



# AMERICAN ACADEMY *of* ACTUARIES

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## **Update to Principles-Based Reserves for Life Products Model Regulation from the American Academy of Actuaries' Life Reserves Work Group**

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

**St. Louis, MO - September 2006**

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## PRINCIPLES-BASED RESERVES FOR LIFE PRODUCTS MODEL REGULATION

~~*Drafting note: Throughout this document, the definition of the Stochastic Reserve is based on a reserve method that equals the present value of future benefits and expenses less the present value of future gross premiums (i.e. a Gross Premium Valuation method). However, at the June 8, 2006 LHATF meeting, it was decided to change the reserve method for the Stochastic Reserve calculation to an approach based on the Greatest Present Value of Accumulated Deficiencies (GPVAD). The reserve amount under the GPVAD approach equals starting assets plus the greatest present value of accumulated deficiencies, where the accumulated deficiency for each year in the projection is determined by taking the difference between the working reserve and the accumulated assets, and the present value of the accumulated deficiency is determined by discounting the accumulated deficiency in each future year back to the valuation date.*~~

~~*This change only applies to the Stochastic Reserve; the Deterministic Reserve is still calculated using the Gross Premium Valuation method.*~~

~~*Please make note of this change as you review this document, since the document has not been revised to reflect this change.*~~

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### Section 1. Purpose

- A. The method for calculating reserves defined in this regulation shall constitute the Commissioner's Reserve Valuation Method (CRVM) for policies to which this regulation is applicable.
- B. The purpose of this regulation is to define the minimum valuation standard under a principles-based approach for ~~individual life~~ products, including individual life policies ~~individual certificates~~ issued under a group life insurance contract.
- C. A principles-based approach is one that:
  1. Captures all of the material ~~financial~~ risks, benefits and guarantees associated with the contracts including Material Tail Risk 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 and methods that are consistent with, but not necessarily identical to, those utilized within the company's overall risk assessment process. Company risk assessment processes include but are not limited to experience analysis, asset adequacy testing, GAAP valuation and pricing.

4. Permits the use of company experience, based on the availability of relevant company experience and its degree of credibility, to establish assumptions for risks over which the company has some degree of control or influence.
5. Provides for the use of assumptions, set on a prudent best estimate basis, that contain an appropriate level of conservatism when viewed in the aggregate and that, together with the methods utilized, recognizes the solvency objective of statutory reserve reporting ~~under moderately adverse conditions.~~

## Section 2. Authority

This regulation is issued under the authority of Section [insert applicable section] of the Insurance Laws of [insert state]

*[Drafting Note: This regulation presumes that changes to the SVL have been adopted that permit the use of the principles-based valuation standard defined by this regulation.]*

## Section 3. Scope

1. ~~Unless a policy form, supplemental benefit or rider, is exempted by the commissioner,~~ the method defined by this regulation applies to all individual life insurance policies whether directly written or assumed through reinsurance, including:
  - a. Universal life insurance policies;
  - b. Variable life and variable universal life insurance policies;
  - c. Term life insurance policies;
  - d. Traditional whole life insurance policies;
  - e. ~~Equity-~~Indexed life and indexed universal life insurance policies;  
*[Drafting Note: ~~additional considerations for equity indexed life products need to be incorporated in this regulation~~]*
  - f. Individual life policies ~~certificates~~ issued under a group life insurance contract; and
  - g. Combination policies that include other benefits such as annuity benefits or long-term care benefits in addition to ~~other than~~ life insurance benefits, ~~such as annuity benefits or LTC benefits~~ but are filed as ~~an~~ individual life insurance policies.
2. Reserves for policies, supplemental benefits, and riders on these policies that are not directly identified in this regulation are to be determined on a basis that is consistent with the principles and methodologies defined in this regulation.

*[Drafting Note: emerging products are included in scope, but additional considerations may need to be incorporated in this regulation to address issues related to these new emerging products.]*

## Section 4. Guiding Principles

The method defined by this regulation is based on the following set of principles. These principles should be followed when applying the methodology defined by this regulation and analyzing the resulting reserves.<sup>1</sup>

**Principle 1:** The reserve is based on a prospective valuation method that appropriately captures all material risks underlying the product being valued, including the magnitude of Material Tail Risk, ~~and~~ the revenue to fund the risks, and the effect of any risk mitigation techniques.

**Principle 2:** The method provides a framework that can be applied to all individual life insurance products.

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

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

**Principle 3:** A deterministic reserve approach may be sufficient for certain products, depending on the nature of the risks, and an [additional](#) stochastic approach may be necessary for other products.

**Principle 4:** For risks that the company has some degree of control over (e.g., mortality), assumptions should reflect a blend of company experience and prescribed assumptions (or methods for setting the assumptions), with the relative weightings of each dependent on the credibility of company experience. For risks that the company has no control over (e.g., market interest rate movements), prescribed assumptions or methods for setting the assumption should be used.

**Principle 5:** Assumptions that are not stochastically modeled should be based on Prudent Best Estimates that incorporate appropriate Margins for uncertainty.

**Principle 6:** Assumptions are not locked in at issue, but are updated as expectations of future experience and economic conditions change.

**Principle 7:** 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. 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 Stochastic Reserve Amount. As such:

1. The actuary must take the model's limitations into consideration when setting assumptions, applying the methodology and determining the appropriateness of the resulting reserve levels.
2. The use of assumptions and risk management strategies should be appropriate to the business and not merely constructed to exploit 'foreknowledge' of the components of the required methodology. Therefore, the use of assumptions, methods, models, risk management strategies (e.g., hedging), derivative instruments, structured investments or any other risk transfer arrangements (such as reinsurance) that serve to materially reduce the calculated statutory reserve without also reducing risk on scenarios similar to those used in the actual cash flow modeling are inconsistent with these principles.

## Section 5. Definitions

The following terms shall have the indicated meanings fFor purposes of this regulation:

A. Accumulated Deficiency: An amount measured as of the beginning of the Projection Period and as of the end of each Projection Interval that equals the projected Working Reserve less the amount of projected assets.

A.B. Actuarial Report: A document prepared by the actuary that summarizes all of the material decisions supporting the calculation of the Reported Reserve, including assumptions, margins and methodologies used to calculate the Reported Reserve.

C.B. Aggregate Deterministic Scenario Reserve: An amount used to support the stochastic modeling exclusion for a group of policies that is determined by calculating the greatest present value of Accumulated Deficiencies of the policies using Deterministic Reserve assumptions.

B.C. Asset Segment: A grouping of policies in a manner that generally follows the company's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes.

C.D. Best Estimate Assumptions: ~~†The set of actuary's most reasonable~~ estimates of future experience for ~~each~~ Risk Ffactor in a given Projection Interval that, in the opinion of the Qualified Actuary, given all available, relevant information pertaining to the contingencies being valued, is most likely to give an unbiased estimate of the cash flows in that Projection Interval.

~~D.E.~~ Cash Flow Model: ~~a~~A model that projects asset and liability cash flows used to determine a path of Net Asset Earned Rates and the net cash flows for the Deterministic Reserve and Stochastic Reserve

~~E.F.~~ Cash Surrender Value: ~~¶~~¶The amount available to the policyholder upon surrender of the policy, prior to any outstanding policy indebtedness.

~~F.G.~~ Clearly Defined Hedging Strategy. A strategy undertaken by a company to manage risks through the future purchase or sale of hedging instruments and the opening and closing of hedging positions meeting the principles outlined in Section 4 of this regulation (particularly Principle 7) and the requirements of a Clearly Defined Hedging Strategy as described in Subsection E (~~7~~5) of Section 7.

~~H.~~ Conditional Tail Expectation (CTE): ~~a~~A statistical risk measure that is calculated as the average of all modeled outcomes (ranked from lowest to highest) at percentiles above the percentile corresponding to the CTE level. The CTE measure~~That~~ provides enhanced information about the tail of a distribution compared above to that provided by the order statistics~~the traditional use of~~ (percentiles). For example, CTE 65 averages all modeled outcomes at percentiles above the 65<sup>th</sup> percentile. Instead of only identifying a value at a particular percentile and thus ignoring the possibility of extremely large values in the tail, the CTE provides the average over all values in the tail beyond the CTE level.

~~H.I.~~ Deterministic Reserve: ~~A~~A reserve determined on a seriatim basis using a single Scenario and a set of Prudent Best Estimate assumptions. It equals the sum of the greater of the Seriatim Reserve and the Cash Surrender Value for each policy.

~~I.J.~~ Discount Rates: ~~¶~~¶The path of pre-tax interest rates used to discount cash flows for the Deterministic Reserve and Stochastic Reserve calculations.

