addressed.

For both the stochastic reserve and deterministic reserve calculations the company shall:

- 1. Reflect prudent estimates of default costs over a lifetime of the assets for all starting assets subject to credit default risk, including both cash market assets and derivative instruments under which the company buys or sells credit default protection. Default cost assumptions shall be consistent with the type of asset and quality rating and are subject to the following:
  - a. Market default cost experience shall be the basic experience assumed for assets traded in public and liquid markets. A company may adjust the anticipated experience assumption for default cost for a particular asset class based on available insurance industry and broad financial market experience and based on the company's own experience, but only if
    - i. The company experience is credible, appropriate, and if better than the basic experience, sustainable; and available insurance industry and broad financial market experience.

- ii. The company discloses any adjustment based on company experience and the rationale for such adjustment in the PBR Actuarial Report.
- b. As default cost experience is generally observed to be cyclical in nature, anticipated experience assumptions shall be related to historical experience over a period of time long enough to cover both favorable and unfavorable experience years, such that the average historical experience reasonably constitutes an unbiased long-term historical average. The company shall use a consistent method from one reserve valuation to the next in developing the supporting historical experience. When changes in method are made, the company shall disclose them in the PBR Actuarial Report.
- c. If the company consolidates quality rating categories for purposes of setting the default cost assumptions, the resulting default costs shall be consistent with those that would have resulted had the more refined recognition of rating categories been used.
- d. The company may use level default cost assumptions over time that are equivalent to the expected default costs over the projected lives of the corresponding assets.
- e. The company shall add a margin to the anticipated experience assumption for each asset class. The greater the uncertainty in the anticipated experience assumption for each asset class the larger the required margin (expressed as a percentage of the credit exposure on the corresponding assets, commonly known as a "basis points charge"). The company shall use a larger margin when
  - i. the asset class experiences greater historical variability in the default rates, recovery rates, or both, which generally occurs with lower quality assets relative to other assets with similar maturities; and
  - ii. the company has material exposures to newer asset structures that have limited historical experience.

**Guidance Note**: Default cost assumptions for reinvestment assets are already implicit in the prescribed net spreads and do not need to be explicitly.

2. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values contained in the various Scenarios directly in the projection of asset cash flows under the various scenarios within the stochastic reserve calculation model and under the deterministic scenario within the deterministic reserve calculation model.

Guidance Note: For example, model the impact on cash flows of embedded prepayment, extension, call and put options in a manner consistent with current asset adequacy analysis practice.

- G. Revenue Sharing Assumptions
  - 1. The company may include income from projected future revenue sharing (as defined in these requirements equals gross revenue sharing income (GRSI)) net of applicable projected expenses (net revenue sharing income) in cash flow projections, if:
    - a. The GRSI is received by the company;
    - b. Signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the GRSI; and
    - c. The GRSI is not already accounted for directly or indirectly as a company asset.

- 2. For purposes of this section, GRSI is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the GRSI or an affiliated company that receives the GRSI. GRSI would also be considered to be received if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case the actuary shall assess the likelihood that future GRSI is reduced due to the reported statutory income of the subsidiary being less than future GRSI received.
- 3. If the requirements in Section 8.I.1 are not met, and GRSI is not included in cash flow projections, applicable projected expenses are also not included.
- 4. In determining the anticipated experience assumption for GRSI, the company shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):
  - a. the terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the GRSI as part of the agreement(s);
  - b. the relationship between the company and the entity providing the GRSI that might affect the likelihood of payment and the level of expenses;
  - c. the benefits and risks to both the company and the entity paying the GRSI of continuing the arrangement;
  - d. the likelihood that the company will collect the GRSI during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended;
  - e. the ability of the company to replace the services provided to it by the entity providing the GRSI or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide; and
  - f. the ability of the entity providing the GRSI to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.
- 5. The company shall include all expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the GRSI, as well as any assumed expenses incurred by the company in conjunction with the assumed replacement of the services provided to it in the projections as a company expense. In addition, the company shall include expenses incurred by either the entity providing the net revenue sharing income or an affiliate of the company in the applicable expenses that reduce the GRSI.
- 6. In determining the prudent estimate of projected GRSI the company shall reflect a margin (which decreases the assumed GRSI) related to the uncertainty of the revenue. Such uncertainty is driven by many factors including but not limited to the potential for changes in industry trends. Contractually guaranteed GRSI shall not reflect a margin, although Company expenses related to contractually guaranteed GRSI shall reflect a margin.
- 7. The actuary is responsible for reviewing the revenue sharing agreements, verifying compliance with these requirements, and documenting the rationale for any source of GRSI used in the projections.
- 8. The amount of net revenue sharing income assumed in a given scenario shall not exceed the sum of a) and b), where:
  - a. is the contractually guaranteed GRSI, net of applicable expenses projected under the scenario, and

b. is the actuary's estimate of non-contractually guaranteed net revenue sharing income

**Guidance Note:** Provisions such as one that gives the entity paying the net revenue sharing income the option to stop or change the level of income paid would prevent the income from being guaranteed. However, if such an option becomes available only at a future point in time, and the revenue up to that time is guaranteed, the income is considered guaranteed up to the time the option first becomes available.

**Guidance Note:** If the agreement allows the company to unilaterally take control of the underlying fund fees that ultimately result in the net revenue sharing income then the revenue is considered guaranteed up until the time at which the company can take such control. Since it is unknown whether the company can perform the services associated with the revenue sharing arrangement at the same expense level, it is presumed that expenses will be higher in this situation. Therefore, the net revenue sharing income shall be reduced to account for any actual or assumed additional expenses.

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#### Draft: 10/23/09

The NAIC solicits comments on this draft. Comments should be sent to John Engelhardt, NAIC, at JEngelha@naic.org.

# VM-25 HEALTH INSURANCE RESERVES MINIMUM RESERVE REQUIREMENTS

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## A. Purpose

1. The following requirements apply to all individual and group accident and health insurance policies subject to the Standard Valuation Law, excluding credit disability insurance, which is included in a different section of this manual.

# B. Definitions

# Definitions in sections VM-01 and VM-05 of the Manual are applicable to this section. Additional definitions specific to this section are below.

1. The term "annual claim cost" means the net annual cost per unit of benefit before the addition of expenses, including claim settlement expenses, and a margin for profit or contingencies. For example, the annual claim cost for a \$100 monthly disability benefit, for a maximum disability benefit period of one year, with an elimination period of one week, with respect to a male at age 35, in a certain occupation might be \$12, while the gross premium for this benefit might be \$18. The additional \$6 would cover expenses and profit or contingencies.

