

The American Academy of Actuaries

Introduction to PBA:

An Overview of a Principle-Based Approach
to Reserves and Capital in the U.S.
for Life and Annuity Products

August 2010



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An Overview of a Principle-Based Approach to Reserves & Capital
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Introduction to PBA

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- The Case For Change
- The Solution – A Principle-Based Approach (PBA)
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History of Reserves and Capital (U.S.)

Reserve Valuation – Historical

- 1858 Massachusetts Legislation
- Commissioner to calculate reserves on all policies of all licensed companies
- Actuary Elizur Wright was appointed commissioner
- Wright selected Net Level Premium Reserve Method and Combined Experience (1843 British) Mortality Table and 4% Interest Rate



History of Reserves and Capital (U.S.)

Reserve Valuation – Historical

- Very little change in valuation process for last 150 years
- Minimum reserve is based on a formula with prescribed mortality and interest
- IRS tax deductible reserves have been engineered with the same formulaic approach
- No actuarial judgment allowed in determining the minimum
- In 1990s, Asset Adequacy Analysis added to test the adequacy of the formulaic reserve in light of the supporting assets



History of Reserves and Capital (U.S.)

Reserve Valuation – Current

- Governed by the Standard Valuation Law, with supporting regulations and Actuarial Guidelines
- Generally, minimum reserve standards have been established to be sufficient to cover future claims 75%-85% of the time
- Subject to an Actuarial Opinion signed by a qualified actuary
- Opinion supported by Asset Adequacy Analysis, which is a principle-based analysis of the reserves in light of the assets
- Asset Adequacy Analysis is calculated in the aggregate and defines a floor (i.e., only impacts reserve if a deficiency is discovered)
- Valuation is currently formula-based for most products
- Model-based for Variable Annuities (AG VACARVM)
 - The first step away from the traditional formulaic approach to calculating reserves



History of Reserves and Capital (U.S.)

Risk-Based Capital (RBC) – Historical

- Originally, states only specified minimum surplus requirements to start a company
- Later added solvency ratios (IRIS) to monitor companies on an ongoing basis
- Companies and rating agencies began developing risk-based capital (RBC) measures
- The NAIC developed a standardized RBC regime to supplement the IRIS ratios and identify weakly capitalized companies



History of Reserves and Capital (U.S.)

Risk-Based Capital (RBC) – Historical

- NAIC RBC regime primarily formula-driven, derived from data in published statutory statements
- Calculation delineates four categories of risk (C1-C4):
 - Asset default and subsidiary risk (C1)
 - Pricing inadequacy risk (C2)
 - Interest rate mismatch and equity risk (C3)
 - General business risk (C4)
 - Covariance among risk categories is reflected in determination of total capital requirements
- Calculation emphasizes solvency and the identification of weakly capitalized companies



History of Reserves and Capital (U.S.)

Risk-Based Capital (RBC) – Current

- RBC statute references NAIC RBC Instructions for specific methodology and factors, promoting uniformity across states
- Generally, minimum capital requirements are expected to be sufficient to protect insurer solvency 95% of the time
- RBC Ratio of actual to required capital determines regulatory action
- Formula-based for C-1, C-2 and C-4
- Model-based for C-3 for VAs and certain fixed annuities
 - C-3 Phase I – addressed interest rate risk on certain fixed annuities
 - C-3 Phase II – addressed interest rate and equity risk for VAs
 - The first steps away from a traditional formulaic approach to calculating RBC



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The Case For Change

Why A Formulaic Approach Used To Work

For decades, a formulaic approach worked well to establish reserve and capital requirements

- Asset and liability portfolios were relatively “vanilla”
- Products between companies were relatively homogenous with somewhat basic features, resulting in similar risk profiles between companies
- Prescribed valuation assumptions were set at conservative levels, producing reserve and capital levels far in excess of the typical company’s actual risk profile
- Required reserve and capital values were relatively easy for regulators to audit and monitor



The Case For Change

Prescription

A Formula-Based Approach Relies On Prescription

- Prescribed formulas
- Prescribed assumptions
- Prescribed caps/floors
- Prescribed guidelines
- Prescribed testing



The Case For Change

Shortcomings of a Formula-Based System

- Relies on a static formula that may not capture all the risks of the contract
- Requires regulatory and/or legislative action to make adjustments for new products or economic developments
- Follows a “one size fits all” approach by using prescribed assumptions, regardless of differences in company risk profiles
- Severely restricts the use of actuarial judgment



