UNAFFILIATED PREFERRED AND COMMON STOCK

LR005

Basis of Factors

Unaffiliated Preferred Stock

Starting with year-end 2004 RBC, the preferred stock factors were changed to be the same as for bonds.

Unaffiliated Common Stock

Non-government money market mutual funds are more like cash than common stock; therefore, it is appropriate to use the same factor as for cash. Federal Home Loan Bank Stock has characteristics more like a fixed-income instrument rather than common stock. A 1.1 percent pre-tax factor was chosen. The factor for other unaffiliated common stock is based on studies conducted at two large life insurance companies. Both of these studies focused on well-diversified portfolios with characteristics similar to the Standard and Poor's 500 and indicate that a 30 percent pre-tax factor is needed to provide capital to cover approximately 95 percent of the greatest losses in common stock value over a two-year future period. This factor assumes capital losses are unrealized and not subject to favorable tax treatment at the time loss in fair value occurs.

Two adjustments are made to the 30 percent pre-tax factor to account for differences between the insurer's portfolio and the Standard and Poor's 500: first, the factor for publicly traded unaffiliated common stock is adjusted up or down by the weighted average beta of the insurer's portfolio subject to a ma2036. andard and Poo1374t

Line (22)
Amounts should reflect only those money market mutual funds reported on Schedule D, Part 2, Section 2. Money market funds qualifying for Schedule DA treatment or reported on Schedule D, Part 1 should not be included on this line. Refer to the *Purposes and Procedures Manual of the NAIC Securities Valuation Office* for a discussion on those money market funds that qualify for Schedule DA treatment.

Line (23)
Federal Home Loan Bank common stock reported on Schedule D, Part 2, Section 2 of the annual statement should be reflected on this line.

Line (25)
The pre-tax factor for other unaffiliated common stock should be equal to 30 percent adjusted in the case of publicly traded stock by the weighted average beta for the insurer's portfolio of common stock, subject to a minimum factor of 22.5 percent and a maximum factor of 45 percent. The calculation of the beta adjustment should follow the procedures laid out for the similar adjustment in the asset valuation reserve calculation. Insurers that choose not to calculate a beta for their portfolio should use the maximum factor of 45 percent.

Line (26)
Column (1) should equal Annual Statement Schedule D Summary by Country, Column 1, Line 24 less Schedule D Summary by Country, Column 1, Line 23.

Lines (27) and (28)
To the extent that a modco or funds withheld transaction is backed by common stock included in Line (26) of the ceding company's RBC calculation, the ceding company's credit and assuming reinsurer's charge should include a beta adjustment that is calculated in a manner consistent with the Line (26) calcu

Indexed Class II Strategies:

A company using a Class II strategy does not follow a traditional general account investment strategy when investing deposits. Under this strategy, the company is buying securities that are either included in the underlying index or are highly correlated with these underlying securities. Alternatively, a mix of strategies that are market neutral in aggregate or that are not normally associated with general account investing could form the core investment strategy. This strategy may be combined with an overlay strategy that transforms the returns to the guaranteed index. The RBC factor derivation is described below. The factor determined in the calculation includes both C-1 and C-3 risk. A spreadsheet at http://www.naic.org/documents/committees_e_capad_lrbc_rbc_june03.xls is available to do the calculation.

Non-Indexed Separate Accounts:

Non-indexed separate accounts with guarantees are subject to the risk of the underlying assets; therefore, 100 percent of the calculated risk-based capital of these accounts is appropriate. Contracts reserved at book value are reported for the RBC calculation exactly as if they were general account funded.

For contracts valued using the fair value of assets and the fair value (at current interest rates) of liabilities, risk-based capital is calculated as the exce

Lines (2) and (3)
The amounts to be reported for non-indexed separate accounts with guarantees [Line (2) and Line (3), Column (2)] must be calculated manually. Risk-based capital for these amounts should be calculated using the life company formula; however, the RBC calculation for non-indexed separate accounts should not include the size factor for bonds, the experience adjustment for mortgages or the concentration factor.

Line (11)
Report the CRVM or CARVM expense allowance transfers where the current surrender charge is based on the fund balance or all other expense allowance transfers. Exclude expense allowance transfers for contracts subject to the LR025 Line (37) market risk requirements.

Line (12)
Report the CRVM or CARVM expense allowance transfers where the current surrender charge is based on fund contributions for each contract for which the fund balance exceeds the sum of the premiums less withdrawals. Exclude expense allowance transfers for contracts subject to the LR025 Line (37) market risk requirements.

Line (14)
The total assets of separate accounts with guarantees and separate accounts without guarantees of the formula should be equal to total separate account assets on Page 2, Line 25, Column 3 of the annual statement.

INTEREST RATE RISK AND MARKET RISK

LR025

Basis of Factors

The interest rate risk is the risk of losses due to changes in interest rate levels. The factors chosen represent the surplus necessary to provide for a lack of synchronization of asset and liability cash flows.

The impact of interest rate changes will be greatest on those products where the guarantees are most in favor of the policyholder and where the policyholder is most likely to be responsive to changes in interest rates. Therefore, risk categories va

All Other Reserves

This captures all reserves not included in Reserves on Certain Annuities ~~and Single Premium Life Insurance~~ that were Cash Flow Tested or products included under the "~~Recommended~~ Approach ~~for Setting~~to Determining ~~Risk-Based Capital~~C3 Requirements for Variable Annuities and Similar Products~~.~~" detailed in Appendix 2 or products included under the "Approach to Determining C3 Requirements for Life Insurance Products" detailed in Appendix 3.

The risk categories are:

(a) Low-Risk Category

The basic risk-based capital developed for annuities and life insurance in the low-risk category was based on an assumed asset/liability duration mismatch of 0.125 (i.e., a well-matched portfolio). This durational gap was combined with a possible 4 percent one-year swing in interest rates (the maximum historical interest rate swing 95 percent of the time) to produce a pre-tax factor of 0.0077. In addition to the 50 percent loading discussed above, the risk-based capital pre-tax factor is 0.0115.

(b) Medium and High-Risk Category

The factors for the medium and high-risk categories were determined by measuring the value of the additional risk from the more discretionary withdrawal provisions based on assumptions of policyholder behavior and 1,000 random interest rate scenarios. Supplementary contracts not involving life contingencies and dividend accumulations are included in the medium-risk category due to the historical tendency of these policyholders to be relatively insensitive to interest rate changes.

Additional Component for Callable/Pre-Payable Assets

Identify the amount of callable/pre-payable assets (including IOs and similar investments) not reported for Reserves on Certain Annuities ~~and Single Premium Life Insurance~~ that were Cash Flow Tested or the Interest Rate Risk Component for products included under the "~~Recommended~~ Approach to ~~for Setting Risk-~~

(a) The remaining company business that was not cash flow tested for asset adequacy (see Appendix 1 for details) excluding products included under the "Recommended Approach for Setting Risk-Based Capital Requirements for Variable Annuities and Similar Products" and
(b) Business in companies that did not cash flow test for asset adequacy.

The calculation for risk-based capital should not include unitized separate accounts without guarantees even though they may be included in Item 32 of the Notes to Financial Statements. Separate accounts with guarantees should be included, except for those separate accounts that guarantee an index and follow a Class IId

If Line (33) is equal to zero, then Line (34) should equal Line (32). Otherwise, Line (34) should equal Line (32) plus Line (33) less Line (16) less Line (17) subject to a minimum of 0.5 times Line (32).

Line (35)

Line (35) is the sum of the interest rate risk component for Variable Annuities and Similar Products~~,~~ and the interest rate risk component for Life Insurance Products.

Specifications for the calculation of the interest rate risk component for Variable Annuities and Similar Products are given in Appendix 2.

Specifications for the calculation of the interest rate risk component for Life Insurance Products are given in Appendix 3

Life Insurance Products

The amount reported on Line (35) relating to Life Insurance Products is calculated using a four step process:

Line (36)
Total interest rate risk. Equals Line (34) plus Line (35).

Line (37)

Line (37) is the sum of the market risk component for Variable Annuities and Similar Products~~,~~ and.the market risk component for Life Insurance Products.

Specifications for the calculation of the market risk component for Variable Annuities and Similar Products are given in Appendix 2.

Specifications for the calculation of the market risk component for Life Insurance Products are given in Appendix 3.