Note: Definitions for "claims liability" and for "claims reported" were deleted.

- 2. The term "claim reserve" means a liability established with respect to any incurred contractual benefits not yet paid as of the valuation date.
- 3. The term "contract reserve" means a liability established with respect to inforce contracts equal to the excess of the present value of claims expected to be incurred after a valuation date over the present value of future valuation net premiums.
- 4. The term "date of disablement" means the earliest date the insured is considered disabled under the definition of disability in the contract. Normally this date will coincide with the start of any elimination period.
- 5. The term "elimination period" means a specified number of days, weeks, or months starting at the beginning of each period of loss, during which no benefits are payable.
- 6. The term "gross premium" means the amount of premium charged by the company.

- 7. The term "group insurance" includes blanket insurance and franchise insurance and any other forms of group insurance.
- 8. The term "level premium" means a premium, whether guaranteed or not, calculated to remain unchanged throughout either the lifetime of the policy or for some shorter projected period of years. Although it is calculated to remain level, it may be changed if any of the assumptions on which it was based are revised at a later time. Generally, the annual claim costs are expected to increase each year and the company, instead of charging premiums that correspondingly increase each year, charges a premium calculated to remain level for a period of years or for the lifetime of the contract. The benefit portion of the premium is therefore more than needed to provide for the cost of benefits during the earlier years of the policy and less than the actual cost in the later years.
- 9. The term "long-term care insurance" means any insurance policy or rider advertised, marketed, offered or designed to provide coverage for not less than twelve (12) consecutive months for each covered person on an expense incurred, indemnity, prepaid or other basis; for one or more necessary or medically necessary diagnostic, preventive, therapeutic, rehabilitative, maintenance or personal care services, provided in a setting other than an acute care unit of a hospital. Such term also includes a policy or rider which provides for payment of benefits based upon cognitive impairment or the loss of functional capacity. Insurers; fraternal benefit societies; nonprofit health, hospital, and medical service corporations; prepaid health plans; health maintenance organizations or any similar organization, to the extent they are otherwise authorized to issue life or health insurance, may issue long-term care insurance. Long-term care insurance does not include any insurance policy which is offered primarily to provide basic Medicare supplement coverage, basic hospital expense coverage, basic medical-surgical expense coverage, hospital confinement indemnity coverage, major medical expense coverage, disability income or related asset-protection coverage, accident only coverage, specified disease or specified accident coverage, or limited benefit health coverage.
- 10. The term "modal premium" means the premium payable on a contract based on a premium term, which could be annual, semi-annual, quarterly, monthly, or weekly. For example, if the annual premium is \$100 and if, instead, monthly premiums of \$9 are paid, the modal premium is \$9.

Note: The definition of "negative reserve" was deleted.

- 11. The term "preliminary term reserve method" means a method of valuation whereby the valuation net premium for each year falling within the preliminary term period is exactly sufficient to cover the expected incurred claims of that year, so that the terminal reserves will be zero at the end of the year. As of the end of the preliminary term period, a new constant valuation net premium (or stream of changing valuation premiums) becomes applicable such that the present value of all such premiums is equal to the present value of all expected claims incurred after the end of the preliminary term period.
- 12. The term "present value of amounts not yet due on claims" means the reserve for "claims reserve" (see definition) discounted at interest.

**Note:** The definition of "rating block" was deleted

- 132. The term "terminal reserve" means the reserve at the end of a contract year and is defined as the present value of expected incurred claims after that contract year minus the present value of future valuation net premiums.
- 14<u>3</u>. The term "unearned premium reserve" means that portion of the premium paid or due to the company which is applicable to the period of coverage extending beyond the valuation date. Thus if an annual premium of \$120 was paid on November 1, \$20 would be earned as of December 31 and the remaining \$100 would be unearned. The unearned premium reserve could be on a gross basis as in this example or on a valuation net premium basis.
- 154. The term "valuation net modal premium" means the modal fraction of the valuation net annual premium that corresponds to the gross modal premium in effect on any contract to which contract reserves apply. Thus if the mode of payment in effect is quarterly, the valuation net modal premium is the quarterly equivalent of the valuation net annual premium.

165. The term "valuation net premium" means one element of an array of net premiums. Each net premium is a uniform percentage of the respective gross premium except for net premiums during the preliminary term period. The net premiums are calculated such that the present value of all such premiums is equal to the present value of all expected claims incurred.

#### C. Claim Reserves

1. A company shall hold claim reserves for all incurred but unpaid claims on all health insurance policies, and shall hold appropriate claim expense reserves for the estimated expense of settlement of all incurred but unpaid claims.

Note: A paragraph requiring the testing for reasonableness and adequacy of claim reserves for prior years using runoff schedules was deleted.

- 2. For policies where the claim reserve is calculated as a present value, the maximum interest rate for claim reserves is as specified below.
  - a. For claim reserves on policies that require contract reserves, the maximum interest rate is the maximum rate permitted by the Computation of Minimum Standard by Calendar Year of Issue section of VM-5 of the valuation manual in the valuation of whole life insurance issued on the same date as the claim incurral date.
  - b. For claim reserves on policies not requiring contract reserves, the maximum interest rate is the maximum rate permitted by the Computation of Minimum Standard by Calendar Year of Issue section of VM-5 of the valuation manual in the valuation of single premium immediate annuities issued on the same date as the claim incurral date, reduced by one hundred basis points.

Note: The valuation interest rates were moved from section I.

- 3. The minimum morbidity assumptions for disability income insurance are as specified in I.1, except that at the option of the company:
  - a. For individual disability income claims incurred on or after[enter operative date of valuation manual], assumptions regarding claim termination rates for the period less than two (2) years from the date of disablement may be based on the company's experience, if such experience is considered credible, or upon other assumptions designed to place a sound value on the liabilities. For claims liabilities and claim reserves to reflect "sound values" and/or reasonable margins, morbidity (and if necessary mortality) tables of valuation based on credible experience should be adjusted regularly to maintain reasonable margins.
  - b. For group disability income claims incurred on or after [enter operative date of valuation manual]:
    - i. Assumptions regarding claim termination rates for the period less than two (2) years from the date of disablement may be based on the company's experience, if experience is considered credible, or upon other assumptions designed to place a sound value on the liabilities; For claims liabilities and claim reserves to reflect "sound values" and/or reasonable margins, morbidity (and if necessary mortality) tables of valuation based on credible experience should be adjusted regularly to maintain reasonable margins.
    - ii. Assumptions regarding claim termination rates for the period two (2) or more years but less than five (5) years from date of disablement may be based on the company's experience, if the experience is considered credible, only on business if the experience is credible and for which the company maintains underwriting and claim administration control. For claims liabilities and claim reserves to reflect "sound values" and/or reasonable margins, morbidity (and if necessary mortality) tables of valuation based on credible experience should be adjusted regularly to maintain reasonable margins.