~~J.K.~~ Gross Wealth Ratio. The Gross Wealth Ratio is 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).

~~K.L.~~ Independent Reviewer.

*[Drafting Note: Definition to be provided by SVL-2 group]*

~~M.~~ Margin: ~~a~~An amount applied added to, or deducted from, the Best Estimate Assumption in order to derive a Prudent Best Estimate assumption to provide account for estimation error and adverse deviation. The Margin should be directly related to the level of uncertainty in the behavior of phenomenon for which the Prudent Best Estimate assumption is made, whereby the greater the uncertainty, the larger the required Margin, with the Margin added or subtracted as needed to produce a larger reserve than would otherwise result without it.

~~M.N.~~ Margin Ratio: ~~¶~~¶The ratio of the aggregate margin for an Asset Segment to the discounted value of the capital requirement for the Policies in the Asset Segment, calculated in accordance with Section 7.B.4 of this Regulation.

~~The Margin should be directly related to the level of uncertainty in the underlying risk factor whereby the greater the uncertainty, the larger the Margin. Each Margin should serve to increase the Reported Reserve that would otherwise be held in its absence (i.e., using only the Best Estimate assumption).~~

~~M.O.~~ Material Tail Risk: Material Tail Risk arises when the Scenario Reserves for one or more Scenarios are materially unfavorable compared to the Scenario Reserves for the rest of the Scenarios.

~~N.P.~~ Net Asset Earned Rates: ~~¶~~¶The path of earned rates reflecting the net General Account portfolio rate in each Projection Interval (net of appropriate default costs and investment expenses). ~~This~~ese set of rates is one factor ~~are~~ used to determine the amount of benefits, expenses, and revenue that depend on the level of interest credited.

- Q-Q. Net Investment Earnings: ~~¶~~The amount used to determine the Net Asset Earned rate for each Projection Interval as defined in Section F (2) of Section 7.
- R-R. Non-Guaranteed Elements (NGE): ~~D~~ebits or credits to a policyholder's account value, benefit, or consideration that may be adjusted at the discretion of an insurance company. For purpose of this regulation, Non-Guaranteed Elements includes policyholder dividends for participating policies.
- S. Notional Gross Reserve: The amount the Reported Reserve would have been held in the absence of any ceded reinsurance.
- T. Per Policy Reserve: An amount determined for each Policy that equals the greater of the Cash Surrender Value and the Seriatim Reserve.
- U-U. Policy: A life insurance policy included in the scope of this Regulation.
- V-V. Projection Interval: ~~¶~~The time interval selected in the cash flow model to project the cash flows amounts (e.g. monthly, quarterly, annually).
- W-W. Projection Period: The period over which the Cash Flow Model is run to produce the Stochastic and Deterministic Reserves.
- X-X. Proprietary Predetermined Scenario Sets: A small number of prescribed paths of interest rate and equity performance that are not necessarily a representative sample of a larger set of stochastic paths, but a conservative sample developed by the company adopted by the NAIC for the purpose of calculating the Stochastic Reserve for policies within the scope of this regulation.
- Y-Y. Prudent Best Estimate Assumption: A deterministic assumption, used to represent a Risk Factor, Any valuation assumption used for projections not stochastically modeled. It is developed by applying a Margin for uncertainty (reflecting estimation error and adverse deviation) to the Best Estimate Assumption for that Risk Factor.  
~~The resulting assumption should be consistent with the stated principles in Section 4, be based on any relevant and credible experience that is available, and should be set to produce, in concert with other Prudent Best Estimate Assumptions, a Reported Reserve that is consistent with the stated CTE level under moderately adverse conditions.~~
- Z-Z. Recalculated Deterministic Reserve: The amount used as a replacement for the Stochastic Reserve for those policies that are subject to the stochastic modeling exclusion.
- AA-AA. Risk Factor: An aspect of future experience that is not fully predictable on the valuation date Valuation Date and that can affect the future financial results arising from the provisions of a Policy.
- BB-BB. Qualified Actuary: ~~a~~An actuary who meets the qualifications as defined in Section 6 (Certifications) to certify that the reserves for the policies subject to this regulation have been calculated following all applicable laws, regulations, actuarial guidelines and Actuarial Standards of Practice. The Qualified Actuary shall be referred to throughout this regulation as "the actuary".
- CC-CC. Reported Reserve: ~~¶~~The minimum reserve as of the Valuation Date for the policies falling within the scope of this regulation using a principles-based approach and equals the greater of the Deterministic Reserve and the Stochastic Reserve, as defined by this regulation.
- DD-DD. Revenue Sharing: ~~a~~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 record keeping. Only payments that are attributable to charges or fees taken from the underlying variable funds or mutual funds supporting the

policies that fall under the scope of this regulation shall be included in the definition of Revenue Sharing.

Z.EE. Scenario: ~~a~~A single path of outcomes used in a 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).

AA.FF. Scenario Reserve: ~~e~~Equals the amount determined in Subsection (H)(5)(b) of Section 7 for all policies on an aggregated basis for a given Scenario that is used as a step in the calculation of the Stochastic Reserve.

BB.GG. Seriatim Reserve: ~~e~~Equals the amount determined in Subsection (G)(3)(b) of Section 7 for a given policy that is used as a step in the calculation of the Deterministic Reserve.

CC.HH. Stochastic Reserve: ~~p~~Provides for all material risks of a group of policies, including Material Tail Risk arising from sensitivities to changing economic conditions. It equals 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 Best Estimate assumptions for all assumptions not stochastically modeled. The prescribed CTE level is established by the NAIC.

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

II. Valuation Date: The date when the Reported Reserve is to be valued as required by the Standard Valuation Law.

EE.JJ. Working Reserve: ~~t~~The assumed reserve used in the projections of Accumulated Deficiencies supporting the calculation of the Scenario Reserve.

*[Drafting Note: Discussions are in progress to define how the Working Reserve will be determined.]*

## Section 6. Certification and Documentation Requirements

*[Drafting Note: This regulation presumes that requirements have been adopted to define the regulatory and governance process.]*

- A. A Qualified Actuary shall provide a certification ~~certify~~ that the Reported Reserve was calculated ~~work has been done~~ in a manner that meets the requirements of this regulation and complies with all applicable Actuarial Standards of Practice.
- B. A Qualified Actuary shall prepare an Actuarial Report each year that documents all material decisions made, and information used, to support the certification, including assumptions, margins and methodologies used to calculate the Reported Reserve.
  1. The Actuarial Report shall include:
    - a. A description of the blocks of policies subject to the Model Regulation.
    - b. A description of the assets supporting the block of policies subject to the Model Regulation.
    - c. A comparison of the Deterministic Reserve to the Stochastic Reserve, including the distribution of the Scenario Reserves and the result of applying the CTE risk level.
    - d. Documentation of the key modeling decisions made by the Actuary, including:

- i. A description of the valuation assumptions, ~~and~~ methods, [models, risk management strategies \(e.g., hedging\), derivative instruments, structured investments or any other risk transfer arrangements \(such as reinsurance\)](#),
    - ii. Results of applicable sensitivity tests, and
    - iii. Disclosure of all items required by this regulation, including but not limited to: the impact of aggregation, the aggregate impact of all Margins on the Reported Reserve and a demonstration of the stochastic modeling exclusion.
  - e. [A summary of the availability and effectiveness of controls on judgment via sound feedback loops.](#)
  - f. [A list of the key risk measurement tracking tools that the company uses as an early warning of changes in experience between Valuation Dates.](#)
2. The Actuarial Report shall be provided to an Independent Reviewer who shall provide an opinion to the commissioner on whether the company prepared proper documentation, made proper disclosures, and complied with regulatory requirements.

***[Drafting note: The timing of when the Report is provided will be determined by the NAIC. Details as to exactly what the Independent Reviewer will be doing is needed.]***

3. The Actuarial Report and any other material provided by the company to the commissioner or an Independent Reviewer in connection therewith, shall be kept confidential by the commissioner and the Independent Reviewer and shall not be made public. The Actuarial Report or other material may otherwise be released by the commissioner (a) with the written consent of the company or (b) to the American Academy of Actuaries upon request stating that the report of other material is required for the purpose of professional disciplinary proceeding and setting forth procedures satisfactory to the commissioner for preserving the confidentiality of the Actuarial Report or other material.