Life Insurance Products

The amount reported on Line (37) relating to Life Insurance Products is calculated using a two step process:

(1) The first step is to determine the market risk component relating to Life Insurance Products (ssl66(8p.245.5((s))-1.6(l66et)3.l66(8p.2r.24jl9jei22) The ff6d628.97

~~Calculation of the Total Asset Requirement~~

The method of calculating the Total Asset Requirement is explained in detail in the AAA's June

~~Tax Adjustment: Under the U.S. IRC the tax reserve is defined. It can never exceed the statutory reserve nor be less than the cash surrender value. If tax reserves assumed in the projection are set equal to Working Reserves and if tax reserves actually exceed Working Reserves at the beginning of the projection, a tax adjustment is required.~~

~~A tax adjustment is not required in the following situations:~~

- ~~Tax reserves are projected directly; that is, it is not assumed that projected tax reserves are equal to Working Reserves, whether these are cash values or other approximations.~~
- ~~Tax reserves at the beginning of the projection period are equal to Working Reserves.~~
- Tax reserves at the beginning of the projection period

~~3.For contracts under the scope of the Report other than contracts for which paragraphs 1 and 2 apply, the Standard Scenario Amount is determined by use of The Standard Scenario Method described in Section III. The Standard Scenario Method requires a single projection of account values based on specified returns on the assets supporting the account values. On the valuation date an initial drop is applied to the account values based on the supporting assets. Subsequently, account values are projected at the rate earned on supporting assets less a margin. Additionally, the projection inc~~

Table A

Standard Scenario Amounts	Guideline Variations	Validation Measures	
		Model Office Projection	Projection of Prior Inforce
A.Aggregate valuation on the statement date on inforce contracts required in I(A)(3)	None	None	None
B.Seriatim valuation on the statement date on inforce contracts	None: Compare to A	None	None
C.Aggregate valuation on the statement date on the model office	If not material to model office validation	A/C compare to 1.00	None
D.Aggregate valuation on a prior inforce date on prior inforce contracts	If not material to projection validation	None	A/D - S/PS Compare to 0
E.Aggregate valuation on a prior inforce date of a model office	If not material to model office or projection validation.	(A/E - S/PM) compare to 0	

Modification of the requirements in Section III when applied to a prior inforce or a model office is permitted if such modification facilitates validating the projection of inforce or the model office. All such modifications should be documented. No modification is allowed for row B as of the statement date unless the Domiciliary Commissioner approved such modification as necessary to produce a reasonable result under the corresponding amount in row A.

II)Basic Adjusted Reserve

For purposes of determining the Standard Scenario Amount for Risk-Based Capital, the Basic Adjusted Reserve for a contract shall be the Working Reserve, as described in the Report, as of the valuation date.

III)Standard Scenario Amount - Application of the Standard Scenario Method

A)General

Where not inconsistent with the guidance given here, the process and methods used to determine results under the Standard Scenario Method shall be the same as required in the calculation under the modeling methodology required by the Report. Any additional assumptions needed to apply the Standard Scenario Method to the inforce shall be explicitly documented.

B)Results for the Standard Scenario Method.

The Standard Scenario Amount is equal to (1) + (2) – (3) where:

1)Is the sum of the Basic Adjusted Reserve as described in Section II for all contracts for which the Standard Scenario Amount is being determined,

2)Is zero or if greater the aggregate greatest present value for all contracts measured as of the end of each projection year of the negative of the Accumulated Net Revenue described below using the assumptions described in Subsection III(D) and a discount rate equal to the Accumulation Rate, AR. The Accumulated Net Revenue at the end of a projection year equals (i) + (ii) – (iii) where:

(i)Is the Accumulated Net Revenue at the end of the prior projection year accumulated at the rate AR to the end of the current projection year. The Accumulated Net Revenue at the beginning of the projection (i.e., time 0) is zero.

(ii)Are the margins generated during the projection year on account values as defined in paragraph III(D)(1) multiplied by one minus the tax rate and accumulated at rate AR to the end of current projection year, and

(iii)Are the contract benefits paid in excess of account value applied plus the Individual reinsurance premiums (ceded less assumed) less the Individual reinsurance benefits (ceded less assumed) payable or receivable during the projection year multiplied by one minus the tax rate and accumulated at rate AR to the end of current projection year. Individual reinsurance is defined in paragraph III(D)(2).

3) Is the value of approved hedges and Aggregate reinsurance as described in paragraph III(E)(2). Aggregate reinsurance is defined in paragraph III(D)(2).

C)The actuary shall determine the projected reinsurance premiums and benefits reflecting all treaty limitations and assuming any options in the treaty to the other party are exercised to decrease the value of reinsurance to the reporting company (e.g., options to increase premiums or terminate coverage). The positive value of any reinsurance treaty that is not guaranteed to the insurer or its successor shall be excluded from the value of reinsurance. The commissioner may require the exclusion of any portion of the value of reinsurance if the terms of the reinsurance treaties are too restrictive (e.g., time or amount limits on benefits correlate to the Standard Scenario Method).

D)Assumptions for Paragraph III (B) (2) Margins and Account Values.

1)Margins on Account Values. The bases for return assumptions on assets supporting account values are shown in Table I. The Initial returns shall be applied to the account values assigned to each asset class on the valuation date as immediate drops, resulting in the Account Values at time 0. The "Year 1" and "Year 2+" retu

~~The margins on Account Values are defined as follows:~~

~~a)During the Surrender Charge Period:~~

~~i.0.10% of Account Value; plus~~

~~ii.~~

3)Lapses, Partial Withdrawals, and Moneyness. Partial withdrawals elected as guaranteed living benefits or required contractually (e.g., a contract operating under an automatic withdrawal provision on the valuation date) are to be included in subparagraph III(B)(2)(iii). No other partial withdrawals, including free partial withdrawals, are to be included. All lapse rates shall be applied as full contract surrenders.

A contract is in the money (ITM) if it includes a guaranteed living benefit and at any time the portion of the future projected account value under the Standard Scenario Method required to obtain the benefit would be less than the value of the guaranteed benefit at the time of exercise or payment. If the projected account value is 90 percent of the value of the guaranteed benefit at the time of exercise or payment, the contract is said to be 10 percent in the money. If the income from applying the projected account value to guaranteed purchase rates exceeds the income from applying the projected benefit base to GMIB purchase rates for the same type of annuity, then there is no GMIB cost and the GMIB is not in the money. A contract not in the money is out of the money (OTM). If a contract has multiple living benefit guarantees then the contract is ITM to the extent that any of the living benefit guarantees are ITM. Lapses shall be at the annual effective rates given in Table II.

Table II—Lapse Assumptions

During Surrender

6) Projection Frequency. The projection used to determine the greatest present value amount required under paragraph III(B)(2) shall be calculated using an annual or more frequent time step, such as quarterly. For time steps more frequent than annual, assets supporting Account Values at the start of each projection year may be retained in such funds until year-end (i.e., pre-tax margin earned during the year will earn the fund rates instead of the Discount Rate until year-end) or removed after each time step. However, the same approach shall be applied for all years. Subsequent to each projection year end, Accumulated Net Revenues for the year shall earn the Accumulation Rate. Similarly, projected benefits, lapses, elections and other contract activity can be assumed to occur annually or at the end of each time step, but the approach shall be consistent for all years.

7) Surrender Charge Period. If the surrender charge for the contract is determined based on individual contributions or deposits to the contracts, the surrender charge amortization period may be estimated for projection purposes. Such estimated period shall not be less than the remaining duration based on the normal amortization pattern for the remaining total contract charge assuming it resulted from a single deposit, plus one year.

8) Contract

E)Assumptions for use in paragraph III (B) (3).

1)The Value of Aggregate Reinsurance. The value of Aggregate reinsurance is the discounted value, at rate AR of the excess of: a) the benefit payments from the reinsurance, over b) the reinsurance premiums, where (a) and (b) are determined under the assumptions described in Subsection III(D).

2)The Value of Approved Hedges. The value of approved hedges shall be calculated separately from the calculation in paragraph III(B)(2). The value of approved hedges is the difference between: a) the discounted value at rate AR of the after-tax cash flows from the approved hedges; less b) their statement values on the valuation date.

To be an approved hedge, a derivative or other investment has to be an actual asset held on the valuation date, be designated as a hedge for one or more contracts subject to the Standard Scenario, and be part of a clearly defined hedging strategy as described in the Report. If the approved hedge also supports contracts not subject to the Standard Scenario, then only that portion of the hedge designated for contracts subject to the Standard Scenario shall be included in the value of approved hedges. Approved hedges must be held in accordance with an investment policy that has been implemented for at least six months and has been approved by the Board of Directors or a subcommittee of Board members. A copy of the investment policy and the resolution approving the policy shall be maintained with the documentation of the Standard Scenario and available on request. Approved hedges must be held in accordance with a written investment strategy developed by management to implement the Board's investment policy. A copy of the investment strategy on the valuation date, the most recent investment strategy presented to the Board if different and the most recent written report on the effectiveness of the strategy shall be maintained with the documentation of the Standard Scenario and available on request.

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

The item being hedged, the contract guarantees, and the approved hedges are assumed to be accounted for at the average present value of the tail scenarios. The value of approved hedges for the standard scenario is the difference between an estimate of this "tail value" and the "fair value" of approved hedges. For this valuation to be consistent with the statement value of approved hedges, the statement value of approved hedges will need to be held at fair value with the immediate recognition of gains and losses. Accordingly, it is assumed that approved hedges are not

a)For runs A and B as defined in I(C) by contract and in aggregate the amounts determined in III(B)(1) and III(B)(2).

b)For run A the aggregate amounts determined in III(E)(1) and III(E)(2).