- c. With respect to C.3.b.ii, for experience to be considered credible for purposes of these requirements, the company should be able to provide claim termination patterns over no more than six (6) years reflecting at least 5,000 claims terminations during the third through fifth claims durations on reasonably similar applicable policy forms. Prior to the adoption by a company of either-C.3.b.ii, a plan of modification to the reserve basis must be prepared and must include:
  - i. An analysis of the credibility of the experience;
  - ii. A description of how the company's experience is to be used in modifying the morbidity assumptions specified in H.1;
  - iii. A description and quantification of the margins to be included; and
  - iv. A summary of the financial impact that the modified reserve basis would have had on the company's last filed annual statement.
- 4. For disability income contracts with an elimination period, the date of disablement is the date that benefits would have begun to accrue in the absence of an elimination period.
- 5. Claim reserves for survivor income benefits contained in group long-term disability contracts must be established based on the design of the survivor income benefits including the minimum period of disability before the spouse of a disabled person becomes eligible for a survivor income benefit and the amount of the benefit.

Note: The language in paragraph 5 is from Actuarial Guideline XXVIII. A sentence regarding approximations was deleted.

- 6. For insurance other than disability insurance, the morbidity assumptions or assumptions for other contingencies-for insurance other than disability income must be based on the company's experience, if such experience is credible, or upon other assumptions designed to place a sound value on the liabilities. For claims liabilities and claim reserves to reflect "sound values" and/or reasonable margins, morbidity (and if necessary mortality) tables of valuation based on credible experience should be adjusted regularly to maintain reasonable margins.
- 7. A company shall test all claim reserves for prior valuation years for adequacy and reasonableness using claim runoff schedules in accordance with the statutory financial statement including consideration of any residual unpaid liability.
- 8. A generally accepted actuarial reserving method or other reasonable method or a combination of methods may be used to estimate all claim liabilities. The methods used for estimating liabilities generally may be aggregate methods, or various reserve items may be separately valued. Approximations based on groupings and averages may also be employed.

Note: A paragraph requiring that valuation tables based on credible experience should be adjusted regularly was deleted.

#### D. Unearned Premium Reserves

Note: The term "premium reserves" was changed to "unearned premium reserves." Note that premium deficiency reserves are not included in VM-25.

Note: A paragraph regarding due and unpaid premiums being treated as premiums in force was deleted.

- 1. Unearned premium reserves are required for all contracts with respect to the period of coverage for which premiums, other than premiums paid in advance, have been paid beyond the date of valuation.
- 2. If premiums due and unpaid are carried as an asset, such premiums must be treated as premiums in force, subject to unearned premium reserve determination. The value of unpaid commissions, premium taxes, and the cost of collection associated with due and unpaid premiums must be carried as an offsetting liability.

- 23. The minimum unearned premium reserve with respect to any contract is the pro rata unearned modal premium that applies to the premium period beyond the valuation date, with such premium determined on the basis of:
  - a. The valuation net modal premium on the contract reserve basis applying to the contract; or
  - b. The gross modal premium for the contract if no contract reserve applies.
- 4. In no event may the sum of the unearned premium and contract reserves for all contracts of the company subject to contract reserve requirements be less than the gross modal unearned premium reserve on all such contracts, as of the date of valuation. Such reserve must never be less than the expected claims for the period beyond the valuation date represented by such unearned premium reserve, to the extent not provided for elsewhere.
- 4<u>5</u>. A company may employ suitable approximations and estimates in computing unearned premium reserves; including but not limited to groupings, averages and aggregate estimation. Such approximations or estimates must be tested periodically to determine their continuing adequacy and reliability.

#### E. Contract Reserves

- 1. Unless otherwise specified below, contract reserves are required for individual and group contracts with constant or level premiums, and all individual and group contracts with respect to which, due to the gross premium pricing structure at issue, the value of the future benefits at any time exceeds the value of any appropriate future valuation net premiums at that time. This evaluation may be applied on a rating block basis if the total premiums for the block were developed to support the total risk assumed and expected expenses for the block each year and a qualified actuary certifies the premium development. The actuary should state in the certification that premiums for the rating block were developed such that each year's premium was intended to cover that year's costs without any prefunding. If the premium is also intended to recover costs for any prior years, the actuary should also disclose the reasons for and magnitude of such recovery. Minimum contract reserves are determined on the basis specified in the remainder of this section.
- 2. Contract reserves are not required for contracts that cannot be continued beyond one year from issue.-or for contracts already in force on January 1, 2001 for which contract reserves were not required by the company's domiciliary state.
- 3. Contract reserves may be applied on a rating block basis if the total premiums for the block were developed to support the total cost of contractual benefits and related expenses and if a qualified actuary has certified the premium development. If premium rates for the rating block were determined such that each year's premium is intended to cover that year's costs, contract reserves are not required, subject to the provisions of subsection H. If premium rates for the rating block were designed to prefund future year's costs, contract reserves are required.

**Note:** The following paragraph was deleted: "This evaluation may be applied on a rating block basis if the total premiums for the block were developed to support the total risk assumed and expected expenses for the block each year, and a qualified actuary certifies the premium development. The actuary should state in the certification that premiums for the rating block were developed such that each year's premium was intended to cover that year's costs without any pre-funding. If the premium is also intended to recover costs for any prior years, the actuary should also disclose the reasons for and magnitude of such recovery. The values specified in this paragraph must be determined on the basis specified in this subsection."

**Note:** The following paragraph was deleted: "If premium rates are determined for a block such that each year's premium is intended to cover that year's cost, the rating block approach above results in no contract reserves, unless required by G. If premium rates for a block are designed to prefund future years' costs, contract reserves are required."

Note: The following paragraph was deleted: "The contract reserve is in addition to claim reserves and premium reserves."