***[Drafting note: Record retention requirements are needed if not included in the law.]***

- C. This regulation requires a Qualified Actuary to make various determinations, verifications and certifications. The company shall provide the Qualified Actuary with the necessary information sufficient to permit the actuary to fulfill the responsibilities set forth in this regulation and responsibilities arising from applicable Actuarial Standards of Practice.
- D. Except in cases of fraud or willful misconduct, the qualified actuary shall not be liable for damages to any person (other than the insurance company and the commissioner) for any act, error, omission, decision or conduct with respect to the actuary's opinion.
- E. The qualifications of a Qualified Actuary are:
1. Be a member of the American Academy of Actuaries;
  2. Be familiar with all appropriate standards of practice that apply to principles-based reserves;
  3. Not have been found by the commissioner, following appropriate notice and hearing to have:
    - a. 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 or an Appointed Actuary;
    - b. Been found guilty of fraudulent or dishonest practices;
    - c. Demonstrated his or her incompetence, lack of cooperation, or untrustworthiness to act as a Qualified Actuary; or
    - d. Resigned or been removed as a Qualified 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 a failure to adhere to generally acceptable actuarial standards;

4. Not fail to notify the commissioner of any action taken by a commissioner of another state similar to that under Paragraph (3) above;

*[Drafting Note: it needs to be determined whether the Qualified Actuary must be appointed by, or be delegated authority by, the Board of Directors of the company. This will depend on the requirements of the regulatory and governance process being established in other regulations and guidelines]*

## Section 7. Definition of General Reserve Methodology

### A. Summary

1. This regulation applies the principles of risk management, asset adequacy analysis and stochastic modeling to establish the minimum reserve for the products within its scope. For some products, using only a deterministic, single scenario approach may be adequate to capture the risks of the policy. For products with Material Tail Risk arising from sensitivities to changing economic conditions, a stochastic modeling approach is required— (although an exception to this requirement can be made if certain conditions are met, as described in Subsection H(5) below). However, the stochastic modeling approach does not require that all assumptions be stochastically modeled.
2. This regulation requires that the Reported Reserve for policies falling within its scope be based on the greater of an amount calculated using a seriatim, deterministic method (Deterministic Reserve) and an amount calculated using a stochastic method when appropriate (Stochastic Reserve), where the comparison is done on an aggregate basis. Both the Deterministic Reserve and the Stochastic Reserve shall be determined by projecting taking the present value of net cash flows as described below.
3. The actuary can elect to perform the reserve calculations required by this regulation on a date other than the ~~valuation date~~ Valuation Date, but in no event earlier than six months before the valuation date ~~Valuation Date~~, as long as an appropriate method is used to adjust the reserve so determined to the ~~valuation date~~ Valuation Date. Disclosure of the results of such adjustment and the methodology used to determine the adjustment is required.
4. The Deterministic Reserve is calculated as the sum over all policies using a seriatim approach that uses Prudent Best Estimate assumptions over a single Scenario. For policies without Material Tail Risk, as defined in section 5, a company may only need to calculate the Deterministic Reserve.
5. The Stochastic Reserve is calculated in the aggregate using a projection of net cash flows over a broad range of stochastically generated Scenarios, using Prudent Best Estimate assumptions for all assumptions not stochastically modeled, and then applying a prescribed Conditional Tail Expectation (CTE) level. A company may elect to exclude certain policies from the stochastic modeling requirement if certain conditions are met (as described in Subsection H(5) below.)

*[Drafting note: LHATF needs to determine whether aggregate or seriatim calculations are performed.]*

### B. Prudent Best Estimate Assumptions and Margins

1. The actuary shall determine Prudent Best Estimate Assumptions used in the calculation ~~the valuation assumptions~~ for ~~eachall Rmaterial-risk Factors for each policy~~ that ~~isare~~ not stochastically modeled ~~using Prudent Best Estimate assumptions as defined in Section 5.~~ A ~~The~~ Prudent Best Estimate assumptions shall vary from Scenario to Scenario if necessary, in the actuary's judgment, to reflect dependencies ~~is developed by applying a Margin for estimation error and adverse deviation to the Best Estimate assumption of the Risk Factor.~~ This means that valuation assumptions not stochastically modeled are to be consistent with the stated principles in Section 4, be based on any relevant and credible experience that is available, and should be set to produce, in concert with other Prudent Best Estimate Assumptions, a Reported Reserve that is consistent with the stated CTE level under moderately adverse conditions. ~~A~~ Prudent Best Estimate ~~valuation~~ assumptions is developed by applying a Margin to a Best Estimate assumption for the Risk Factor. ~~not stochastically modeled shall be the same for both the Deterministic Reserve and the Stochastic Reserve.~~ The Prudent Best Estimate Assumption for each Risk Factor shall be:

- a. consistent with the principles stated in Section 4,
- b. based on any relevant and credible experience that is available,
- c. set to produce, in concert with other Prudent Best Estimate Assumptions, an overall value for the Reported Reserve that is consistent with the stated level of conservatism for that quantity, and
- d. have a documented feedback loop process for reassessing the assumption in the future.

2. In setting~~Recognizing that assumptions are simply assertions of future unknown experience,~~ the Margin for a Risk Factor, the actuary must assure that:

- a. ~~for estimation error and adverse deviation~~the Margin is ~~should be~~ directly related to uncertainty in the ~~underlying Risk Factor, whereby. The~~ the greater the uncertainty, the larger the required Margin, with the Margin added or subtracted as needed to produce a larger reserve than would otherwise result without it.
- b. ~~Each larger Margins are used if experience data are lacking or limited than would be the case if abundant and relevant experience data are available, should serve to increase the Reported Reserve that would otherwise be held in its absence (i.e., using only the Best Estimate assumption)~~
- c. sensitivity testing is performed to determine the assumptions that are material to the extent that a small change in the assumptions leads to a large change in the reserve. If such case occurs, a larger margin would be needed unless relevant credible experience is relied upon to conclude otherwise, and
- e-  
e.d. the Margin satisfies any further conditions set forth by this Regulation or any supporting Actuarial Guidelines and applicable Actuarial Standards of Practice with respect to Margins or Prudent Best Estimate Assumptions for the Risk Factor.

3. In addition, in setting the Margin for a Risk Factor, the actuary must consider:

- a. that larger Margins may be required to reflect contingencies related to policyholder behavior in situations where a given policyholder action results in the surrender or exercise of a valuable option..
- b. the relationship of the Margin for certain or all Risk Factors to the market price of risk for that Risk Factor. For certain risk factors, the market price of risk for a Risk Factor may be estimated by taking the product of the economic or regulatory capital allocation for the Risk Factor and the excess of the pre-tax market rate of return for such risks over the pre-tax risk-free interest rate of comparable maturity.
- c. the magnitude of fluctuation in the historical experience of the company for the Risk Factor as measured by the standard deviation around the mean or other standard statistical measure (if meaningful historical experience data are available for the Risk Factor).

3.4. The actuary shall determine and disclose in the Actuarial Report an estimate of the impact of the Margin for each material Risk Factor for each Asset Segment by:

- a. Calculating the sum of Seriatim Reserves based on the Best Estimate Assumption for the Risk Factor and Prudent Best Estimates for all other Risk Factors, and
- b. Subtracting the value determined in Subsection 4(a) above from the sum of Seriatim Reserves as reported.

4.5. The actuary shall determine and disclose in the Actuarial Report an estimate ~~offor~~ the aggregate Margin ~~in the Deterministic Reserve~~ for each Asset Segment by:

- a. Calculating the sum of Seriatim~~Deterministic~~ Reserves based on Best Estimate ~~A~~assumptions, prior to the addition of any ~~valuation~~ Margins, ~~and~~
- b. Subtracting the value determined in Subsection 5(a) above from the sum of Seriatim~~Deterministic~~ Reserves as reported.

6. The actuary shall determine and disclose in the Actuarial Report an estimate of the Margin Ratio for each Asset Segment by:

- a. Estimating the capital requirement for the Policies in the Asset Segment.
- b. Determining the discounted value of the capital requirement for the Policies in the Asset Segment using the Discount Rates for the Asset Segment.
- c. Dividing the aggregate margin for the Asset Segment determined in Subsection (5) above by the discounted value of the capital requirement for the Policies in the Asset Segment determined in (b) above.

*[Drafting Note: Further guidance on how to calculate the Margin Ratio may be provided in an Actuarial Guideline. This regulation presumes that requirements have been adopted that provide more specific guidance to determine the Prudent Best Estimate in order to comply with this requirement.]*

### C. Cash Flow Models

1. Purpose. Both the Stochastic Reserve and Deterministic Reserve calculations require the use of Cash Flow Models for each Asset Segment. The Cash Flow Models shall:
  - a. Project the premiums, benefits, expenses, and other applicable revenue items to be used in the reserve calculations; and
  - b. Project the total asset and liability cash flows, Net Investment Earnings, and invested asset balances for the purpose of determining the path of Net Asset Earned Rates.