Smoothing and Transition Rules

If a company is following a Clearly Defined Hedging Strategy (See "Recommended Approach for Setting Risk Based Capital Requirements for Variable Annuities and Similar Products Presented by the American Academy of Actuaries' Life Capital Adequacy Subcommittee to the National Association of Insurance Commissioner's Capital Adequacy Task Force (June 2005)" for the definition of this phrase) on some or all of its business, a decision should be made whether or not to smooth the TAR. In all cases where 'cash value' is to be used, the values used must be computed on a consistent basis for each block of business at successive year-ends. For deferred annuities with a cash value option, direct writers will use the cash value. For deferred annuities with no cash value option, or for reinsurance assumed through a treaty other than coinsurance, use the policyholder account value of the underlying contract. For payout annuities, or other annuities with no account value or cash value, use the amount as defined for variable payout annuities in the definition of Working Reserve. For any business reinsured under a coinsurance agreement that complies with all applicable reinsurance reserve credit "transfer of risk" requirements, the ceding company shall reduce the value in proportion to the business ceded while the assuming company shall use an amount consistent with the business assumed.

A company who reported an amount in Line (37) last year may choose to smooth the Total Asset Requirement. A company is required to get approval from its domestic regulator prior to changing its decision about smoothing from the prior year. To implement smoothing, use the following steps. If a company does not qualify to smooth or a decision has been made not to smooth, go to the step "Reduction for reported Statutory Reserves."

Instructions – 2007 and Later

1.

Exhibit 5, Column 2, Line 0199999
– Page 2, Column 3, Line 6
+ Exhibit 5, Column 2, Line 0299999
+ Exhibit 5, Column 2, Line 0399999
+ Exhibit 7, Column 1, Line 14
+ Separate Accounts Page 3, Column 3, Line 1 plus Line 2 after deducting (a) funds in unitized separate accounts with no underlying guaranteed minimum return and no unreinsured guaranteed living benefits; (b) non-indexed separate accounts that are not cash flow tested with guarantees less than 4 percent; (c) non-cash-flow-tested experience rated pension reserves/liabilities; and (d) guaranteed indexed separate accounts using a Class II investment strategy.
– Non policyholder reserves reported on Exhibit 7
+ Exhibit 5, Column 2, Line 0799997
+ Schedule S, Part 1, Section 1, Column 11
– Schedule S, Part 3, Section 1, Column 13

Appendix 1 – Cash Flow Testing for C-3 RBC

This appendix is applicable for all companies who do Cash Flow Testing for C-3 RBC.

The method of developing the C-3 component is building on the work of the asset adequacy modeling, but using interest scenarios designed to help approximate the 95th percentile C-3 risk.

The C-3 component is to be calculated as the sum of four amounts, but subject to a minimum. The calculation is:

(a) For Certain Annuities or Single Premium Life Insurance products other than equity-indexed products, whether written directly or assumed through reinsurance, that the company tests for asset adequacy analysis using cash flow testing, an actuary should calculate the C-3 requirement based on the same cash flow models and assumptions used and same "as-of" date as for asset adequacy, but with a different set of interest scenarios and a different measurement of results. A weighted average of a subset of the scenario-specific results is used to determine the C-3 requirement. The result is to be divided by 0.65 to put it on a pre-tax basis for LR025 Interest Rate Risk and Market Risk Column (2) Line (33).

- In order to allow time for the additional work effort, an estimated value is permitted for the year-end annual statement. For the RBC electronic filing, the actual results of the cash flow testing for C-3 RBC will be required. If the actual RBC value exceeds that estimated earlier in the blanks filing by more than 5 percent, or if the actual value triggers regulatory action, a revised filing with the NAIC and the state of domicile is required by June 15; otherwise, re-filing is permitted but not required.

- The risk-based capital submission is to be accompanied by a statement from the appointed actuary certifying that in his or her opinion the assumptions used for these calculations are not unreasonable for the products, scenarios and purpose being tested. This C-3 Assumption Statement is required from the appointed actuary even if the cash flow testing for C-3 RBC is done by a different actuary.

- The cash flow testing used for this purpose will use assumptions as to cash flows, assets associated with tested liabilities, future investment strategy, rate spreads, “as-of” date and how negative cash flow is reflected consistent d con7(t)3.7(-1.6)3.8(3.7(at)35629tte)]TJ15.7725 042-.0002stvc.1151 Tw[(fl-3.1(setl-3.1d6(earlier636(in)]TJ13.2575 036D.0016 i)acy.8(

Appendix 1a – Cash Flow Testing for C-3 RBC Methodology

General Approach

1. The underlying asset and liability model(s) are those used for year-end Asset Adequacy Analysis cash flow testing, or a consistent model.

2. Run the scenarios (12 or 50) produced from the interest-rate scenario generator.

3. The statutory capital and surplus position, S(t), should be captured for every scenario for each calendar year-end of the testing horizon. The capital and surplus position is equal to statutory assets less statutory liabilities for the portfolio.

4.

Single Scenario C-3 Measurement Considerations

1. GENERAL METHOD - This approach incorporates interim values, consistent with the approach used for bond, mortgage and mortality RBC factor quantification. The approach establishes the risk measure in terms of an absolute level of risk (e.g., solvency) rather than volatility around an expected level of risk. It also recognizes reserve conservatism, to the degree that such conservatism hasn't been used elsewhere.

2. INITIAL ASSETS = RESERVES - Consistent with appointed actuary practice, the cash flow models are run with initial assets equal to reserves; that is, no surplus assets are used.

3. AVR - Existing AVR-related assets should not be included in the initial assets used

Appendix 1b - Frequently Asked Questions for Cash Flow Testing for C-3 RBC

1. Where can the scenario generator be found? What is needed to run it?

   The scenario generator is a Microsoft Excel spreadsheet. By entering the Treasury yield curve at the date for which the testing is done, it will generate the sets of 50 or 12 scenarios. It requires Windows 95 or higher. This spreadsheet and instructions are available on the NAIC Web site at (http://www.naic.org/committees_e_capad_lrbc.htm). It is also available on diskette from the American Academy of Actuaries.

2. The results may include sensitive information in some instances. How can it be kept confidential?

   As provided for in Section 8 of the Risk-Based Capital (RBC) For Insurers Model Act, all information in support of and provided in the RBC reports (to the extent the information therein is not required to be set forth in a public

Appendix 2

D

Section 2. Definition of General Methodology

All covered products that contain any living benefit guarantees, whether written directly or assumed through reinsurance, must utilize scenario testing to establish capital requirements. Variable annuities with no such guarantees may use scenario testing or the "Alternative Method" described below. Other covered products must utilize scenario testing, unless sufficient modeling is done to allow adjustment of the Alternative Method factors.

The methodology involves running a cash flow testing model over a number of scenarios, calculating a value for each and basing the total asset requirement (including reserves) on the distribution of those results. The RBC requirement is the difference between the total asset requirement and the reserve with an adjustment for differences between tax reserves and statutory reserves.

Projections using stochastic market scenarios are run for the book of business (in aggregate) for all contracts falling under the scope of this requirement, reflecting product features, anticipated cash flows, the parameters associated with the funds being used, expenses, fees, Federal Income Tax, hedging, and reinsurance. Cash flows from any fixed account options should also be included.

For each scenario, the C-3 asset increase needed is the smallest of the series of present values S(t)*pv(t), where S(t) is statutory assets less liabilities for the products in question at the end of year t, and pv(t) is the accumulated discount factor for t years using the after-tax swap rates (or post-tax one year Treasury rates for that scenario, if applicable). For this purpose, t should range from 0 (i.e. the valuation date) to a point such that the effect of further extension is not material.

1. Scenarios

Scenarios will consist of a sufficient number of equity scenarios, adequate for the purpose, created by the company. The equity scenarios will need to meet the calibration methodology and requirements outlined in Section 3. Guaranteed Fund results need to reflect the risk of interest rate shocks and several alternatives for doing so are available (see Section 9). If stochastic interest rate scenarios are not part of the model being used, the GMIB results need to reflect the impact of the uncertainty in interest margins (see Section 7).

2. Asset/Liability Model

Asset/Liability models are to be run that reflect the dynamics of the expected cash flows for the entire contract, given the guarantees provided under the contract. Federal Income Tax, insurance company expenses (including overhead and investment expense), fund expenses, contractual fees and charges, revenue sharing income received by the company (net of applicable expenses), and cash flows associated with any reinsurance or hedging instruments are to be reflected on a basis consistent with the requirements herein. Cash flows from any fixed account options should also be included. Any market value adjustment assessed on projected withdrawals or surrenders shall also be included (whether or not the Cash Surrender Value reflects market value adjustments).

For large blocks of business, the actuary may employ grouping methods to in-force seriatim data in order to improve model run times. Care needs to be exercised when aggregating data for RBC purposes. Grouping methods must retain the characteristics needed to model all material risks and options embedded in the liabilities. RBC needs to cover "tail scenarios" and these are impacted by low probability, high impact scenarios. This may require more granularity (i.e., model points) in the grouping of data than what is needed for other purposes. Testing indicates that, typically, if each "cell" is assumed to have parameters equal to its mean or midpoint, the capital requirements are understated. This implies the need for either fine subdivision of the book of business, use of a value other than the mean, or an appropriate error adjustment.