- 4<u>3</u>. The methods and procedures for determining contract reserves must be consistent with those used to determine claim reserve for those same contracts. For example, the definition of the date of incurral must be the same in both determinations.
- 54. Revisions to the assumptions underlying contractual premiums that impact contract reserves must be reflected in the calculation of contract reserves no later than the effective date of the revised premiums. Annually, an appropriate review shall be made of the insurer's prospective contract liabilities on contracts valued by tabular reserves, to determine the continuing adequacy and reasonableness of the tabular reserves giving consideration to future gross premiums. The insurer shall make appropriate increments to such tabular reserves if such tests indicate that the basis of such reserves is no longer adequate.
- 65. Contract reserves may be calculated separately with respect to each distinct contract benefit. A negative reserve for one contract benefit may offset positive reserves for another contract benefit for each contract, but the total contract reserve for all benefits combined may not be less than zero.
- 76. For coverage that contains any nonforfeiture benefits the contract reserve on a policy basis must not be less than the net single premium for the nonforfeiture benefits on the valuation date. For purposes of this paragraph, nonforfeiture benefits include contingent benefits upon lapse of such coverage only during the period of time that the benefit may be exercised.
- 87. The maximum interest rate is the maximum interest rate allowed in the valuation of whole life insurance issued on the same date as the health insurance contract, as specified in the Computation of Minimum Standard by Calendar Year of Issue section of VM-5 of this valuation manual.
- <u>98</u>. The minimum mortality assumptions are as specified in subsection I.2.
- <u>109</u>. The minimum morbidity assumptions are as specified in I.1 subject to the following:
  - a. Contracts for which morbidity assumptions are not specified in I.1 must be valued using morbidity tables established for reserve purposes by a qualified actuary. Those morbidity tables must contain a pattern of incurred claims cost that reflects the underlying morbidity, must incorporate provision for adverse deviation and must not be constructed for the primary purpose of minimizing reserves.
  - b. Valuation net premiums used under each contract must have a structure consistent with the gross premium structure at issue of the contract as this relates to advancing age of insured, contract duration and period for which gross premiums have been calculated. If the gross premiums for a policy form do not vary by age, the valuation net premiums will nonetheless vary based on age at issue for each contract, since at issue the present value of valuation net premiums for a contract must equal the present value of tabular claim costs.
  - c. For contracts issued on or after the operative date of the valuation manual, morbidity assumptions must incorporate a provision for adverse deviation based on the best estimate of anticipated future experience by a qualified actuary. Morbidity assumptions may not incorporate any expectation of future morbidity improvement.
- <u>110.</u> If the morbidity assumptions specified in H.1 are on an aggregate basis, the morbidity assumptions specified in H.1 may be adjusted to reflect the effect of company underwriting by policy duration. The adjustments must be appropriate to the company's underwriting.

**Note:** The following section was deleted: "Morbidity improvement is a change, in the combined effect of claim frequency and the present value of future expected claim payments given that a claim has occurred, from the current morbidity tables or experience that will result in a reduction to reserves. It is not the intent of this provision to restrict the ability of the actuary to reflect the morbidity impact for a specific known event that has occurred and that is able to be evaluated and quantified"

11. The maximum termination rate assumptions are as specified in I.3.

- 12. The reserve method is applied only in relation to the date of issue of a contract and is
  - a. For insurance other than long-term care and contracts providing return of premium or other deferred cash benefits, the two-year full preliminary term method;
  - b. For long-term care insurance, is the one-year full preliminary term method;
  - c. For contracts providing return of premium or other deferred cash benefits, the one year preliminary term method if the benefits are provided at any time before the twentieth anniversary or the two year preliminary term method if the benefits are only provided on or after the twentieth anniversary.
- 13. Provided the contract reserves on all contracts to which an alternate method or valuation basis is applied are not less in the aggregate than the reserve determined according to the applicable standards specified above, the company, in determining its contract reserves, may:
  - a. In place of the above specified assumptions, use any reasonable assumptions as to interest rates, termination and/or mortality rates, and rates of morbidity or other contingency; or
  - b. In place of the above specified methods, use other methods including, but not limited to the following: the net level premium method; the one-year full preliminary term method; prospective valuation on the basis of actual gross premiums with reasonable allowance for future expenses; the use of approximations such as those involving age groupings, groupings of several years of issue, average amounts of indemnity, grouping of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of a composite annual claim cost for all or any combination of the benefits included in the contracts valued.
  - c. Use approximations such as: those involving age groupings, groupings of several years of issue, groupings of average amounts of indemnity, or groupings of similar contract forms; the computation of the reserve for one contract benefit as a percentage of, or by other relation to, the aggregate contract reserves exclusive of the benefit or benefits so valued; and the use of a composite annual claim cost for all or any combination of the benefits included in the contracts valued.
- 14. The total contract reserve established shall incorporate provisions for moderately adverse deviations.

**Note:** The following paragraph was deleted: "The company shall conduct an appropriate annual review of prospective contract liabilities on contracts valued by tabular reserves, to determine the continuing adequacy and reasonableness of the tabular reserves giving consideration to future gross premiums. The company shall make appropriate increments to such tabular reserves if such tests indicate that the basis of such reserves is no longer adequate subject, however, to the minimum standards in E.6 - E.12." This change takes away the adequacy of contract reserves at the individual contract level.

15. In the event a company has a contract or a group of related similar contracts, for which future gross premiums will be restricted by contract, insurance department regulations, or for other reasons, such that the <u>existing premium and contract reserves plus</u> future gross premiums reduced by expenses for administration, commissions, and taxes will be insufficient to cover future claims, the company shall establish <u>additional</u> contract reserves for such shortfall in the aggregate.

#### F. "Waiver of Premium" Reserves

1. Determination of waiver of premium reserves involves several special considerations. First, the disability valuation tables promulgated by the NAIC are based on exposures that include contracts on premium waiver as in-force contracts. Therefore, contract reserves based on these tables are NOT reserves on "active lives", but rather reserves on contracts "in force." This is true for the 1964 CDT and for both the 1985 CIDA and CIDB tables. Accordingly, tabular reserves using any of these tables should value reserves on the following basis:

- a. Claim reserves should include reserves for premiums expected to be waived, valuing as a minimum the valuation net premium being waived.
- b. Premium reserves should include contracts on premium waiver as in-force contracts, valuing as a minimum the unearned modal valuation net premium being waived.
- c. Contract reserves should include recognition of the waiver of premium benefit in addition to other contract benefits provided for, valuing as a minimum the valuation net premium to be waived.
- 2. If a company is, instead, valuing reserves on an active life table, or if a specific valuation table is not being used but the company's gross premiums are calculated on a basis that includes in the projected exposure only those contracts for which premiums are being paid, then it may not be necessary to provide specifically for waiver of premium reserves. Any company using such a true "active life" basis should carefully consider whether or not additional liability should be recognized on account of premiums waived during periods of disability or during claim continuation.