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

2. General description of cash flow projections. For the Deterministic Reserve and for each Scenario for the Stochastic Reserve, a cash flow projection shall be made ignoring Federal Income Tax and shall reflect the dynamics of the expected cash flows for the entire Asset Segment. The projection shall include the effect of all material product features, both guaranteed and non-guaranteed.
  - a. Actual gross premiums received from the policyholder shall be included as revenue in the cash flow projection. Amounts charged to account values on General Account business (such as COI and expense charges) shall not be included in the cash flow projection as revenue, but shall be projected since they will affect the level of cash surrender benefits.
  - b. Net cash flows between the General Account and Separate Account for variable products will be included in the cash flow projection. (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.
  - c. Insurance company expenses (including overhead expenses), commissions, fund expenses, contractual fees and charges, Revenue Sharing income received by the company (net of applicable expenses) and cash flows associated with any reinsurance are to be reflected on a basis consistent with the requirements herein.
  - d. Asset cash flows shall include cash receipts/disbursements associated with investment income, realized capital gains and losses, principal repayments, appropriate asset default costs, investment expenses, income from hedge instruments, asset prepayments, and asset sales.
  - e. Throughout the projection, where estimates of asset or liability items are made that are neither stochastically generated nor prescribed, such estimates shall be on a Prudent Best Estimate basis.
  - f. Since the projection of cash flows reflects premium mode directly, deferred premiums are zero under this approach.

3. Cash flows from starting assets. Assets at the beginning of the projection shall be selected from the company's actual assets backing the policies associated with each Asset Segment. The amount of starting assets shall be determined as described in Section E.1. Cash flows on General Account starting assets for each Projection Interval shall be determined as follows:
  - a. Fixed income investments (e.g., public bonds, convertible bonds, preferred stocks, private placements, ABS, commercial mortgage loans, residential mortgage loans, MBSs, and CMOs) including hedge instruments associated with these assets.
    - i. Gross investment income and principal repayments shall be modeled in accordance with the contractual provisions of each asset and in a manner consistent with each Scenario. Grouping of assets is allowed if the actuary can demonstrate that grouping does not result in materially lower reserves than would have been obtained using a seriatim approach.
    - ii. Appropriate asset default costs and investment expenses shall be reflected through a deduction to the gross investment income using Prudent Best Estimates.
    - iii. Realized capital gains and losses on asset sales shall be modeled in a manner that is consistent with the company's documented investment and disinvestment policy.
    - iv. Any uncertainty in the timing of asset cash flows related to movements in interest rates (e.g., prepayment risk) shall be reflected directly in the projection of asset cash flows under the various Scenarios within the model as defined in Section 7.D.
  - b. Equity investments (i.e., non-fixed income investments having substantial volatility of returns such as e.g., common stocks and real estate investments) including hedge instruments associated with these assets.
    - i. The number of equity investment categories, and the allocation of specific assets to each category (e.g. large cap stocks, international stocks, owned real estate, etc.) shall be determined by the actuary as described in Section 7.E.43.
    - ii. The gross investment return (including realized and unrealized capital gains) for each investment category shall be projected in a manner that is consistent with the projected total return on the S&P 500 for the Scenario, reflecting any differences in the total return and risk between the S&P 500 and each equity investment category. This does not imply a strict functional relationship between the returns on the various investment categories and the return on the S&P 500, but it would generally be inappropriate to assume that an investment category consistently 'outperforms' (i.e. has lower risk, but achieves a higher expected return relative to the efficient frontier) the S&P 500 over the long term.
    - iii. For the Deterministic Reserve, the projected S&P 500 total return shall be prescribed as described in Section 7.D.1. For the Stochastic Reserve, the projected S&P 500 return for each scenario shall be modeled stochastically as described in Section 7.D.2.
    - iv. The maturity-time of sale of the asset shall be modeled in a manner that is consistent with the investment policy of the company for the respective equity investment categories. Investment expenses shall be reflected through a deduction to the gross investment return using Prudent Best Estimates.
  - c. All other assets. Asset cash flows on other assets that are not described in item a) and b) shall be modeled using methods consistent with the methods described in items a) and b). This includes assets that are a hybrid of fixed income and equity investments.
4. Disclosure of embedded spread on starting assets. For fixed income investments included in the starting assets (i.e. the asset categories defined in Section 7.C.3 (a), the actuary shall estimate and disclose in the Actuarial Report the following values for each Asset Segment:

- a. The approximate market value and the method used to determine such approximate market value of such investments on the ~~valuation date~~ Valuation Date.
- b. The statutory value of such investments on the ~~valuation date~~ Valuation Date.
- c. The gross level “option-adjusted” spread (in basis points) over the Treasury yield curve at the ~~valuation date~~ Valuation Date implied in the approximate market values of such investments on that date. Further guidance on acceptable methods to compute this spread shall be published by the NAIC.
- d. The projected average estimated annual default costs (including how they were derived) expressed as a percent of the approximate average annual market value of such investments. Further guidance on acceptable methods to compute this spread shall be published by the NAIC.
- e. The net level “option-adjusted” spread over the Treasury yield curve at the ~~valuation date~~ Valuation Date (Item c. minus Item d.).
- f. The aggregate weighted average life and the method used to determine such aggregate weighted average life of such investments at the ~~valuation date~~ Valuation Date.

*[Drafting Note: This disclosure is intended to provide regulators and Independent Reviewers a tool to assess from a capital market perspective the level of asset risk embedded in a company’s principles-based valuation compared to that of other companies or compared to the current market risk associated with typical asset classes found in insurance company portfolios. It is anticipated that market spread benchmarks for various asset classes and quality rating levels will be developed or recommended to provide context to regulators and Independent Reviewers when assessing an individual company’s disclosures. It is important to recognize that asset spreads reflect all sources of risk, not just defaults. Further, the existence of these disclosure metrics does not indicate an intent that long-term estimates of default costs should fluctuate significantly from period to period based on movements in market values.]*

5. Cash flows from reinvestment assets. Net cash flows in each Projection Interval shall be reinvested in a manner consistent with the company’s investment policy for each Asset Segment. Handling of disinvestment shall be consistent with the company’s investment policy and reflect economic reality such as the reasonable short-term borrowing capacity of the company. Cash flows from reinvestment assets shall be determined as described in Section 7.C.3., but with the additional requirement that spreads over Treasuries reflected in the purchase yields are to be Prudent Best Estimates. However, for each Asset Segment, the aggregate weighted spread over Treasuries, net of appropriate default costs, in each Projection Interval for the fixed income portion of the reinvestment assets (i.e. the asset categories defined in Section 7.C.3. (a)) shall be subject to a prescribed cap.

*[Drafting Note: the NAIC shall define the nature and level of the prescribed cap in an actuarial guideline.]*

6. Future IMR amounts. Realized capital gains and losses arising from changes in interest rates can be reflected in the Projection Interval when they occur, or can be spread out over future Projection Intervals by establishing a new IMR amount.

*[Drafting note: more discussion is needed as to how principles-based reserves will interact with IMR.]*

7. Length of projections. Projections shall be performed for at least as many future years as needed so that no materially greater reserve value would result from longer projection periods.
8. Simplified approaches. For the Deterministic Reserve and Stochastic Reserve, simplified approaches may be acceptable if they can be shown to produce reserves that are not materially different than those produced by a more robust cash flow model.

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

#### D. Description of Scenarios

1. For the Deterministic Reserve, the cash flow projections shall be made in a manner that reflect a single path of U.S. Treasury yield curves, a single path of S&P 500 returns for General Account assets, and a single set of paths of future fund performances for Separate Account assets. For Treasuries, this path shall start with the current U.S. Treasury rate yield curve in effect at the ~~valuation date~~ Valuation Date and grade linearly over time to an ultimate static U.S. Treasury rate yield curve. The length of the grading period and the values of the ultimate yield curve shall be prescribed by the NAIC. The method applicable to determine the single paths of S&P 500 returns and future fund performance shall also be prescribed by the NAIC.