Actuaries may want to consider the following when grouping data;

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Suppose the number of scenarios used for simulation is *N*. Hence, the CTE estimator at the α-confidence level is the average of the $k = N \times (1 - \alpha)$ order statistics (i.e., sample results ordered from highest to lowest). The standard error of the estimator is a function of α, CTE(α) and the (*k*

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Adjustment for Credibility to Determine for Prudent Best Estimate Mortality

A. Adjustment for Credibility. Expected mortality curves determined according to Section II above shall be adjusted based on the credibility of the experience used to determine the curves in order to arrive at Prudent Best Estimate mortality. The adjustment for credibility shall result in blending the expected mortality curves with a mortality table consistent with a statutory valuation mortality table. For a plus segment, the table shall be consistent with 100% of the 1994 Variable Annuity MGDB table (or a more recent mortality table adopted by the NAIC to replace this table). For a minus segment, the table shall be consistent with 100% of the 2000 Annuity table (or a more recent mortality table adopted by the NAIC to replace that table). The approach used to adjust the curves shall suitably account for credibility[29].

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Appendix 2
Approach to Determining C3 Requirements for Variable Annuities and Similar Products

Section 7. GMIB Purchase Rate Margins

The GMIB purchase rate margin is the difference between the cost to purchase an annuity using the guaranteed purchase basis and the cost using the interest rates prevailing at the time of annuitization. The modeling for this benefit can either use a point estimate for this margin or model the margin directly using a stochastic model of interest rates. If a point estimate is being used, following is guidance on how to apply this method to estimate this margin. If a stochastic model of interest rates is used instead of a point estimate then no such adjustment is needed.

If a point estimate is being used, it is important that the margin assumed reflects:

a) Current market expectations about future interest rates at the time of annuitization, as described more fully below.

b) A downward adjustment to the interest rate assumed in the purchase rate basis since a greater proportion of contract-holders will select an annuitization benefit when it is worth more than the cash surrender value then when it is not. As a practical matter, this effect can be approximated by using an interest rate assumption in the purchase rate basis that is 0.30 percent below that implied m6w. Tw[((s)-2.7 T928)

Section 9. Methods of Calculating Capital Requirements for Interest Rate Risk on the Guaranteed Fund of Variable Annuities

The objective is to assign a value for the risk of unexpected interest rate shocks comparable to that assigned to fixed dollar interest sensitive products. This risk may result from either a traditional duration mismatch or from optionality in either the product or the supporting assets.

Ideally, a fully integrated model of equity returns and interest rates, with rate volatility and expectations and frequency and duration of yield curve inversions consistent with the "Phase I" requirements, would be run to develop an estimate of the (combined) market risks. (Documentation of the Phase I model can be found on the AAA web site at www.actuary.org/pdf/life/lrbc_october.pdf.) The US Treasury Fund scenarios within the 10,000 prepackaged scenarios qualify as meeting this standard. Although an integrated modeling approach is desirable a number of simpler approaches are acceptable.

For companies that are modeling their equity risks (i.e., not using the Alternative Method), these meu9-u to5(i)3®"2(e)6(Aq(lly

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Appendix 2
Approach to Determining C3 Requirements for Variable Annuities and Similar Products

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All else being equal, the margin offset α has a profound effect on the resulting AAR. In comparing the Alternative Method against models for a variety of GMDB portfolios, it became clear that some adjustment factor would be required to "scale" the results to account for the diversification effects[34] of attained age, policy duration and AV/GV ratio. The testing examined

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Table 9-6: Sample Nodes on the Factor Grid

KEY	GMDB TYPE	GV ADJUST	FUND CLASS	AGE	POLICY DUR	AV/GV	MER (bps)	OFFSET	COST FACTOR	MARGIN FACTOR
10132031	ROP	$-for-$	Balanced Allocation	55	0.5	1.00	250	100	0.01073	0.04172
10133031	ROP	$-for-$	Balanced Allocation	60	0.5	1.00	250	100	0.01619	0.03940
10134031	ROP	$-for-$	Balanced Allocation	65	0.5	1.00	250	100	0.02286	0.03634
12044121	5% Rollup	Pro-rata	Diverse Equity	65	3.5	0.75	250	100	0.18484	0.04319
12044131	5% Rollup	Pro-rata	Diverse Equity	65	3.5	1.00	250	100	0.12931	0.03944
12044141	5% Rollup	Pro-rata	Diverse Equity	65	3.5	1.25	250	100	0.08757	0.03707
12044121	5% Rollup	Pro-rata	Diverse Equity	65	3.5	0.75	250	50	0.18484	0.02160

Interpolation in the Factor Tables

Interpolation is only permitted across the last four (4) dimensions of the risk parameter set $\tilde{\theta}$: Attained Age (*X*), Policy Duration (*D*), AV÷GV Ratio (ϕ) and MER. The "MER Delta" is calculated based on the difference between the actual MER and that assumed in the factor testing (see Table 10-10), subject to a cap (floor) of 100 bps (–100 bps). In general, the calculation for a single policy will require *three* applications of multi-dimensional linear interpolation between the $16 = 2^4$ factors/values in the grid:

(1) To obtain the *Base Factors* $f\left(\tilde{\theta}\right)$ and $g\left(\tilde{\theta}\right)$.

(2) To obtain the *Scaling Factor* $h\left(\hat{\theta}\right) = R.$.

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Table 9-7: Base Factors for a 5% Rollup GMDB Policy, Diversified Equity

Key	Age	Policy Dur	Policy Av/Gv	Mer (Bps)	Base Cost Factor	Base Margin Factor
INTERPOLATED	62	4.25	0.80	265	0.15010	0.04491
12043121	60	3.5	0.75	250	0.14634	0.04815
12043122	60	3.5	0.75	350	0.15914	0.04511
12043131	60	3.5	1.00	250	0.10263	0.04365
12043132	60	3.5	1.00	350	0.11859	0.04139
12043221	60	6.5	0.75	250	0.12946	0.04807
12043222	60	6.5	0.75	350	0.14206	0.04511
12043231	60	6.5	1.00	250	0.08825	0.04349
12043232	60	6.5	1.00	350	0.10331	0.04129
12044121	65	3.5	0.75	250	0.18484	0.04319
12044122	65	3.5	0.75	350	0.19940	0.04074
12044131	65	3.5	1.00	250	0.12931	0.03944
12044132	65	3.5	1.00	350	0.14747	0.03757
12044221	65	6.5	0.75	250	0.16829	0.04313
12044222	65	6.5	0.75	350	0.18263	0.04072
12044231	65	6.5	1.00	250	0.11509	0.03934
12044232	65	6.5	1.00	350	0.13245	0.03751

3. Extract the corresponding factors from the published grid. For each cell, calibrate to the published tables by defining a "model adjustment factor" (denoted by asterisk) separately for the "cost" and "margin offset" components:

$$F_J^* = \frac{f\left(\tilde{\theta}\right)}{F_J} \text{ and } G_J^* = \frac{\hat{g}\left(\tilde{\theta}\right)}{G_J}$$

4. Execute "product specific" cashflow projections using the documented assumptions and pre-packaged scenarios for the same set of representative cells. Here, the company should model the actual product design. Rank (order) the sample distribution of results for the present value of net cost. Determine those scenarios which comprise CTE(90).

5. Using the results from step 4., average the present value of cost for the CTE(90) scenarios and divide by the current guaranteed value. For a the J^{th} cell, denote this value by $\overline{F}_J$. Similarly, average the present value of margin offset revenue for the same subset of scenarios and divide by account value. For a the J^{th} cell, denote this value by $\overline{G}_J$.

6. To calculate the AAR for the specific product in question, the company should implement the Alternative Method as documented, but use $\overline{F}_J \times F_J^*$ in place of $f\left(\tilde{\theta}\right)$ and $\overline{G}_J \times G_J^*$ instead of $\hat{g}\left(\tilde{\theta}\right)$. The company must use the "Scaling Factors" for the product evaluated in step 1. (i.e., the

Assumptions for the Alternative Method Published GMDB Factors

This subsection reviews the model assumptions used to develop the Alternative Method factors. Each node in the factor grid is effectively the modeled result for a given "cell".

Table 9-9: Model Assumptions & Product Characteristics

Section 10. Supplied Functions for the Alternative Method

Special functions have been supplied in the file GMDBFactorCalc.dll (C++ dynamic linked library) to retrieve the "cost", "margin offset" and "scaling" factors from the factor file *and* perform the multi-dimensional linear interpolation based on the input parameters. Cover functions in the Microsoft® Visual Basic "Add-In" are provided in the file GMDBFactorCalc(2004-05-19).xla so that the C++ routines are callable from Microsoft Excel. The VBA[37] and C++ functions are identically named and are described in Table 11-1. Installation instructions are given later in this section. A call to an Excel function (built-in or VBA) must be preceded by a "+" or "=" character (e.g., =GetCostFactor(...)).

Using the notation given earlier, $GC = GV \times f\left(\tilde{\theta}\right) - AV \times \hat{g}\left(\tilde{\theta}\right) \times h\left(\hat{\theta}\right)$.