#### G. Reinsurance

1. Increases to, or credits against, reserves carried, arising because of reinsurance assumed or reinsurance ceded, must be determined in a manner consistent with these minimum reserve standards and with all applicable provisions of the reinsurance contracts which affect the company's liabilities.

#### H. Health Insurance Reserve Adequacy and Additional Reserves

- 1. <u>Appropriate Minimum</u>-reserves, not less than minimum reserves, must be determined for claim reserves, unearned premium reserves, and contract reserves, with recognition of and-waiver of premium-reserves benefits, separately in accordance with Sections C, D, E, F.
- 2. With respect to any block of contracts, or with respect to a company's health business as a whole, a prospective gross premium valuation is the ultimate test of reserve adequacy as of a given valuation date. Such a gross premium valuation will take into account, for contracts in force, in a claims status, or in a continuation of benefits status on the valuation date, the present value as of the valuation date of: all expected benefits unpaid, all expected expenses unpaid, and all unearned or expected premiums, adjusted for future premium increases reasonably expected to be put into effect.
- 3. A gross premium valuation is to be performed whenever a significant doubt exists as to reserve adequacy with respect to any major block of contracts, or with respect to the company's health business as a whole. When a company determines that adequacy of its health insurance reserves requires reserves in excess of the minimum standards specified herein, the company shall hold such increased reserves and the increased reserves are the minimum reserves for that company.
- 4. Whenever minimum reserves, as defined in sections C,D,E,F, exceed reserve requirements as determined by a prospective gross premium valuation, such minimum reserves remain the minimum requirement pursuant to the valuation manual.
- 5. A company shall hold reserves for experience rated contracts such that
  - a. The method used to estimate the reserves is reasonable based on the company's procedures and is consistent among reporting periods unless the change is clearly identified; and
  - b. The assumptions used are not inconsistent with the assumptions made in determining other reserves.

#### I. Minimum Standards

I.1 Morbidity

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- 1. Minimum morbidity standards for valuation of specified individual contract health insurance benefits are as follows:
  - a. For Disability Income Benefits Due to Accident or Sickness:

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- i. Contract Reserves:
  - (a) The 1985 Commissioners Individual Disability Tables A (85CIDA); or
  - (b) The 1985 Commissioners Individual Disability Tables B (85CIDB).

Each company shall elect, with respect to all individual contracts issued in any one statement year, whether it will use Tables A or Tables B as the minimum standard.

- ii. Claim Reserves:
  - (a) For claims incurred on or after January 1, 2002:

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The 1985 Commissioners Individual Disability Table A (85CIDA) with claim termination rates multiplied by the following adjustment factors:

Derestica	Adjustment	Adjusted
Duration	ractor	Termination Kates*
Week 1	0 366	0.04831
2	0.366	0.04172
2	0.366	0.04063
<u>у</u> Д	0.366	0.04355
5	0.365	0.04088
6	0.365	0.04000
7	0.365	0.04380
7 8	0.365	0.04344
0 Q	0.303	0.04292
<u>)</u> 10	0.370	0.04292
10	0.370	0.03848
12	0.370	0.03478
12	0.370	0.03034
15	0.570	0.05051
Month 4	0.391	0.08758
5	0.371	0.07346
6	0.435	0.07531
7	0.500	0.07245
8	0.564	0.06655
9	0.613	0.05520
10	0.663	0.04705
11	0.712	0.04486
12	0.756	0.04309
13	0.800	0.04080
14	0.844	0.03882
15	0.888	0.03730
16	0.932	0.03448
17	0.976	0.03026
18	1.020	0.02856
19	1.049	0.02518

Duration	Adjustment Factor	Adjusted Termination Rates*	
20	1.078	0.02264	
21	1.107	0.02104	
22	1.136	0.01932	
23	1.165	0.01865	
24	1.195	0.01792	
Year 3	1.369	0.16839	
4	1.204	0.10114	
5	1.199	0.07434	
6 and later	1.000	**	

Health	Insurance	Reserves	Minimum	Reserve 1	Requirements	- VM-24	5
IICalu	insui ance	ILESCI VES	1VIIIIIIIIIIIIIII	INCSCI VC I	ixequil cincints	- • • • • • • • • • • • • • • • • • • •	5

\*The adjusted termination rates derived from the application of the adjustment factors to the DTS Valuation Table termination rates shown in exhibits 3a, 3b, 3c, 4, and 5 (*Transactions of the Society of Actuaries* (TSA) XXXVII, pp. 457-463) is displayed. The adjustment factors for age, elimination period, class, sex, and cause displayed in exhibits 3a, 3b, 3c, and 4 should be applied to the adjusted termination rates shown in this table.

\*\*Applicable DTS Valuation Table duration rate from exhibits 3c and 4 (TSA XXXVII, pp. 462-463).

The 85CIDA table so adjusted for the computation of claim reserves shall be known as 85CIDC (The 1985 Commissioners Individual Disability Table C).

(b) For claims incurred prior to January 1, 2002:

Each company may elect which of the following to use as the minimum standard for claims incurred prior to January 1, 2002:

- (i) The minimum morbidity standard in effect for contract reserves on currently issued contracts, as of the date the claim is incurred, or
- (ii) The standard as defined in Item I.1.1.a, applied to all open claims.

Once a company elects to calculate reserves for all open claims on the standard defined in I.1.1.b.i, all future valuations must be on that standard.

- b. For Hospital Benefits, Surgical Benefits and Maternity Benefits (scheduled benefits or fixed time period benefits only):
  - i. Contract Reserves:

The 1974 Medical Expense Tables, Table A, Transactions of the Society of Actuaries, Volume XXX, pg. 63. Refer to the paper (in the same volume, pg. 9) to which this table is appended, including its discussions, for methods of adjustment for benefits not directly valued in Table A: "Development of the 1974 Medical Expense Benefits," Houghton and Wolf.

- ii. Claim Reserves: No specific standard.
- c. Cancer Expense Benefits (Scheduled benefits or fixed time period benefits only).
  - i. Contract Reserves: The 1985 NAIC Cancer Claim Cost Tables.