*[Drafting Note: It is anticipated that specific parameters associated with the deterministic paths of these underlying indices will be published in an actuarial guideline and updated from time to time.]*

2. For the Stochastic Reserve, the cash flow projections shall be made in a manner that reflect stochastically generated paths of U.S. Treasury yield curves, S&P 500 returns for General Account equity assets, and future fund performance for Separate Account assets. These stochastically generated paths shall be determined by:
  - i. Stochastic generators and model parameters prescribed by the NAIC, or
  - ii. Pre-packaged scenarios generated from the stochastic generators and model parameters prescribed by the NAIC, or
  - iii. The use of Proprietary Predetermined Scenario Sets developed by the company adopted by the NAIC for the purpose of calculating the Stochastic Reserve for policies within the scope of this regulation, or

*[Drafting Note: The Proprietary Predetermined Sscenario Sset and weights will be constructed from a universe of scenarios in manner that produces a result that is reasonably similar to the prescribed CTE amount. This is needed to provide small to intermediate size ~~insurer companies~~ an alternative to modeling- a large representative sample from an interest rate generator, or a large number of prepackaged scenarios. Additional guidance is needed to assist the actuary in developing and justifying the use of appropriate Proprietary Predetermined Scenario Sets]*

- iv. Stochastic models developed by the company if mandated calibration criteria established by the NAIC are met. Returns for equity performance and groupings of variable funds shall be determined on a stochastic basis such that the resulting distribution of the Gross Wealth Ratios of the Scenarios meets the scenario calibration criteria established by the NAIC.

If the company chooses to use a fully integrated interest rate/equity return model, the equity return scenarios must satisfy the equity return calibration criteria adopted by the NAIC and the interest rate scenarios must satisfy the interest rate calibration criteria adopted by the NAIC.

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

*It is also anticipated that the actuarial guideline will define a prescribed set of pre-packaged equity return scenarios similar to those used for C3P2 RBC requirements for variable annuities, as well as a prescribed set of pre-packaged interest rate scenarios. In addition, it is anticipated that the actuarial guideline will define a set of Predetermined Scenario Sets for interest rates (similar to the 12 and 50 scenario set used for C3PI, but developed for the purpose of calculating the Stochastic Reserve on life*

~~insurance business subject to the scope of this regulation) and a set of Predetermined Scenario Sets for equity returns.~~

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

*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/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 US Treasury Fund scenarios within the 10,000 prepackaged scenarios for the C3P2 requirements qualify as meeting this standard. Although an integrated modeling approach is desirable, we believe a number of simpler approaches are acceptable.*

3. The number of scenarios for which Scenario Reserves are computed shall be considered to be sufficient if any resulting understatement in total reserves, as compared with that resulting from running a broader/more robust range of additional scenarios, is not material.

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

## E. Starting and Projected Assets

1. Starting Asset Amount. For the projections supporting the reserve methodology, the value of assets at the start of the projection shall be set equal to the estimated value of the Reported Reserve at the start of the projection. However, in no event shall the total starting asset amount (i.e. the sum of the starting asset amounts for all Asset Segments) be less than a prescribed percentage, established by the NAIC, of the final Reported Reserve. 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 policies;
  - b. an amount of assets held in the General Account equal to the estimated value of the Reported Reserve as of the start of the projections less the amount in a.) above.

For products in which a substantial portion of policyholder funds are allocated to Separate Accounts, in many instances the initial General Account assets may be negative, resulting in a projected interest expense. General Account assets chosen for use as described above shall be selected on a consistent basis from one reserve valuation hereunder to the next.

2. Due and Accrued Investment Income. Starting Assets shall include the balance of any due and accrued investment income on the invested assets included in the starting asset amount.
- ~~2.3.~~ Treatment of Hedge Assets. Any hedge assets allocable to the business being valued and meeting the requirements described in subsection 7 below shall be reflected in the projections and included with other General Account assets under item E.1.b.) above. To the extent the sum of the value of such hedge assets and the value of assets in item E.1.a.) above is greater than the estimated value of the Reported Reserve as of the start of the projection, then item E.1.b.) above may include enough negative General Account assets such that the sum of items a.) and b.) above equals the estimated value of the Reported Reserve as of the start of the projection.
- ~~2.4.~~ Treatment of IMR. Any positive Interest Maintenance Reserve (IMR) balance allocable to the business being valued may be included as a negative asset in the determination of the General Account Assets under item 2) above, thus allowing additional positive General Account assets to be allocated to support the reserve calculation. Any negative IMR balance allocable to the business being valued, to the extent it offsets positive IMR balances elsewhere in the entity, must be included as a positive asset with the opposite effect as described above.

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

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

An appropriate proxy for each equity investment category shall be designed in order to develop the investment return paths. The development of the returns for the proxy equity investment categories is a fundamental step in the modeling and can have a significant effect on results. As such, the actuary must map each investment category to an appropriately crafted proxy investment category normally expressed as a linear combination of recognized market indices (or sub-indices). The proxy construction process should include an analysis that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.

5.7. 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 returns for the proxy funds is a fundamental step in the modeling and can have a significant effect 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). The proxy construction process should include an analysis that establishes a firm relationship between the investment return proxy and the specific variable funds.

6.8. Modeling of Hedges. The appropriate costs and benefits of hedging instruments that are currently held by the company in support of the policies falling under the scope of the regulation shall be included in the projections when determining the Deterministic Reserve and the Stochastic Reserve. If the company is following a Clearly Defined Hedging Strategy and the hedging strategy meets the requirements as defined in subsection 5 below, the projections shall take into account the appropriate costs and benefits of hedge positions expected to be held in the future through the execution of that strategy.

*[Drafting note: permitting the modeling of hedges in the Deterministic Reserve calculation on policies that are subject to the stochastic modeling exclusion is still under study.]*

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

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.

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.

**7.9. Requirements of a Clearly Defined Hedging Strategy.** In order to qualify as a Clearly Defined Hedging Strategy, the strategy must meet the principles outlined in section 4 of this regulation (particularly Principle 7) 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,
- j. the person or persons responsible for implementing the hedging strategy, ~~and~~
- k. areas where basis, gap or assumption risk related to the hedging strategy have been identified, ~~and~~
- l. the circumstances under which the hedging strategy will not be effective in hedging the risks.

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

Strategies involving the offsetting of the risks associated with other products outside of the scope of this regulation do not currently qualify as a Clearly Defined Hedging Strategy.

#### **F. Net Asset Earned Rates and Discount Rates**

1. For both the Deterministic Reserve and the Stochastic Reserve calculations, a Cash Flow Model shall be used to determine a path of Net Asset Earned Rates that reflects the net General Account portfolio rate in each Projection Interval (i.e., monthly, quarterly, annually). Separate Account investment returns are not included in the calculation of Net Asset Earned Rates. This path of Net Asset Earned Rates will vary by Asset Segment and for each Scenario, and will depend on, among other things,
  - a. the projected Net Investment Earnings from the portfolio of starting assets,
  - b. the pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets,
  - c. the pattern of net liability cash flows, and
  - d. the projected Net Investment Earnings from reinvestment assets.
2. The Net Asset Earned rate for each Projection Interval shall be computed in a manner that is consistent with the timing of cash flows and length of the Projection Interval of the related cash flow model. It shall be calculated as the ratio of Net Investment Earnings divided by invested assets. The following considerations pertain to the calculation of this ratio:
  - a. Net Investment Earnings shall include investment income plus capital gains and losses (excluding capital gains and losses that are included in the IMR), minus appropriate default costs and investment expenses
  - b. Net Investment Earnings shall include any change in due and accrued investment income during the Projection Interval.
  - ~~b.c.~~ Net Investment Earnings shall also include income from hedge instruments and amortization of the Interest Maintenance Reserve on all applicable assets.
  - ~~d.~~ Policy loan interest (net of investment expenses) and policy loan balances shall be included in the calculation.
  - ~~d.e.~~ Invested assets shall be determined in a manner that is consistent with the timing of cash flows and length of the Projection Interval of the related cash flow model.

e.f. The outstanding Interest Maintenance Reserve shall be reflected as an adjustment to invested assets. Any negative IMR balance can only be reflected to the extent that a positive IMR balance exists on policies outside the scope of this regulation.

f.g. The statutory value of hedge instruments shall be included in invested assets. Reasonable approximations are acceptable.

g.h. All items reflected in the ratio shall be consistent with statutory asset valuation, including reflection of accrued and unearned investment income where appropriate.