GetCostFactor(ProductCode, GVAdjust, FundCode, AttAge, PolicyDur, PolicyMVGV, MER)

- Returns the "*Cost Factor*" $f\left(\tilde{\theta}\right)$, interpolating between nodes where necessary.

GetMarginFactor(ProductCode, GVAdjust, FundCode, AttAge, PolicyDur, PolicyMVGV, MER, RC)

- Returns the "*Margin Offset Factor*" $\hat{g}\left(\tilde{\theta}\right)$, interpolating between nodes where necessary and scaling for the actual margin offset ("RC").

GetScalingFactor(ProductCode, GVAdjust, FundCode, AttAge, PolicyDur, AdjProductMVGV, MER, RC)

- Returns the "*Scaling Factor*" $h\left(\hat{\theta}\right) = R$, interpolating between nodes where necessary.

[37] Visual Basic for Applications.

Table 10-1: Input Parameters (Arguments) to Supplied Lookup Functions

Input Parameter	Variable Type	Description
ProductCode	Long Integer	Product Definition code as per lookup key in Table 8-4 of Appendix

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B) Results for the Standard Scenario Method.

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last reported index before the valuation date, the initial drop in equity returns and the subsequent equity returns in the standard scenario projection up to the time the index is used. The sources of information and how the information is used to determine indexes shall be documented and, to the extent possible, consistent from year to year.

11) Taxes. All taxes shall be based on a tax rate of 35 percent.

E) Assumptions for use in paragraph III (B) (3).

1) The Value of Aggregate Reinsurance. The value of Aggregate reinsurance is the discounted value, at rate AR of the excess of: a) the benefit payments from the reinsurance, over b) the reinsurance premiums, where (a) and (b) are determined under the assumptions described in

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Section 12. Certification and Documentation Requirements

1) Actuarial Memorandum

An actuarial memorandum should be constructed documenting the methodology and assumptions upon which the required capital is determined. The memorandum should also include sensitivity tests that the actuary feels appropriate, given the composition of their block of business (i.e., identifying the key assumptions that, if changed, produce the largest changes in the RBC amount.). This memorandum will be confidential and available to regulators upon request.

(k) Investment / Fund Choice
(l) Revenue Sharing
(m) Asset Allocation, Rebalancing and Transfer Assumptions
(i) Dollar Cost Averaging
(n) Federal Income Tax

iii) Scenarios
(1)

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Appendix 3
Approach to Determining C3 Requirements for Life Insurance Products

Introduction

This Appendix details a principle-based approach (PBA) to the determination of the C3 component of Risk-Based Capital for all life insurance products.

A principle-based approach is one that:

1. Captures the benefits and guarantees associated with the contracts and their identifiable, quantifiable and material risks, including the risks represented in the tails of the distribution and the funding of the risks.
2. Utilizes risk analysis and risk management techniques to quantify the risks and is guided by the evolving practice and expanding knowledge in the measurement and management of risk. This may include, to the extent required by an appropriate assessment of the underlying risks, stochastic models or other means of analysis that properly reflect the risks of the underlying contracts.
3. Incorporates assumptions, risk analysis methods, and models and management techniques that are consistent with those utilized within the company's overall risk assessment process. Risk and risk factors explicitly or implicitly included in the company's risk assessment and evaluation processes will be included in the risk analysis and cash flow models used in the PBA. Examples of company risk assessment processes include economic valuations, internal capital allocation models, experience analysis, asset adequacy testing, GAAP valuation and pricing.
4. Should use 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. Incorporates assumptions that reflect an appropriate level of conservatism when viewed in the aggregate and that, together with the methods utilized, recognizes the solvency objective of statutory reporting.
6. Reflects risks and risk factors in the calculation of the PBA minimum statutory reserves and statutory Risk-Based Capital that may be different from one another and may change over time as products and risk measurement techniques evolve, both in a general sense and within the company's risk management processes.

These statements should be applied in a manner consistent with statutory requirements and company risk measurement practices then in effect.

The method defined in this Appendix applies to all life insurance policies including supplemental benefits, and riders on those policies, whether directly written or assumed through reinsurance.

The C3 RBC amount to be calculated is based on a prospective valuation method that appropriately captures all material C3 risks underlying the product being valued, the revenue to fund those risks, and the effect of any risk mitigation techniques.

While the method contemplates a stochastic approach to the determination of appropriate values, a deterministic approach may be sufficient for certain products, depending on the nature of the risks. A stochastic approach may be necessary for other products.

The only assumptions for which stochastic processes were

Assumptions should be updated as experience data emerges and expectations of future experience and economic conditions change. In other words, assumptions are not locked in at issue.

Finally, it is recognized that 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

This C3 RBC amount relates to interest rate risk and market risk. That portion which is attributable to interest rate risk is to be combined with the current C3a component of the formula. That portion which is attributable to market risk is to be allocated and combined with the current C3c component of the formula.

Appendix 3
Approach to Determining C3 Requirements for Life Insurance Products

Section 1. Definitions

The following terms shall have the indicated meanings for purposes of this Appendix:

A. Accumulated Deficiency. The projected working reserve, if any, less the annual statement value of projected assets and measured as of the projection start date and as of the end of each projection year.

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

C. Alternative Amount. Provides for all material C3 risks of a group of policies, including

L. Derivative Program. A program to buy or sell one or more Derivative Instruments or open or close hedging positions to achieve a specific objective. Both hedging and non-hedging programs (e.g., for replication or income generation objectives) are included in this definition.

M. Discount Rates. The path of rates used to derive the present value.

N. Duration. The period of time elapsed from the Projection Start Date to a future d5.4(tu1(Ap)8 1 T-5.41ttates.)]7a

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DD. Prudent Estimate Assumption. A deterministic assumption, used to represent a Risk Factor, developed by applying a Margin to the Anticipated Experience Assumption for that Risk Factor.

EE. Qualified Actuary. An actuary who meets the qualifications as defined in Section 7 (Certification and Documentation Requirements) to certify that the amounts for the policies subject to this report have been calculated following all applicable laws, regulations, actuarial guidelines (AGs) and Actuarial Standards of Practice. The Qualified Actuary shall be referred to throughout this report as "the actuary".

FF. Risk Factor. An aspect of future experience that is not fully predictable on the Valuation Date.

GG. Reported Amount. The minimum amount as of the Valuation Date for the policies falling within the scope of this report using a principle-based approach. The Reported Amount equals the Total Asset Requirement less the statutory value on the valuation date of the liabilities included in the determination of the Total Asset Requirement.

HH. Revenue Sharing. 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 report shall be included in the definition of Revenue Sharing.

II. Scenario. A sequence of outcomes used in the cash flow model, such as a path of future interest rates, equity performance, or separate account fund performance

JJ. Scenario Amount. Equals the amount determined in Section 2(I)(6) for a given set of policies for a given Scenario that is used as a step in the calculation of the Stochastic Amount.

KK. Starting Assets. The assets assigned to a Business Segment prior to the calculation of the Reported Amount, and valued as of the Projection Start Date.

LL. Stochastic Amount. The amount determined by applying a prescribed CTE level to the distribution of Scenario Amounts over a broad range of stochastically generated Scenarios calculated using Prudent Estimate Assumptions for all assumptions not stochastically modeled.

MM. Stochastic Exclusion Test. A test to determine whether the block of policies being tested is considered to have material tail risk arising from interest rate movements or equity performance. Passing the test allows the company to exclude the block of policies from the

Section 2. Definition of General Methodology

A. Summary

1. This Appendix applies the principles of risk management and asset adequacy analysis, using the tool of stochastic modeling to establish the C3 RBC risk component for the products within its scope. In general, a stochastic approach to interest rates and equity performance is preferred. However, an exception to the stochastic modeling requirement can be made if certain conditions are met, as described in Sections 2(I)(2) and 2(I)(3) below.
2. The Reported Amount for policies falling within its scope is to be based on an amount calculated using a stochastic method when appropriate (Stochastic Amount). The Stochastic Amount shall be determined based on projections of net cash flows using the methods described below.
3. The actuary may elect to perform the calculations required by this report on a date other than the Valuation Date, but in no event earlier than six months before the Valuation Date, as long as an appropriate method is used to adjust the amounts so determined to the Valuation Date. Disclosure of the results of such adjustment and the methodology used to determine the adjustment is required.
4. The Stochastic Amount is calculated in the aggregate using a projection of net cash flows over a broad range of stochastically generated Scenarios, using Prudent Estimate Assumptions for all assumptions not stochastically modeled, and then applying a prescribed Conditional Tail Expectation level.
5. It will not be necessary to determine the Stochastic Amount for groups of policies where such policies are deemed not have material tail risk by means of passing the Stochastic Exclusion Test detailed in Section 2(I)(2). For groups of policies passing the Stochastic Exclusion Test, the C3 amount may be determined as the Factor-based Amount as described in section 2K.
6. A company may elect to exclude certain policies from the stochastic modeling requirement if certain conditions are met (as described in Section 2(I)(3) below.) The Alternative Amount is otherwise determined for those policies not covered by the Factor-based Amount and otherwise excluded from the stochastic modeling requirement.
7. Recognizing that there may be some liabilities not included in a company's models, an amount for non-modeled liabilities should be included in the Total Asset Requirement determined.
8. The Total Asset Requirement is the sum over

Estimate Assumption is developed by applying a Margin to the Anticipated Experience Assumption for the Risk Factor. The Prudent Estimate Assumption for each Risk Factor shall be:

a. Consistent with those that would be appropriate for reserves;
b. Based on any relevant and credible experience that is available, including, but not limited to, the company's own experience studies and industry experience studies; and
c. Supported by a documented process to reassess the appropriateness of the assumptions in future valuations.