#### Attachment Twenty Life and Health Actuarial Task Force 12/3-4/09

# Health Insurance Reserves Minimum Reserve Requirements - VM-25

- ii. Claim Reserves: No specific standard.
- d. Accidental Death Benefits.
  - i. Contract Reserves: The 1959 Accidental Death Benefits Table.
  - ii. Claim Reserves: Actual amount incurred.
- e. Other Individual Benefits.
  - i. Contract Reserves: For all other individual contract benefits, morbidity assumptions are to be determined as provided in the reserve standards.
  - ii. Claim Reserves: For all benefits other than disability, claim reserves are to be determined as provided in the standards.
- 2. Minimum morbidity standards for valuation of specified group contract health insurance benefits are as follows:
  - a. Disability Income Benefits Due to Accident or Sickness.
    - i. Contract Reserves: The 1987 Commissioners Group Disability Income Table (87CGDT).
    - ii. Claim Reserves: The 1987 Commissioners Group Disability Income Table (87CGDT);
  - b. Other Group Benefits.
    - i. Contract Reserves: For all other group contract benefits, morbidity assumptions are to be determined as provided in the reserve standards.
    - ii. Claim Reserves: For all benefits other than disability, claim reserves are to be determined as provided in the standards.
- I.2 Mortality
- 1. Unless 2. below applies, the mortality basis used for all policies except long-term care individual policies and group certificates issued on or after [enter operative date of valuation manual] shall be according to a table (but without use of selection factors) allowed by law for the valuation of whole life insurance issued on the same date as the health insurance contract.
- 2. For long-term care insurance individual policies or group certificates issued on or after [enter operative date of valuation manual], the mortality basis used shall be the 1994 Group Annuity Mortality Static Table.
- I.3 Terminations
- 1. Under contracts for which premium rates are not guaranteed, and where the effects of company underwriting are specifically used by policy duration in the valuation morbidity standard or for return of premium or other deferred cash benefits, total termination rates may be used at ages and durations where these exceed specified mortality table rates, but not in excess of the lesser of eighty percent of the total termination rate used in the calculation of the gross premiums or eight percent.
- 2. For long-term care individual policies or group certificates issued on or after [enter operative date of valuation manual], the contract reserve shall be established on the basis of:
  - a. Mortality (as specified in I.2); and

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- b. Terminations other than mortality, where the terminations are not to exceed:
  - i. For policy year one, the lesser of eighty percent (80%) of the voluntary lapse rate used in the calculation of gross premiums and six percent (6%);
  - ii. For policy years two (2) through four (4), the lesser of eighty percent (80%) of the voluntary lapse rate used in the calculation of gross premiums and four percent (4%);
  - iii. For policy years five (5) and later, the lesser of one hundred percent (100%) of the voluntary lapse rate used in the calculation of gross premiums and two percent (2%), except certificates under policies issued to one or more employers or labor organizations, or to a trust or to the trustees of a fund established by one or more employers or labor organizations, or a combination thereof, for employees or former employees or a combination thereof, or for members or former members or a combination thereof, of a labor organization where the 2% shall be three percent (3%).

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#### MEMORANDUM

TO: Larry Bruning, Chair, Life and Health Actuarial Task Force

FROM: Donna Claire, Chair, American Academy of Actuaries' Life Financial Soundness/Risk Management Committee

DATE: December 3, 2009

RE: Status of Review of Country Specific Regulatory Responses to the Financial Crisis

Per a request of the Life and Health Actuarial Task Force (LHATF), the Academy's Life Financial Soundness/Risk Management Committee informally surveyed through an open request, the International Actuarial Association's Insurance Regulation Committee members and interested parties the regulatory actions of countries around the world in response to last year's financial downturn. The following questions were asked of this list serve:

- 1. Were there any changes made in your country to the regulatory capital and/or reserve requirements at year-end?
- 2. Did any countries that use market value (MV) reporting alter the MV calculation requirements or make other adjustments to capital requirements related to MV, fair value (FV) or FV-related calculations? What changes or additional reporting (if any) was requested?

The attached table summarizes responses, along with our account of what has been done in the United States for comparative purposes. We note that this is not an authoritative representation of regulatory bodies, but is based on self-reporting by actuaries practicing outside the United States. The Academy has requested of the IAA's Insurance Regulation Committee and the IAIS Solvency Sub-Committee, the possibility of one (or both of) these groups continuing this tracking on a going forward basis (as well as including a short description of the current and expected future regulatory frameworks within each country). Lastly, we note that many EU countries made no adjustments to 2008 reporting requirements. Due to the expectation of a near-term implementation of Solvency II there has been more interest within the EU in understanding the potential impact of the 2008 results under the proposed Solvency II regime than in changing current reporting requirements.

<sup>&</sup>lt;sup>1</sup> The American Academy of Actuaries is a 16,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

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	Financial Reporting	Capital Requirements
Australia+	No change	No change
Canada+	Modified reserve standard on	Modified capital requirement
	fund guarantees <sup>1</sup>	standard on fund guarantees <sup>1</sup>
Denmark	Allowed a broader application of	Solvency reporting to the Danish
	a liquidity risk premium <sup>2</sup>	FSA was increased from twice
		annually to quarterly
India	No change	Lower Solvency 1 based factors
		for required solvency margin <sup>3</sup>
Japan*	No change	No change
New Zealand*	No change	No change
Russia	Information still pending	
South Africa	No change	No change
Spain	No change	No change
Taiwan	No change	Modified RBC charge for
	_	unrealized equity losses <sup>4</sup>
United Kingdom*	Allowed a broader application of	Indirectly impacted due by any
	a liquidity risk premium <sup>5</sup>	changes in reported reserves
United States	Several states allowed permitted	Indirectly impacted by any
	practices to accelerate the use of	changes in reported reserves
	already approved reserve	
	requirements due for later	
	implementation and/or to give	
	slightly higher credit for a portion	
	of a previously non-admitted	
	deferred tax asset	

\*Countries that use market value for financial reporting

+Countries that use some kind of modeled or fair value type of reporting

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<sup>&</sup>lt;sup>1</sup> There used to be a flat CTE for required capital and reserves on fund guarantees. It was replaced by non-level CTE that varies by the duration of the cash flow.

<sup>&</sup>lt;sup>2</sup> The discount rate curve was altered in October 2008 to include a liquidity premium. This liquidity premium varies (along with the entire interest rate curve) from day to day. Thus, this change only caused an increase in discount rate curve used for the annual accounts at the end of 2008 of 6-7 basis points.