*[Drafting Note: Section 7, part C, Item 8 permits the use of simplified approaches to calculate the Deterministic Reserve and Stochastic Reserve. This availability for simplification includes ways to determine appropriate Net Asset Earned Rates. Small to intermediate size companies, or any size company with smaller blocks of business, have options to create Net Asset Earned Rates under simplified approaches if they continue to meet the requirements of Section 7.C.(8).]*

3. The path of Discount Rates for each Asset Segment shall be equal to the path of Net Asset Earned Rates.

#### **G. The Deterministic Reserve**

1. Purpose. The purpose of the Deterministic Reserve is to produce a reserve that is adequate to cover the product benefits and expense, reflecting future revenue, under a single Scenario. However, it is not meant to explicitly capture Material Tail Risk.
2. Reserve Calculation Description. The Deterministic Reserve is determined using the following steps:
  - a. Determine Prudent Best Estimate assumptions as defined in Subsection B.
  - b. Project cash flows for each policy as described in Subsections C, D, and E.
  - c. Calculate the path of Net Asset Earned Rates for each Asset Segment as described in Subsection F.
  - d. Calculate the Seriatim Reserve for each policy using the methodology described in Subsection G (3).
  - e. Calculate the Per Policy Reserve for each policy.
  - e.f. Calculate the Deterministic Reserve as described Subsection G (4).
3. Calculation of the Seriatim Reserve for Each Policy.
  - a. ~~Project-Use the Cash Flow Model to project~~ the items in (i) through (v) below for each policy. Use the path of Net Asset Earned Rates as appropriate to determine benefits, expenses and revenue that depend on earned rates. For example, earned rates are needed to determine the level of cash surrender benefits.
    - i. The future benefits for each policy, including but not limited to death and cash surrender benefits.
    - ii. The future expenses for each policy, including but not limited to, commissions, general expenses, and premium taxes. Federal income taxes are excluded.
    - iii. The future gross premium payments for each policy.
    - iv. Other applicable revenue for each policy, such as fees and revenue on assets invested in sub-accounts, and any Revenue Sharing income.
    - v. The future net cash flows to/from the General Account from/to the Separate Account for each policy
  - b. The Seriatim Reserve for each policy is equal to:
    - i. The present value of future benefits determined by discounting the future benefits using the path of Discount Rates for the corresponding Asset Segment; plus

- ii. The present value of future expenses determined by discounting the future expenses using the path of Discount Rates for the corresponding Asset Segment; plus
- iii. The policy account value invested in the Separate Account at the ~~valuation date~~Valuation Date for the corresponding Asset Segment; minus
- iv. The present value of future gross premium payments and/or other applicable revenue determined by discounting these future premiums and other revenue using the path of Discount Rates for the corresponding Asset Segment; minus
- v. The present value of future net cash flows to/from the General Account from/to the Separate Account determined by discounting these future net cash flows using the path of Discount Rates for the corresponding each Asset Segment.

4. The Deterministic Reserve

~~b. The Deterministic Reserve equals the sum of the Per Policy Reserve as of the Valuation Date deterministic reserve for each policy for all policies falling under the scope of this regulation. If the The Per Policy Reserve deterministic reserve for each policy is determined on a date that precedes the Valuation Date, then the Per Policy Reserves shall be adjusted to the Valuation Date, equals the greater of the Cash Surrender Value on the valuation date for each policy and the Seriatim Reserve for each policy determined in Subsection G (3).~~

**H. The Stochastic Reserve**

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

~~To exclude a group of policies from the Stochastic Reserve requirement, the actuary must provide a demonstration that the Seriatim Reserve for the policies adequately provides for all material risks underlying such policies. An acceptable demonstration should:~~

- ~~a. Provide a reasonable assurance that if the Stochastic Reserve was calculated for only those policies subject to the stochastic modeling exclusion, it would not be materially greater than the Seriatim Reserves for such policies.;~~
- ~~b. Provide sufficient supporting information that an experienced independent actuarial reviewer can assess the reasonableness of the conclusion to exclude the group of policies; and~~
- ~~c. Provide an effective evaluation of the residual risk exposure resulting from risk mitigation techniques such as hedge instruments and reinsurance.~~

2. Reserve Calculation Description: The Stochastic Reserve is determined using the following steps:

- a. Determine policy grouping as defined in Subsection H (34)
- b. Determine Prudent Best Estimate assumptions as defined in Subsection B
- c. Project cash flows for each Asset Segment for each Scenario as described in Subsections C, D, and E
- d. Calculate the path of Net Asset Earned Rates and Discount Rates for each Asset Segment for each Scenario as described in Subsection F
- e. Calculate the Scenario Reserve for each Scenario using the methodology described in Subsection H (45)
- f. Calculate the Stochastic Reserve as described in subsection H (6).

4.3. Grouping of Policies for Modeling: Projections may be performed 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. Grouping shall not be done in a manner that intentionally understates the resulting Reported Reserve.

#### 5.4. Calculation of the Scenario Reserve for each Scenario

a. Use the asset model to project the items in (i) through (v) below for each Scenario. Use the path of Net Asset Earned rates as appropriate for each Asset Segment to determine benefits, expenses and revenue that depend on earned rates. For example, earned rates are needed to determine the level of cash surrender benefits.

- ~~i. The future benefits, including but not limited to death and cash surrender benefits.~~
- ~~ii. The future expenses, including but not limited to, commissions, general expenses, and premium taxes.~~
- ~~iii. The future gross premium payments.~~
- ~~iv. The future other applicable revenue such as fees and revenue on assets invested in sub-accounts, and any Revenue Sharing income.~~
- ~~v. The future net cash flows to/from the General Account from/to the Separate Account.~~

b. The Scenario Reserve for each Scenario is determined by following steps (i) through (iii) below for each Asset Segment, and then summing the results for all Asset Segments:

- ~~i. The present value of future benefits determined by discounting these future benefits using the path of Discount Rates for each Asset Segment; plus~~
- ~~ii. The present value of future expenses determined by discounting these future expenses using the path of Discount Rates for each Asset Segment; plus~~
- ~~iii. The account values invested in the Separate Account at the valuation date for each Asset Segment; minus~~
- ~~iv. The present value of future gross premium payments and/or other applicable revenue determined by discounting these future premiums and other revenue using the path of Discount Rates for each Asset Segment; minus~~
- ~~v. The present value of future net cash flows to/from the General Account from/to the Separate Account determined by discounting these future net cash flows using the path of Discount Rates for each Asset Segment.~~

a. For each Scenario, the Scenario Reserve is determined by following steps (i) through (v) below:

- i. Calculate the net accumulated asset amount for each Asset Segment at the end of each duration and at the start of the projection, as described in paragraph (b) below. Note that the accumulated asset amount can be either positive or negative.
- ii. Calculate the Accumulated Deficiency at the end of each duration and at the start of the projection for each Asset Segment as the excess of the Working Reserve over the aggregate accumulated asset amount at that duration. Note that the Accumulated Deficiency can be either positive or negative.
- iii. At the end of each duration and at the start of the projection, calculate the discounted value of the Accumulated Deficiency calculated in step (ii). The discounted value shall be calculated using the path of Discount Rates for the Asset Segment from the starting date of the projection to the duration.
- iv. Determine the aggregate discounted value of the Accumulated Deficiency at the end of each duration and at the start of the projection as the sum of the discounted value of Accumulated Deficiency across all Asset Segments.
- v. Determine the Scenario Reserve as the sum of (a) the statement value of the starting assets across all Asset Segments and (b) the maximum of the values calculated in step (iv). Note that the amount in (b) can be either positive or negative.

b. For each Scenario the net accumulated asset amount at each duration is equal to the projected statement value of invested assets. The projected statement value of invested assets at any future duration must reflect the accumulation of cash flows in and out of the portfolio for the items listed in (i) through (vi) as described in section 7.C.2. and 7.C.3. The net accumulated asset amount can be either positive or negative.

- i. Benefits, including but not limited to death and cash surrender benefits.

- ii. Expenses, including but not limited to, commissions, general expenses, and premium taxes, but excluding Federal Income Tax.
- iii. Gross premium payments.
- iv. Other applicable revenue such as fees and revenue on assets invested in sub-accounts, and any Revenue Sharing income.
- v. Net payments to/from the General Account from/to the Separate Account.
- vi. Net Investment Earnings as defined in section 7.F.2.