2. Anticipated Experience Assumption. The actuary shall use company experience, if relevant and credible, to establish the Anticipated Experience Assumption for any Risk Factor. To the extent that company experience is not available or credible, the actuary may use industry experience or other data to establish the Anticipated Experience Assumption, making modifications as needed to reflect the actuary's expectation of the risk.

3. In setting the Margin for a Risk Factor, the actuary must assure that:

   a. The Margin is directly related to uncertainty in the Risk Factor, whereby the greater the uncertainty, the l-4.5(i an)-5..00veka9-2h-5.2(d .4(Max)3(peri)]TJ17.2064 0 TD.0055sd-.0 8an)-af7 TD

2. General description of cash flow projections. For each Scenario for the Scenario Amount, a cash flow projection shall be made reflecti

borrowing capacity of the company. Cash flows from reinvestment assets shall be determined as described in Section 2.C.3., but with the additional requirement that net spreads (net of default costs and investment expenses) over U.S. Treasuries reflect what a company expects to receive on the purchase and/or sale of securities and the strategies the company expects to utilize in managing its assets.

5. Frequencr 4 8ectio 4 8 Use6.44an4annual cashflow frequencr ("timestep") is generally acceptable for benefits/features that are not sensitive to projection frequency. The lack of sensitivity to projection frequency should be validated by testing wherein the actuary should ensure that the use .44a more frequent (i.e., shorter) timestep does not materially increase capital requirements. A more frequent time increment should always be used when the product features are sensitive to projection period frequency.
6. Length of Projection Period. The nrojection Period shall be sufficiently long that no

packaged scenarios may be downloaded from the American Academy of Actuaries webpage at the following address: http://www.actuary.org/life/phase3.asp.

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

The actuary should document and justify the choice of scenarios used in the determination of C3 capital.

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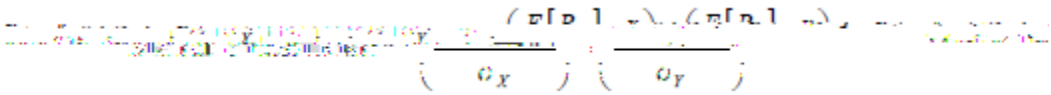
To interpret the above values, consider the 5-year point of 0.72 at the $\alpha = 2.5^{th}$ percentile.

would satisfy Table 1. This ILN model has an expected total return of 10% per annum. However, the resulting wealth factors would be too fat-tailed over the longer holding periods (relative to the criteria imposed by Table 1), indicating more conservatism than would strictly be necessary. As such, it should be clear that a two-parameter model (such as the ILN) does not offer much flexibility – to obtain a "better fit," it would be necessary to introduce more parameters. [4]

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

   If the scenarios are "close" to the calibration points, an acceptable method to true up the scenarios is to start with the lowest bucket not meeting the calibration criteria (e.g., one year factor at $\alpha = 2.5\%$) and randomly duplicate (or re-generate) a scenario meeting this criteria until the set of scenarios meets this calibration point. If a fixed number of scenarios is required, a scenario can be eliminated at random in the first higher bucket

When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing "consistent" parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk[6]. Specifically, two return distributions *X* and *Y* would satisfy the following relationship:



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

A closely related method would assume some form of "mean-variance" efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, "drift-volatility") frontier could be a constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form[7], with the co-efficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a "corridor" could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Clearly, there are many other techniques that could be used to establish consistency between the scenarios. While appealing, the above approaches do have drawbacks[8] and the actuary should not be overly optimistic in constructing the model parameters or the scenarios.

G. Starting and Projected Assets

1. Starting Asset Amount. The value of assets at the Projection Start Date shall be set equal to an amount no less than 98% of the statutory value of the reserve and other liabilities on the policies being valued at the Projection Start Date. All starting assets must be in the company's asset portfolios at the projection start date and be normally associated with supporting the Business Segment being modeled. Assets shall be valued consistently with their annual statement values. Starting assets shall include:

   a. Where assets supporting policies are held in Separate Accounts, the entire value of the assets in the Separate Accounts.

   b. The balance of any policy loans outstanding.

   c. An amount of assets in the General Account such that the sum of the assets in the Separate Account in G.1.a. and Policy Loans in G.1.b. and those selected from the

[6] As an example, the standard deviation of log returns is often used as a measure of risk.

[7] Quadratic polynomials and logarithmic functions tend to work well.

[8] For example, mean-variance measures ignore the asymmetric and fat-tailed profile of most equity market returns.

General Account are at least equal to 98% of the reserve and other liabilities on the policies being valued. If specific "hedge assets," such as equity put options, are being held for the benefit of these products, these are to be reflected in the model in full.

General Account assets chosen for use shall be selected on a consistent basis from one valuation hereunder to the next. 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.

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.

3. Treatment of Derivative Instruments. Derivative Instruments currently held at the start of the projection that are part of a Derivative Program allocable to the business being . bat 7(Pro)a om4.4(s)siisang

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 sub-account 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.

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

8. Modeling of Derivative Programs. The appropriate costs and benefits of Derivative Instruments that are currently held by the company in support of the policies falling under the scope of this Appendix shall be included in the projections when determining the Stochastic Amount. The appropriate costs and benefits of anticipated future Derivative Instrument transactions associated with the execution of a Clearly Defined Hedging Strategy shall also be included in the projections when determining the Stochastic Amount. The appropriate costs and benefits of anticipated future Derivative Instrument transactions associated with non-hedging Derivative Programs (e.g., replication, income generation) undertaken as part of the investment strategy supporting the policies shall also be included in the projections when determining the Stochastic Amount provided they are normally modeled as part of the company's risk assessment and evaluation processes. Non-hedging programs included in the model should be appropriate to the business and not merely constructed to exploit foreknowledge of the components of the required methodology, and the actuary shall take due care in maintaining conditions in the model consistent with the requirements for permissibility of such programs.

   Specifics as to the modeling of Derivative Instruments are given in Section 3.

9. Requirements of a Clearly Defined Hedging Strategy. In order to qualify as a Clearly Defined Hedging Strategy, the strategy shall, at a minimum, identify:

   a. The specific risks being hedged (e.g., delta, rho, vega, etc.);
   b. The hedge objectives;
   c. The financial instruments that will be used to hedge the risks;
   d. The hedge trading rules including the permitted tolerances from hedging objectives; and
   e. The criteria, metrics and frequency for measuring hedging effectiveness.

   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 Appendix do not currently qualify as a Clearly Defined Hedging Strategy.

10. Modeling Federal Income Tax. The projections in support of the stochastic amount should be made on an after-tax basis. Reasonable approximations may be made by the Actuary for the projection of tax reserves and other items impacting the calculation of taxable income for a Business Segment. However, the actuary is required to consider

adjusting Scenario Amounts under circumstances described in Section I.6.a.5. where approximations for tax reserves are made.

H. Discount Rates

1. For the Scenario Amount calculations, the path of Discount Rates for each Business Segment shall be calculated as follows:

    a. Companies that model scenarios of interest rates either alone or integrated with scenarios of fund returns are to use the

Appendix 3
Approach to Determining C3 Requirements for Life Insurance Products

One Year Treasury Rates

Scenario / Year	1	2	3	4	5	6	7	8	9	10
1	1.99%	2.71%	2.71%	2.77%	2.93%	3.25%	2.87%	2.64%	2.40%	2.48%
2	1.38%	1.50%	1.86%	1.50%	1.67%	1.77%	1.56%	1.38%	1.32%	1.61%
3	1.71%	1.87%	1.81%	1.98%	1.65%	1.59%	1.37%	1.35%	1.33%	1.30%
4	1.93%	1.55%	1.69%	1.93%	1.83%	1.85%	1.80%	2.10%	2.27%	2.48%
5	1.96%	2.29%	2.41%	2.26%	2.01%	2.03%	2.27%	2.67%	2.70%	2.73%
6	1.87%	1.92%	1.72%	1.40%	1.68%	1.59%	1.49%	1.57%	1.42%	1.26%
7	1.91%	1.88%	2.16%	1.83%	1.91%	2.22%	2.24%	2.53%	2.74%	2.80%
8	1.67%	1.42%	1.51%	1.90%	1.80%	2.17%	2.10%	2.42%	2.55%	2.70%
9	2.00%	1.70%	2.03%	2.08%	2.02%	2.03%	2.06%	2.30%	1.93%	1.57%
10	1.94%	1.30%	1.52%	1.23%	1.44%	1.20%	1.23%	1.26%	1.48%	1.46%

105% of After-tax Discount Factors (taxes at 35%)

Scenario / Year	1	2	3	4	5	6	7	8	9	10
1	0.98658	0.96868	0.95106	0.93339	0.91508	0.89520	0.87801	0.86249	0.84860	0.83450
2	0.99065	0.98062	0.96834	0.95855	0.94777	0.93647	0.92663	0.91797	0.90975	0.89988
3	0.98850	0.97606	0.96413	0.95128	0.94066	0.93059	0.92196	0.9135356 0 TD.0125 Tc-.0r8.		