<sup>&</sup>lt;sup>3</sup> Basic format is x% of reserves + y% of sum at risk where x & y vary by product. In general, reserve margin (x value) reduced 25% (x varied from 1-4% and y varied from .1-.3%)

<sup>&</sup>lt;sup>4</sup> The equity calculation now allows companies to partially recognize unrealized capital loss. Therefore the impact due to changes in the stock market is limited in the RBC calculation: only 30% of the reduction in stock value is recognized in the RBC formula. The result is a higher RBC ratio.

<sup>&</sup>lt;sup>5</sup> For the UK, no formal changes were made, although the FSA did allow changes to the liquidity premium in setting life assurance reserves. As a result companies used a much lower risk deduction than might otherwise have been expected in arriving at the valuation discount rate for liabilities from the yield on assets held. There was also limited use of the IFRS "concessions" on market value which were announced in Q4 2008, which were capable of being read through into regulatory valuations.

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Draft: 12/18/09

#### Life and Health Actuarial Task Force Conference Call November 13, 2009

The Life and Health Actuarial Task Force met via conference call Nov. 13, 2009. The following Task Force members participated: Scott H. Richardson, Vice Chair, represented by Leslie Jones (SC); Linda S. Hall represented by Katie Campbell (AK); Steve Poizner represented by Perry Kupferman (CA); Thomas R. Sullivan represented by Jim Jakielo (CT); Kevin M. McCarty represented by Dan Keating (FL); Glenn Wilson represented by Blaine Shepherd (MN); John M. Huff represented by David Hippen (MO); James J. Wrynn represented by William Carmello (NY); Mary Jo Hudson represented by Pete Weber (OH); Mike Geeslin represented by Mike Boerner (TX); and Kent Michie represented by Tomasz Serbinowski (UT).

Ms. Jones chaired the meeting.

#### 1. <u>Actuarial Guideline XLIII Issues</u>

The Task Force reviewed the referral to the Statutory Accounting Principles (E) Working Group (Attachment Twenty-Two-A) requesting that the impact on surplus from the change in basis be based on the difference between the reserve under the old and new methods as of the end, rather than the beginning, of the year. John Engelhardt (NAIC) reported that the referral had been sent and the Working Group will consider it at the Winter National Meeting.

Mr. Jakielo said because of the grade-in, there will be two points in time at which there would be a change in basis. Under the proposed methodology discussed during the Oct. 20 conference call, the amount of the difference changes each year during the grade-in. Tom Campbell (Hartford) said it would be easier to base the changes in basis on the difference as of Dec. 31, 2009. Mr. Jakielo said if there were a drastic change in the market, the volatility in these reserves could result in the 2009 change in basis disappearing in 2010.

Wayne Stuenkel (Protective Life) said Actuarial Guideline XLIII could be amended to define reserves at any date prior to the effective date as the previously calculated reserve plus a minimal amount, such as \$1,000. This change would make the calculation of the reserve at the beginning of 2009 easier.

Ms. Jones asked Mr. Engelhardt to draft an amendment to the actuarial guideline to reflect the grading method adopted on the Oct. 20 conference call. There is a method specified in the guideline to allocate the total reserve to each contract. This allocated reserve should be used to calculate to change in basis each year.

Mr. Campbell said interrogatory 9.2 of the annual statement was intended to identify the types of guarantees a company is making, the waiting period of each guarantee, the account values and the reserves. Actuarial Guidelines XXXIV and XXXIX had explicit reserves attributable to particular benefits. Under Actuarial Guideline XLIII there is only an aggregate reserve and there is no specific reserve for each guarantee. Mr. Campbell suggested that column 6 (gross reserve) of each row of tables in the interrogatory could be calculated using the reserve allocated to each contract by calculating the difference between the total reserve and the basic adjusted reserve, which would include any excess stochastic reserve. Ms. Jones said the Task Force should review the interrogatory next year.

Ms. Jones said there was a question on whether the extra reserve equal to the excess of the conditional tail expectation (CTE) amount over the standard scenario reserve under the Actuarial Guideline XLIII calculation should be reported in the Annuities section of Exhibit 5 or in the Miscellaneous Reserves section. Mr. Jakielo said that if the excess reserve were reported in the Annuity Reserves section, it could become part of an existing basis and it would be difficult to see the magnitude of the extra reserve or to track it from year to year. The Task Force did not express an opinion as to which section should contain the reserve, but did want the item to be kept separate.

Rob Frasca (Ernst & Young) discussed his comment letter about reflecting hedging strategies in the CTE amount. He said the guideline is written with the presumption that the inclusion of actively managed hedging strategies would reduce the reserve. If the inclusion of the hedging strategy results in an increase in reserve, he asked whether the guideline would be applied in a parallel manner. He also asked whether companies would have the option to elect to model future hedges and, if so, whether the reflection of hedges would only be elected when it provides a reduction in reserves.

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Mr. Carmello said companies should not be able to pick and choose each year. Mr. Campbell said the American Academy of Actuaries' variable annuity practice note group is working on a similar question. Currently held hedges should be included in the modeling — but there are differences of opinion on the inclusion of future hedging strategies. He noted that the E-factor in Appendix 7 is meant to capture the accuracy of the modeling, and if the hedging strategy increases the reserve, the E-factor could be set equal to 1.

Having no further business, the Life and Health Actuarial Task Force adjourned.

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- TO: Joseph Fritsch (NY), Chair, Statutory Accounting Principles (E) Working Group
- FROM: Larry Bruning (KS), Chair, Life and Health Actuarial Task Force
- DATE: October 20, 2009
- RE: Actuarial Guideline XLIII

The Life and Health Actuarial Task Force held a conference call on October 20, 2009, to discuss the treatment of the reserves for variable annuities under Actuarial Guideline XLIII.

Actuarial Guideline XLIII was adopted on September 24, 2008, to interpret the standards for the valuation of reserves for variable annuities. The interpretation in this guideline superseded the interpretation in Actuarial Guideline XXXIV and Actuarial Guideline XXXIX. Because of the effort that would be required to comply with Actuarial Guideline XLIII, the Task Force decided to set the effective date on December 31, 2009. Likewise, Actuarial Guideline XXXIV was repealed effective on December 30, 2009, and Actuarial Guideline XXXIX was set to expire on December 30, 2009.

SSAP No. 51 paragraph No. 32 states as follows:

Consistent with SSAP No. 3, any increase (strengthening) or decrease (destrengthening) in actuarial reserves resulting from such a change in valuation basis shall be recorded directly to surplus rather than as a part of the reserve change recognized in the summary of operations. The impact on surplus is based on the difference between the reserve under the old and new methods as of the beginning of the year.