2.5. Stochastic Modeling Exclusion: It may not be necessary to perform stochastic modeling for groups of policies ~~that where it can be demonstrated that the Stochastic Reserve will not be greater than the Deterministic Reserve. Thus, are not subject to Material Tail Risk. As a result,~~ the actuary may elect to exclude certain groups of policies from the ~~s~~Stochastic ~~Reserve~~ modeling ~~Reserve~~ requirement upon demonstration that the ~~Series~~ ~~Recalculated~~ Deterministic Reserve for those policies (which includes any additional reserve amount that the actuary may decide to add for the purpose of the stochastic modeling exclusion) will adequately provide for all material risks underlying such policies, ~~taking into account the investment strategy supporting the policies and any risk mitigation techniques currently applied, including but not limited to hedge instruments or reinsurance.~~

- a. To exclude a group of policies from the stochastic modeling requirement, the actuary shall, for the group of policies to be excluded:
  - 1) Determine the Recalculated Deterministic Reserve for these policies, which equals the sum of the amounts in a) and b) below:
    - a) the greater of the Aggregate Deterministic Scenario Reserve (see Subsection H(5)(b) below) and the sum of the Per Policy Reserves for these policies.
    - b) An additional reserve amount that the actuary may decide to include for the purpose of the stochastic modeling exclusion.
  - 2) Provide a demonstration that the Recalculated Deterministic Reserve adequately provides for all material risks underlying such policies. An acceptable demonstration should:
    - a) Provide a reasonable assurance that if the Stochastic Reserve was calculated for only those policies subject to the stochastic modeling exclusion, it would not be greater than the Recalculated Deterministic Reserve for such policies;
    - b) Provide sufficient supporting information that an experienced independent actuarial reviewer can assess the reasonableness of the conclusion to exclude the group of policies; and
    - c) Provide an effective evaluation of the residual risk exposure resulting from risk mitigation techniques such as hedge instruments and reinsurance.
- b. The Aggregate Deterministic Scenario Reserve is equal to the greatest present value of Accumulated Deficiencies, where the Accumulated Deficiency for each duration is determined in the aggregate for all policies using the steps outlined in Subsection H(4) above, but using the cash flows for items listed in (i) through (vi) in Subsection H4(b) that are used to calculate the Deterministic Reserve.

## 6.6. The Stochastic Reserve

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

- a. Rank the Scenario Reserves ~~for each Scenario~~ from lowest to highest.
- b. Take the average of highest (100-CTE risk level) % of the Scenario Reserves.
- c. Add to b) above the Recalculated Deterministic Reserve ~~sum of the deterministic reserves~~ for all policies that are subject to the stochastic modeling exclusion.

If the Scenario Reserves are determined on a date that precedes the Valuation Date, then the Scenario Reserves shall be adjusted to the Valuation Date before performing steps a. through c. above.

*[Drafting Note: the CTE risk level shall be determined by the NAIC. If Pre-determined Scenarios Sets are used, the derivation of the Stochastic Reserve will be defined by actuarial guideline, rather than the process defined above.]*

7. Aggregation: Aggregation of policies to reflect offsetting risks is permitted when calculating the Stochastic Reserve. However, since the regulation requires the Stochastic Reserve be compared to a seriatim Deterministic Reserve that uses the Cash Surrender Value as a minimum floor on a policy by policy basis, this comparison imposes a limitation on the magnitude of any risk offsets that may be reflected in the Reported Reserve.

The Stochastic Reserve may be calculated separately for subsets of the policies. If this approach is followed, the comparison of the Deterministic Reserve to the Stochastic Reserve may be made in the aggregate. In this case, the Stochastic Reserve for each subset of policies is determined by following the methodology in Subsection (H) ~~23~~ separately for each subset of policies.

8. Impact of Aggregation: The actuary shall disclose the estimated impact of aggregation, that is, the degree of risk offsets reflected in the Reported Reserve due to aggregating groups of policies when performing the Stochastic Reserve calculation.
- a. The impact of aggregation on the Reported Reserve shall be determined by:
    - i. Subdividing the total block of policies subject to the regulation into subgroups that reflect similar risk characteristics that will likely create risk offsets when aggregated together.
    - ii. Determining the Reported Reserve for each subgroup of policies.
    - iii. Summing the Reported Reserves for each subgroup of policies, and subtracting the actual Reported Reserve for all policies.
  - b. Examples of risk characteristic that the actuary may consider when selecting the number of subgroups include:
    - i. Separate Account vs. General Account policies.
    - ii. Flexible premium vs. fixed premium policies.
    - iii. Policies with cash values vs. policies with little or no cash values,
  - c. The actuary shall disclose in the Actuarial Report the impact of aggregation at least once every three years, and in the current year regardless of the three year requirement if the company has made a material change in its risk profile, such as buying or selling a block of business, or entering into (or canceling) a reinsurance arrangement covering the policies subject to the regulation.
  - d. The actuary can use reasonable approximations when performing this demonstration, but must fully disclose the nature of the approximations used and the rationale for why the approximations are appropriate.
  - e. The actuary can use a date that precedes the Valuation Date ~~valuation date~~ to perform this demonstration, but shall certify that the use of such date will not produce a material change in the results if the results were based on ~~a 12/31 valuation date~~ the Valuation Date.

## I. The Reported Reserve

‡.The Reported Reserve shall equal the greater of:

- a. The Deterministic Reserve, and
- b. The Stochastic Reserve

2-If there is Separate Account business, the Reported Reserve shall be allocated between the General and Separate Accounts as follows:

The amount of reserve held in the General Account shall be the difference, whether positive or negative, between the Reported Reserve and the reserve held in the Separate Account as of the ~~valuation date~~ Valuation Date.

~~b.c.~~ The amount of reserve held in the Separate Account shall be an amount not less than the sum of the account values held in the Separate Account ~~for values of the~~ policies being valued as of the ~~valuation date~~ Valuation Date.

*[Drafting Note: More guidance is needed to establish the Separate Account values as of the ~~valuation date~~ Valuation Date.]*

## J. Treatment of Non-Guaranteed Elements

1. Non-Guaranteed Elements are to be included in the models used to project future cash flows for both the Deterministic Reserve and the Stochastic Reserve. Where Non-Guaranteed Elements are based on some aspect of experience, future changes in the level of Non-Guaranteed Elements can be determined by the model based on the experience assumed in each Scenario. The intent is to project the Non-Guaranteed Elements as the company would actually set them if experience unfolded in a manner consistent with the Scenario under consideration.
2. Any liability for dividends declared but not yet paid that has been established according to statutory accounting procedures as of the ~~valuation date~~ Valuation Date shall be reported separately from the Reported Reserve. Accordingly, where such a separate liability is reported on the statutory balance sheet as of the ~~valuation date~~ Valuation Date, any dividends that are included in the separate liability shall be excluded from the reserve cash flow projection.

*[Drafting Note: An Actuarial Guideline or Actuarial Standard of Practice will provide details regarding the way future non-guaranteed elements may be adjusted in the projection done for valuation purposes.]*

## K. Treatment of Supplemental Benefits

Reserves for supplemental benefits may be calculated separately when calculating the Deterministic Reserve and the Stochastic Reserve.

## L. Allocation of Reported Reserve to Individual Policies

1. When the Reported Reserve is equal to the Deterministic Reserve, the Reported Reserve allocated to each contract shall be the Per Policy Reserve ~~deterministic reserve~~ for each policy as defined in Subsection G (4) (a).
2. When the Reported Reserve is equal to the Stochastic Reserve, the reserve allocated to each policy shall be the Per Policy Reserve ~~deterministic reserve~~ for each policy as defined in Subsection G (4) (a), plus an allocation of the excess of the Reported Reserve over the Deterministic Reserve. Such allocation shall be made in proportion to the Per Policy Reserve ~~deterministic reserve~~ for each policy as defined in Subsection G (4) (a).

*[Drafting Note: It is the intent of this section to allocate the Reported 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.]*

## Section 8. Requirements for Reinsurance

### A. General Considerations

~~4. In applying the requirements of the Section, the actuary shall assume that the counterparty to a reinsurance agreement is knowledgeable about the contingencies involved in the agreement and thus likely to exercise the terms of the agreement to its advantage.~~

~~2.1.~~ The terms “reinsurance” and “reinsurer” in this Section include retrocession and retrocessionaire respectively.

2. The assumptions that are used by a ceding company to determine the Reported Reserve and the Notional Gross Reserve for policies that are ceded to a reinsurer shall be appropriate for the ceding company and need not be the same as the assumptions used by the assuming company to determine the Reported Reserve for these policies. As a consequence, the credit for reinsurance ceded calculated by the ceding company may not necessarily be equal to the Reported Reserve set up by the assuming company.

3. Since any increase or decrease in actual risk should be reflected in principles-based reserves, it is possible for reinsurance to decrease (or increase) the aggregate risk faced by the ceding and assuming company with respect to the reinsured policies, and if so, the sum of the reserves held by the two companies should decrease (or increase). In any case, the sum of the reserves held by the ceding and assuming companies should not be less than the sum of the Deterministic Reserves held by the companies, and this sum will not, in turn, be less than the total cash surrender value for the reinsured policies.