2

net accumulated asset amount at that duration. Note that the Accumulated Deficiency can be either positive or negative. The Working Reserve is equal to the cash surrender value for purposes of this calculation. For policies having no cash surrender value the Working Reserve is equal to zero;

3. At the end of each Projection Year and at the Projection Start Date, calculate the discounted value of the Accumulated Deficiency for each Business Segment that was calculated in step 2.a.(2) above. The discounted value shall be calculated using the path of Discount Rates for the Business Segment from the Projection Start Date to the end of the Projection Year;
4. Determine the aggregate discounted value of the Accumulated Deficiency at the end of each Projection Year and at the Projection Start Date as the sum of the discounted value of Accumulated Deficiency at that Duration across Business Segments; and
5. Determine the Scenario Amount as the sum of (a) the statement value of the starting assets across Business Segments and (b) the maximum

stochastic Scenarios would generally result in the inability to aggregate results across the two or more Scenario sets.

c. For each Scenario the net accumulated asset amount for a Business Segment at the end of each Projection Year is equal to the projected statement value of invested assets for that Business Segment. For all Scenarios, the net accumulated asset amount for a Business Segment at the Projection Start Date is the statement value of starting assets for that Business Segment. The projected statement value of invested assets at any future duration must reflect the accumulation of cash flows into and out of the portfolio for the items listed in (1) through (8) below as described in Sections 2.C.2. and 2.C.3. The net accumulated asset amount can be either positive or negative, according to:

1. Benefits, including but not limited to death and cash surrender benefits;
2. Expenses, including but not limited to, commissions, general expenses, and premium taxes;
3. Gross premium payments;
4. Other applicable revenue such as fees and revenue on assets invested in sub-accounts, and any Revenue Sharing income;
5. Net payments to/from the General Account from/to the Separate Account;
6. Net Investment Earnings (including realized gains);
7. Net cash flows from Liability-associated Derivatives, and
8. Federal income taxes.

7. <u>The Stochastic Amount</u>

The Stochastic Amount is determined as the sum of applying steps a. and b. below to each segment or set of segments for which a Scenario Amount has been calculated.

a. Rank the Scenario Amounts from lowest to highest; and
b. Take the average of the highest 10% of the Scenario Amounts.

If necessary, add an amount to item (b) above to capture any material risk included in the scope of these requirements but not already reflected in item (b) a-4.3(y)6(reflex13 .3.8(n)-1.(pe497 TDD Am)1

7. Change in the effectiveness of Derivative Programs; changes to existing or addition of new Derivative Programs; and
8. Changes to existing or addition of new reinsurance arrangements.

The Stochastic Amount may be reduced, but not to less than zero, by the factor-based RBC covering market volatility risk of equity assets used in the determination of the Stochastic Amount. The amount of such adjustment and its derivation is to be documented in the Actuarial Report. The adjustment reverses the factor-based C1cs relating to existing equity assets that are included in the determination of the market risk component for Life Insurance Products. The adjustment is determined by applying the applicable risk factors to the applicable amount of assets included in the models in determining the market risk component for Life Insurance Products. The source of the risk factor to be applied and line items that include the asset amounts are given in the table below.

	Asset Class	Amount	Factor
1	Admitted Unaffiliated Public Common Stock	LR005 line (23) column (1) [in part]	LR005 line (24) column (4)
2	Admitted Unaffiliated Public Common Stock	LR008 line (42) column (1) [in part]	LR008 line (42) column (4)

The actuary who certifies the RBC amount must be reasonably certain that the risks that the factor-based RBC are attempting to measure are captured in the Stochastic Amount and that the amount of assets included in determination of the adjustment is not greater than the statutory value of such assets included in the models underlying the Stochastic Amount.

The Stochastic Amount may be reduced, but not to less than zero, by the factor-based RBC covering recoverability of expense allowances at the valuation date relating to liabilities being modeled. The amount of such adjustment and its derivation is to be documented in the Actuarial Report. The adjustment reverses the factor-based C1cs relating to existing equity assets that are included in the determination of the market risk component for Life Insurance Products. The adjustment is determined by applying the applicable risk factors to the applicable amount of assets included in the models in determining the market risk component for Life Insurance Products. The source of the risk factor to be applied and line items that include the asset amounts are given in the table below.

	Asset Class	Amount	Factor
1	Expense Allowance Transfers - All Other	LR006 line (11) column (1) [in part]	LR006 line (11) column (2) x 0.65
2	Expense Allowance Transfers - Surrender Charge Based on Fund Contribution and the Fund Balance Exceeds the Sum of the Premiums Less Withdrawals	LR006 line (12) column (1) [in part]	LR006 line (12) column (2) x 0.65

The actuary who certifies the RBC amount must be reasonably certain that the risks that the factor-based RBC are attempting to measure are captured in the Stochastic Amount

and that the amount of expense allowances included in determination of the adjustment is not greater than the statutory value of such allowances relating to the liabilities included in the models underlying the Stochastic Amount.

To the extent the Stochastic Amount is based on data prior to the valuation date and the Total Adjusted Capital is less than 110 percent of the Company Action Level amount, it

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0.5% (the current C3 after-tax factor for life insurance products) or the ratio of the sum of the modeled Stochastic Amount and Alternative Amount to the modeled liabilities, times the statutory value on the valuation date of the non-modeled liabilities.

M. Total Asset Requirement

1. The Total Asset Requirement equals the sum over all Business Segments of the Stochastic Amount, the Alternative Amount or the Factor-based Amount for each Business Segment or combination of Business Segments, plus any Non-modeled Amount related to each segment or combination of segments.

N. The Reported Amount

1. The Reported Amount is the minimum amount as of the Valuation Date for the policies falling within the scope of this Appendix. The Reported Amount equals the Total Asset Requirement less the statutory value on the valuation date of the liabilities included in the determination of the Total Asset Requirement.

2. The Reported Amount relates to interest rate risk and market risk. The portion which is attributable to interest rate risk is to be combined with the current C3a component of the formula. The portion which is attributable to market risk is to be allocated and combined with the current C3c component of the formula.

   In allocating the Reported Amount between the interest and market risk components the actuary is guided by the following:

   a. In certain situations or for certain products the Reported Amount relates in its entirety to either interest rate risk or market risk. In such cases no allocation is necessary.

   b. In certain situations or for certain products the interest rate risk or market risk may not be a material portion of the Reported Amount. In such situations the actuary may consider allocating the entire amount to the more material portion of the two risk types comprising the Reported Amount. In doing so the actuary should consider the covariance effect of making such an allocation. The allocation of the non-material portion, through the allocation of the entire Reported Amount to one risk component, is conservative if the allocated to risk component has the lower covariance impact. The allocation of the non-material portion, through the allocation of the entire Reported Amount to one risk component, is not conservative if the allocated to risk component has the higher covariance impact. In such case the actuary will be required to document his/her assessment of the materiality of the risk and rationale for such allocation.

   c. In other situations or for other products both the interest rate risk and market risk may form a material portion of the Reported Amount. In this case allocating the Reported Amount to the component with the least covariance effect would be conservative and acceptable. Otherwise, the actuary must develop and document an appropriate basis for allocating the Reported Amount.

O. Treatment of Non-Guaranteed Elements

1. Non-Guaranteed Elements (NGE) are to be included in the models used to project future cash flows for the Stochastic Amount. Where NGEs are based on some aspect of experience, future changes in the level of NGEs can be reflected in the Cash Flow Model based on the experience assumed in each Scenario.
2. As would be the case in actual practice, the projected NGE should not be assumed to change simultaneously with the change in projected experience, but only at the date following the recognition of a change in experience on which the company would normally implement a change.
3. When determining the projected NGE for each Scenario, the actuary must take into consideration those factors that affect how the company will modify its current NGE scale, such as existence of contract guarantees, the company's past NGE practices and current NGE policies.
4. Due to the uncertainty in the future level of NGEs arising from factors such as those listed below, a Margin should be established for the projected NGE that would result in an increase in the Scenario Amount compared to the Scenario Amount that would result without a Margin.
5. The liability for dividends declared but not yet paid that has been established according to statutory accounting procedures as of the Valuation Date is reported separately from the statutory reserve. This liability may be included or not included in the Cash Flow Model at the company's option. If the dividends that give rise to the dividend liability are included in the Cash Flow Model, then the dividend liability may be included in the liabilities that are deducted from the Total Asset Requirement in calculating the RBC requirement.
6.