The intent of the Task Force was to consider the new interpretation in Actuarial Guideline XLIII as a change in valuation basis. However, the intent of the Task Force was to calculate the impact on surplus based on the difference between the reserve under the old and new methods as of the end rather than the beginning of the year.

The Task Force is asking the Statutory Accounting Principles (E) Working Group to consider its intent in calculating the impact on surplus.

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#### Life and Health Actuarial Task Force Conference Call October 20, 2009

The Life and Health Actuarial Task Force met via conference call Oct. 20, 2009. The following Task Force members participated: Scott H. Richardson, Vice Chair, represented by Leslie Jones (SC); Linda S. Hall represented by Katie Campbell (AK); Jim L. Riding represented by Steven Ostlund (AL); Jay Bradford represented by Joe Musgrove (AR); Thomas R. Sullivan represented by Jim Jakielo (CT); Kevin M. McCarty represented by Dan Keating (FL); Glenn Wilson represented by Blaine Shepherd (MN); John M. Huff represented by David Hippen (MO); James J. Wrynn represented by William Carmello (NY); Mary Jo Hudson represented by Pete Weber (OH); Kim Holland represented by Frank Stone (OK); Mike Geeslin represented by Mike Boerner (TX); and Kent Michie represented by Tomasz Serbinowski (UT).

Ms. Jones chaired the meeting.

#### 1. <u>Actuarial Guideline XLIII Issues</u>

John Bruins (American Council of Life Insurers—ACLI) discussed ACLI's Oct. 14 letter (Attachment Twenty-Three-A) regarding transition guidance for Actuarial Guideline XLIII. He said he is looking for clarification of the effect of the guideline. Typically a change in basis is evaluated at the beginning of the accounting period, and income during that accounting period is determined using the new basis. The ACLI thinks AG XLIII represents a different situation because it specifically states that the guideline takes effect Dec. 31, which is the last day of the accounting period. The prior guidance documents, Actuarial Guideline XXXIV and Actuarial Guideline XXXIX, are specifically in effect until Dec. 30. From a logical point of view, it makes sense to report the income for the year on the basis that governed the reserves through Dec. 31. However, the calculation of the reserves on the basis specified in Actuarial Guideline XLIII as of the beginning of 2009 will be a major effort. In addition, using the values on the two bases as of Dec. 31 will make any grading of the reserves easier to implement. Mr. Bruins asked for guidance that is different from the normal accounting guidance.

Mr. Jakielo said that during the development of Actuarial Guideline XLIII, the expectation was that the recalculation of reserves was to be done at the end of 2009. Deborah Whitmore (Ernst and Young) suggested there could be an approach similar to the one taken with SSAP No. 43R, in which there is a different implementation than the normal implementation. Barry Schemin (Consulting Actuary) suggested discounting the reserve as of Dec. 31 at interest to the beginning of the year. Mr. Jakielo said a simplified approach could create problems in regard to the magnitude of the difference between reserves under the old and new bases. Stephen Neill (TX) suggested that the Task Force declare that Actuarial Guideline XLIII does not represent a change in basis for accounting purposes. Jim Lamson (Actuarial Resources) suggested that the previous methods are based on cash flow testing and that Actuarial Guideline XLIII is a refinement on that method, not a change in basis. Mr. Jakeilo said if it were considered a change in accounting estimate, then the entire change in reserves would be included in the income statement.

Mr. Ostlund moved and Mr. Hippen seconded to recommend to the Statutory Accounting Principles (E) Working Group to recognize the effect of Actuarial Guideline XLIII as a change in method, but that the impact on surplus be based on the difference between the reserve under the old and new methods as of the end rather than the beginning of the year. The motion passed unanimously.

Mr. Ostlund moved and Mr. Hippen seconded to grade in the reserve calculation under Actuarial Guideline XLIII by grading only the contracts in-force as of Dec. 31, 2009, by comparing the reserves under the old basis and new basis each year and subtracting 2/3 of the difference in 2009 and 1/3 of the difference in 2010. The motion passed unanimously.

Having no further business, the Life and Health Actuarial Task Force adjourned.

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Attachment Twenty-Three-A Life and Health Actuarial Task Force 12/3-4/09



**John Bruins** Senior Actuary (202) 624-2169 t (866) 953-4097 f johnbruins@acli.com

October 14, 2009

Mr. Larry Bruning Chair – Life and Health Actuarial Task Force

Subject: Transition Guidance for AG43 - Change in Reserve Basis

The ACLI on behalf of its members is seeking clarification regarding the computation and reporting of any change in reserves basis resulting from the implementation of Actuarial Guideline 43 in place of Actuarial Guidelines 34 and 39. Specifically, we are asking for transition guidance that any amount reported in Exhibit 5A due to the implementation of AG43 in 2009 be determined as of December 31, 2009.

Typically, such a change would be evaluated for its effect on the first day of the reporting year. This is consistent with the guidance of SSAP 3 for the reporting of the impact of a change to an accounting principle. The balance of the reporting for the year would then be computed on the new basis. The result of this process is that the income statements for the year are computed consistently and completely on the new basis, with the change being an opening adjustment to the balance sheet. This is a logical result when the change is to an existing standard which had optional application and is elected by the company or when a change is made that is in effect with the beginning of the reporting year. Such changes typically do not come with specified application dates, or with application dates for a particular reporting period, so that using January 1 as the 'change date' for calendar year reporting provides uniformity and consistency in nearly all circumstances.

Actuarial Guideline 43 presents a different situation. The AG specifically becomes applicable on December 31, 2009. Prior to that date, the former guidance of AG34 and 39 were in effect – specifically by the wording of the Actuarial Guidelines. As such, the quarterly statements filed during 2009 reflect current guidance of AG34 and AG39. Since the new AG becomes effective on Dec. 31, 2009, it is logical that the income for the year 2009 would be determined and reported using the guidance that was in effect for 364 of the 365 days of 2009.

In addition to the theoretical basis for this request, this would have some practical benefits. First, companies need to determine values on both bases as of 12/31/09 since the current basis is used to determine reserves for the federal income tax return. Second, this change would make the income statement for the year consistent with the statements already provided for the first three quarters. And finally, there is a provision in AG 43 that permits the Commissioner to grant a 3 year period to phase in results. Computing the value of the change at the end of the year would automatically provide an audited basis for determining the potential value of such a phase in.

We therefore ask that LHATF provide transition guidance for the implementation of AG43 in 2009: that any impact of a change in basis be computed as of December 31,2009 resulting in an income statement determined using AG34 and 39.

cc John Engelhardt

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