## B. Reinsurance Ceded

1. Cash Flows for Reinsurance ceded. The cash flows used in calculating the Deterministic Reserve and Stochastic Reserves shall include the effect of cash flows received from or paid to reinsurers under the terms of such ceded reinsurance agreements that meet the requirements for accounting as reinsurance of NAIC Life and Health Reinsurance Agreements Model Regulation. - Cash flows received from ~~or and~~ paid to reinsurers under the terms of any reinsurance agreement that does not meet the requirements for accounting as reinsurance of the Model Regulation shall be taken into account by the ceding company only if doing so results in an increase in the Reported Reserve held for such policies.

*[Drafting note: the impact of the reinsurance on the Working Reserve needs to be determined.]*

2. Cash Surrender Value floor. In applying subsection G (4) (a) of section 7 (the Cash Surrender Value floor under the Deterministic Reserve) the ~~C~~ash ~~S~~surrender ~~V~~value shall be taken to be that portion of the ~~C~~ash ~~S~~surrender ~~V~~value of the policy that the company is obligated to pay after taking into account the terms of any reinsurance agreement(s) meeting the requirements for accounting as reinsurance of the NAIC Life and Health Reinsurance Agreements Model Regulation.

~~2.~~ 3.—Assumptions for reinsurance ceded. The assumptions used to project cash flows to ~~or and~~ from reinsurers should be consistent with other assumptions used by the ceding company in calculating the Reported Reserve for the reinsured policies, and should reflect the terms of the reinsurance agreement. Current laws and regulations regarding credit for reinsurance should be assumed to remain in effect for the duration of the projection. The actuary shall include a Margin that has the effect of increasing the Reported Reserve if such Margin is necessary to reflect uncertainty regarding the reinsurance cashflows received from the reinsurer. Such uncertainty is likely to be present if the current terms of the reinsurance agreement are not guaranteed for the entire projection period used in calculating the Reported Reserve.

3. Credit for Reinsurance. While it is recognized that the actuary's primary responsibility is to determine the appropriate liability net of reinsurance, a Notional Gross Reserve shall be calculated using methods and assumptions consistent with those used in calculating the Reported Reserve, but excluding the effect of reinsurance. The credit for reinsurance ceded shall be the excess, if any, of the Notional Gross Reserve over the Reported Reserve, for agreements that meet the requirements for accounting as reinsurance. The assumptions used to calculate the Notional Gross Reserve are to some degree

hypothetical, since this is not the situation that actually occurs. For example, assets backing ceded reserves may be held by the reinsurer, not the ceding company. The ceding company should use assumptions that represent what company experience would be if the reinsurance were not entered into and the business was managed in a manner consistent with the manner the retained business is managed.

*[Drafting Note: Items that should be considered by the actuary in deciding whether to use a margin for adverse deviation for non-guaranteed reinsurance, and how large the margin should be, include any limits placed upon the reinsurer's ability to change the terms of treaty, past practices concerning the changing of terms of reinsurers in general and the assuming reinsurer in particular, the ability of the direct company to modify the terms of its policies in response to changes in terms from its reinsurers, and actions that might be taken by the assuming company if the direct company has financial problems. Current laws and regulations regarding reserve credit restrict the terms of reinsurance agreements for which credit may be taken and prescribe conditions under which reinsurance credit may be taken with respect to unauthorized reinsurers. A review of these laws and regulations in light of principles-based reserving may be appropriate.*

~~*If needed for regulatory reporting or other purposes, a Reported Reserve without reinsurance shall be calculated using methods and assumptions consistent with those used in calculating the Reported Reserve, but excluding the effect of cash flows to and from reinsurers. The credit for reinsurance ceded shall be calculated as the excess, if any, of the Reported Reserve without reinsurance over the Reported Reserve. The assumptions used to calculate the Reported Reserve without reinsurance are to some degree hypothetical, since this is not the situation that actually occurs. For example, assets backing ceded reserves are held by the reinsurer, not the ceding company. The ceding company should use assumptions that represent what company experience would be if the reinsurance were not entered into and the business was managed in a manner consistent with the manner the retained business is managed. The assumptions that are used by a direct-writing company to determine the Reported Reserve and the Reported Reserve without reinsurance for policies that are ceded to a reinsurer shall be appropriate for the direct-writing company and need not be the same as the assumptions used by the assuming company to determine the Reported Reserve for these policies. As a consequence, the credit for reinsurance ceded calculated by the ceding company may not necessarily be equal the Reported Reserve set up by the assuming company. Any increase or decrease in actual risk should be reflected in principles-based reserves. It is possible for reinsurance to decrease (or increase) the aggregate risk faced by the ceding and assuming company with respect to the reinsured policies, and if so, the sum of the reserves held by the two companies should decrease (or increase). In this regard, "mirror reserving" is in conflict with the principles of this Section 8. In any case, the sum of the reserves held by the ceding and assuming companies will not be less than the sum of the Deterministic Reserves held by the companies, and this sum will not, in turn, be less than the total cash surrender value for the reinsured policies.]*~~

### **C.C. Reinsurance Assumed**

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

*[Drafting note: the impact of the reinsurance on the Working Reserve needs to be determined.]*

2. Cash surrender value floor. In applying Subsection G (4) (a) of Section 7 (the Cash Surrender Value floor for the Deterministic Reserve), the Cash Surrender Value for each assumed policy shall be taken to be that portion of the Cash Surrender Value of the policy that the company is obligated to pay after taking into account the terms of any reinsurance agreement(s).
3. Assumptions for reinsurance assumed. The assumptions used to estimate cash flows to or from the ceding company should reflect the reinsurer's (i.e. the assuming company's) experience for the business segment to which the reinsured policies belong, and should reflect the terms of the reinsurance agreement. In particular, if reinsurance premiums or allowances are not guaranteed, the actuary should consider treating them in the same manner as a Non-Guaranteed Element.

~~4. Consideration of ceding company actions. The assumptions that are used by a company that assumes policies under a reinsurance arrangement to determine the Reported Reserve for these policies shall take into account any actions that have been or are, in the actuary's judgment, likely to be taken by the ceding company and that could affect the expected mortality or other experience of the assumed policies.~~

~~[Drafting Note: Examples of actions that could be taken by the ceding company that could affect the expected mortality of the assuming company include internal replacement programs or table-shave programs, both of which could have the effect of increasing expected mortality for the assuming company. These and similar actions could also affect policyholder behavior and possibly expense and investment assumptions.]~~

## Section 9. Reporting of Experience

Unless exempted by the commissioner, every authorized ~~insurer company~~ shall annually file with the commissioner, with the NAIC, or with a Statistical Agent designated by the NAIC and acceptable to the commissioner, statistical reports showing mortality, morbidity, policyholder behavior, and expense experience, and other data necessary to value all the types of life insurance in which it does business, and such other information as the commissioner may deem necessary or expedient for the administration of the provisions of this act. The form of the reports shall be established by the commissioner or the commissioner may require the use of a form established by the NAIC or by a statistical agent designated by the NAIC and acceptable to the commissioner.

Statistical Agent means an entity with proven systems for protecting the confidentiality of individual insured and ~~insurer company~~ information; demonstrated resources for and history of ongoing electronic communications and data transfer ensuring data integrity with ~~insurer companies~~, which are its members or subscribers; and a history of and means for aggregation of data and accurate promulgation of the experience modifications in a timely manner.

~~[Drafting note: While the LRWG supports reporting of experience, the WG believes such a program should be implemented only after the issue of Related issues to be ironed out include the confidentiality of the experience can be addressed and only after an infrastructure can be put in place to properly handle the data that is being submitted. Also, if this requirement is included in the SVL, then this Section can be removed.]~~

## Section 10. Effective Date

A.A. The method defined by this regulation affects all policies issued on or after <<insert date>>.

For reinsured policies, the effective date is the original issue date of the policies reinsured, regardless of the effective date of the reinsurance.

*[Drafting Note: LHATF needs to determine the effective date and transition rules regarding application to this approach. Possible transition rules include limiting the application of this methodology to all inforce policies or policies issued after a certain date and/or, establishing a grade in period from current reserve levels to those under this methodology.]*

B. Transitional rules for reinsurance.

*[Drafting Note: We expect that principles-based reserves will be adopted by all US life companies for products within the scope on a uniform date. If there is uneven adoption of principles-based reserves, then some relaxation of this concept until adoption is complete should be considered by the NAIC, based on administrative considerations. This could be done by establishing special transitional rule for situations where the ceding and assuming companies are subject to different effective dates or different reserve requirements. When principles-based reserving methods are applied to all life products, then this section will no longer be needed.]*