Section 3. Modeling of Derivative Instruments

A. General Considerations

The appropriate costs and benefits of Derivative Instruments that are currently held by a company in support of the policies falling under the scope of this Appendix shall be included in the projections when determining the Stochastic Amount.

The appropriate costs and benefits of anticipated future Derivative Instrument transactions associated with the execution of a Clearly Defined Hedging Strategy shall also be included in the projections if a company is following a Clearly Defined Hedging Strategy and the hedging strategy meets the requirements as defined in Section 2.G.

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. To the extent these requirements conflict with any applicable law, the applicable law supersedes.

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

The fundamental characteristic of the first method is that all hedging positions, both the currently held positions and those expected-to-be held in the future, are included in the cash flow model used to determine the Reported Amount.

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B. Specific Conditions and Requirements

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

A discontinuous hedging strategy is a hedging strategy where the relationships between the sensitivities to equity markets and interest rates (Greeks) associated with some guaranteed policyholder options embedded in some products and these same sensitivities associated with the hedging assets are subject to material discontinuities. Any hedging strategy, including a delta hedging strategy, can be a discontinuous hedging strategy if implementation of the strategy permits material discontinuities between the sensitivities to equity markets and interest rates associated with the guaranteed policyholder options embedded in the variable annuities and other in-scope products and these same sensitivities associated with the hedging assets. There may be scenarios that are particularly costly to discontinuous hedging strategies, especially where those result in large discontinuous changes in sensitivities (Greeks) associated with the hedging assets. Where discontinuous hedging strategies contribute materially to a reduction in the Reported Amount, the actuary must evaluate the interaction of future trigger definitions and the discontinuous hedging strategy, in addition to the items mentioned in the previous paragraph. This includes an analysis of model assumptions that, when combined with the reliance on the discontinuous hedging strategy, may result in adverse results relative to those modeled.

The implementation of a strategy strongly dependent on the acquisition of hedging assets at specific times, which also depends on specific values of an index or other market indicators, may not happen precisely as planned.

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

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

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

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Section 4. Revenue Sharing Assumptions

A. Requirements

1. Projections may include income from projected future Revenue Sharing (as defined in this Report**)** net of applicable projected expenses ("Net Revenue Sharing Income") if the following requirements are met**:**

   a. The Net Revenue Sharing Income is received by the company;[9]

   b. Signed contractual agreement or agreements are in place as of the Valuation Date and support the current payment of the Net Revenue Sharing Income; and

   c.

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Section 5. Reinsurance

A. General Considerations

1. In this section, "reinsurance" includes retrocession and "assuming company" includes a retrocessionaire.
2. The company shall use assumptions and margins in developing the Reported Amount that are appropriate for each company pursuant to a reinsurance agreement. The ceding and assuming companies are not required to use the same assumptions and margins for the reinsured policies.
3. In determining the Reported Amount, one party to a reinsurance transaction may make use of calculations of the other party. If the company chooses assumptions that differ from those used by the other party, the company must either rerun the calculation or be prepared to demonstrate that appropriate adjustments to the other party calculation have been made.
4. A reinsurance agreement or amendment shall be considered in force and included in calculating the Reported Amount if:
   a. The agreement or amendment has been duly executed by both parties no later than the "as of date" of the financial statement; or
   b. A binding letter of intent has been duly executed by both parties no later than the "as of date" of the financial statement unless no final agreement or amendment has been executed more than 90 days after the execution date of the letter of intent; or
   c. If neither (a) nor (b), but the company has determined after review of the relevant facts and circumstances that it is likely to have legal obligations under the agreement or amendment and including the agreement or amendment would result in a higher Reported Amount.
5. To the extent that a single deterministic valuation assumption for risk factors associated with certain provisions of reinsurance agreements will not adequately capture the risk, the company shall:
   a. Stochastically model the risk factors directly in the cash flow model when calculating the Stochastic Amount, or
   b. Perform a separate stochastic analysis outside the cash flow model to quantify the impact on reinsurance cash flows to and from the company. The results of this analysis shall be used to adjust prudent estimate assumptions or to determine an amount to adjust the Stochastic Amount to adequately make provision for the risks of the reinsurance features.

B. Reinsurance Ceded

The company shall determine cash flows for reinsurance ceded subject to the following:

1. The company shall include the effect of projected cash flows received from or paid to assuming companies under the terms of ceded reinsurance agreements in the cash flows

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non-guaranteed elements in the reinsured policie

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ceding company warrants that the ceded reinsurance will be profitable to the assuming company, cash flows under scenarios that would otherwise result in a loss to the assuming company must be adjusted to reflect the warranty.

If the impact of such a representation or warranty is not possible to include in projected cash flows, the company should determine the legal consequence of breaching the representation or warranty under the agreement. The Reported Amount is the greater of the calculation assuming the breach of the representation or warranty has occurred, or the calculation assuming the breach has not occurred. For example, if the ceding company warrants that it will remain solvent during the term of the agreement, and the consequence of a breach will be immediate termination of the reinsurance, such immediate termination shall be assumed in the model if doing so will decrease the company's surplus.

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C.

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The test scenarios are defined in terms of 90 percentile random shocks in various directions over various periods of time. The sum of the random shocks over n periods has a distribution, and the 90 percent level of that distribution is 1.28 times the square root of n. As an example, to get a 90 percent level shock over 5 years assuming monthly shocks, the sum of the 60 shocks must be 1.28 times the square root of 60. The test scenarios are as follows:

1. Test Scenario 1 – Pop up, high equity

   Interest rate shocks that maintain the cumulative shock at the 90% level (1.282 standard errors). Equity returns that maintain the cumulative equity return at the 90% level.

   For illustration, the pop-up scenario has shocks of
   1.28 times (sqrt(1) - sqrt(0)) in period 1;
   1.28 times (sqrt(2) - sqrt(1)) in period 2;
   1.28 times (sqrt(3) - sqrt(2)) in period 3; and so on.
   By the end of period n, the cumulative shock is -1.28 times sqrt(n).

2. Test Scenario 2 – Pop up, low equity

   Interest rate shocks that maintain the cumulative shock at the 90% level (1.282 standard errors). Equity returns that maintain the cumulative equity return at the 10% level.

3. Test Scenario 3 – Pop down, high equity

   Interest rate shocks that maintain the cumulative shock at the 10% level (1.282 standard errors). Equity returns that maintain the cumulative equity return at the 90% level.

4. Test Scenario 4 – Pop down, low equity

   Interest rate shocks that maintain the cumulative shock at the 10% level (1.282 standard errors). Equity returns that maintain the cumulative equity return at the 10% level.

5. Test Scenario 5 – Up/down, high equity

   Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during “up” periods and at the 10% level during “down” periods. Equity returns that maintain the cumulative equity return at the 90% level.

6. Test Scenario 6 – Up/down, low equity

   Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during “up” periods and at the 10% level during “down” periods. Equity returns that maintain the cumulative equity return at the 10% level.

7. Test Scenario 7 – Down/up, high equity

   Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during “up” periods and at the 10% level during “down” periods. Equity returns that maintain the cumulative equity return at the 90% level.

8. Test Scenario 8 – Down/up, low equity

Interest rate shocks that, for each five-year period, are consistently in the same direction. The

years. After 20 years, the same as scenario 4. Equity returns that maintain the cumulative equity return at the 10% level.

Section 7. Certification and Documentation Requirements

A. Certification

1. A Qualified Actuary shall provide a certification that the Reported Amount was calculated in a manner that meets the requirements of this Appendix and complies with all applicable Actuarial Standards of Practice. The certification shall consist of at least the following:

   a. A paragraph identifying the Qualified Actuary and his or her qualifications as described under the U.S. Qualification Standards;

   b. A scope paragraph identifying the statement values of the products included in the certification and the methodology used for those statement values (e.g. Stochastic

B. Actuarial Report

1. 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 Amount. The

iii. Derivative Program
- (1.) Documentation of strategy
- (2.) Identification of current positions
- (3.) Description on how strategy was incorporated into modeling:
  - (a) basis risk
  - (b) gap risk
  - (c) price risk
  - (d) assumption risk
- (4.) Document the methods and criterion used to estimate the *a priori* effectiveness of the Derivative Program

iv. Scenarios
- (1.) Description of scenario generation for interest rates and equity returns
- (2.) Disclose the number "n" of scenarios used and the rationale for using "n" scenarios.
- (3.) Time Step of Model (e.g. Monthly, Quarterly, Annual)
- (4.) Correlation of equity and / or fund returns
- (5.) Processes to ensure scenarios meet calibration requirements
- (6.) Support for mapping variable accounts to proxy funds

v. Other
- (1.) Description of and support for any simplified approaches in the Cash Flow Models.
- (2.) Basis for decision to aggregate Business Segments if aggregation is done.
- (3.) Description of the use of data prior to the valuation date.

f. Description and results of material sensitivity tests performed.

3. If there is a material change in assumptions from the previous year, an executive summary shall be sent to the state of domicile communicating such change and quantifying the impact it has on the results. Such communication shall remain confidential, subject to applicable law.

C. This Appendix requires that a Qualified Actuar

2. Be familiar with all appropriate standards of practice that apply to principle-based approaches;
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.