The Case For Change

Concerns with the Current Approach

- Consumers are demanding more complicated and varied product benefits and guarantees
- These enhanced benefits require companies to engage in more sophisticated investment strategies, including hedging strategies
- Advances in technology have allowed companies to increase the complexity of product design with more complex guarantees
- These changes to product offerings and company practices resulted in different risk exposures for insurers on both sides of the balance sheet
- The current formulaic approach does not capture the way most insurers operate



The Case For Change

Temporary Regulatory Solutions

- **Fundamental problem**: a static formula cannot properly capture the risk of these new benefits and guarantees or company risk management techniques
- Regulators have attempted to modify the formulaic reserve requirements to address these changes, but with limited success
- Examples of regulatory actions:
 - Regulation ‘XXX’ (Term and UL)
 - Actuarial Guideline 38 (UL with Secondary Guarantees)
 - Actuarial Guideline 39 (Variable Annuities)



The Case For Change

The Need for a Permanent Solution

- Current valuation system is broken – regulators have been using “band-aid” formulaic modifications with limited success as new products are developed
- Required reserves are too high for some products and too low for other products, as compared to an economic reserve that is more accurate
- Capital requirements and reserves need to take into account the actual risks of the business practices and products issued by individual companies



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The Solution – A Principle-Based Approach

The Beginning of Change

- Formulaic systems are being gradually replaced with principle-based systems, starting with the products and/or risks that were not appropriately addressed
- First step toward principle-based capital standards was C3 Phase I (2000) and C3 Phase II (2005) requiring company specific, model-based calculations for fixed annuities and VAs, respectively.
- First step toward principle-based reserves was VA CARVM (2009), a framework of company-specific calculations for the valuation of VAs



The Solution – A Principle-Based Approach

The Objectives of PBA

- Place greater emphasis on reflecting risks that materialize in “tail” scenarios, where low probability events can have a large impact
- Reflect underlying economics in statutory financials, providing more information and greater insight to readers of financial statements
- Link statutory requirements to company risk management practices
- Allows optimal product price by “right-sizing” the level of reserves
- Eliminate the practice of designing products “around” the regulations
- Facilitate simpler products, satisfying consumer demands with straight-forward designs
- Enhances risk-focused examinations



The Solution – A Principle-Based Approach

The Underlying Principles

- Captures all of the identifiable, quantifiable and material risks, benefits, and guarantees associated with the contracts
- Utilizes risk analysis and risk management techniques to quantify the risks; this may include stochastic models
- Allows the use of company experience to establish assumptions for risks over which the company has some degree of control or influence
- Uses assumptions and methods that are consistent with, but not necessarily identical to, those utilized within the company's overall risk assessment process



The Solution – A Principle-Based Approach

Emphasizes Process Over Prescription

- Identifying risks
- Generating economic scenarios
- Determining assumptions
- Determining margins
- Modeling and measuring risks
- Sensitivity testing of material risks
- Documenting results and processes



The Solution – A Principle-Based Approach

Integrates Reserves with Management of Business

- Sets reserves and capital requirements that are appropriate, considering unique company risk profiles
- Imposes greater discipline around the valuation and financial reporting process
- Increases communication to management and regulators



The Solution – A Principle-Based Approach

Some Observations

- Benefits consumers, companies and regulators
- Is consistent with the global trend toward Enterprise Risk Management
- Relies more on professional actuarial judgment
- Will require a stronger governance process to be in place for companies, auditors, and regulators
- Requires more sophisticated tools and new skill sets for actuaries and regulators



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PBA Development and Implementation

PBA Development Stakeholders

- American Academy of Actuaries
- Actuarial Standards Board
- State Regulators / NAIC
- Industry
- Consumers
- Legislators
- U.S. Treasury Department



PBA Development and Implementation

American Academy of Actuaries

- Public policy arm of U.S. profession
 - Represents the profession
 - Provides objective information and analysis
 - Increases public awareness of the actuary
- Develops professional standards
- Six practice councils; the Life Practice Council has been instrumental in the development of PBA and is the primary technical architect of the PBA framework



PBA Development and Implementation

Actuarial Standards Board

- Establishes and improves Actuarial Standards of Practice (ASOPs), identifying what the actuary should consider, document, and disclose when performing an actuarial assignment
- Reviews and evaluates current and emerging practices
- Determines appropriate guidance
- Obtains input from actuaries and other interested parties
- Publishes standards based on input from actuaries and other interested parties



PBA Development and Implementation

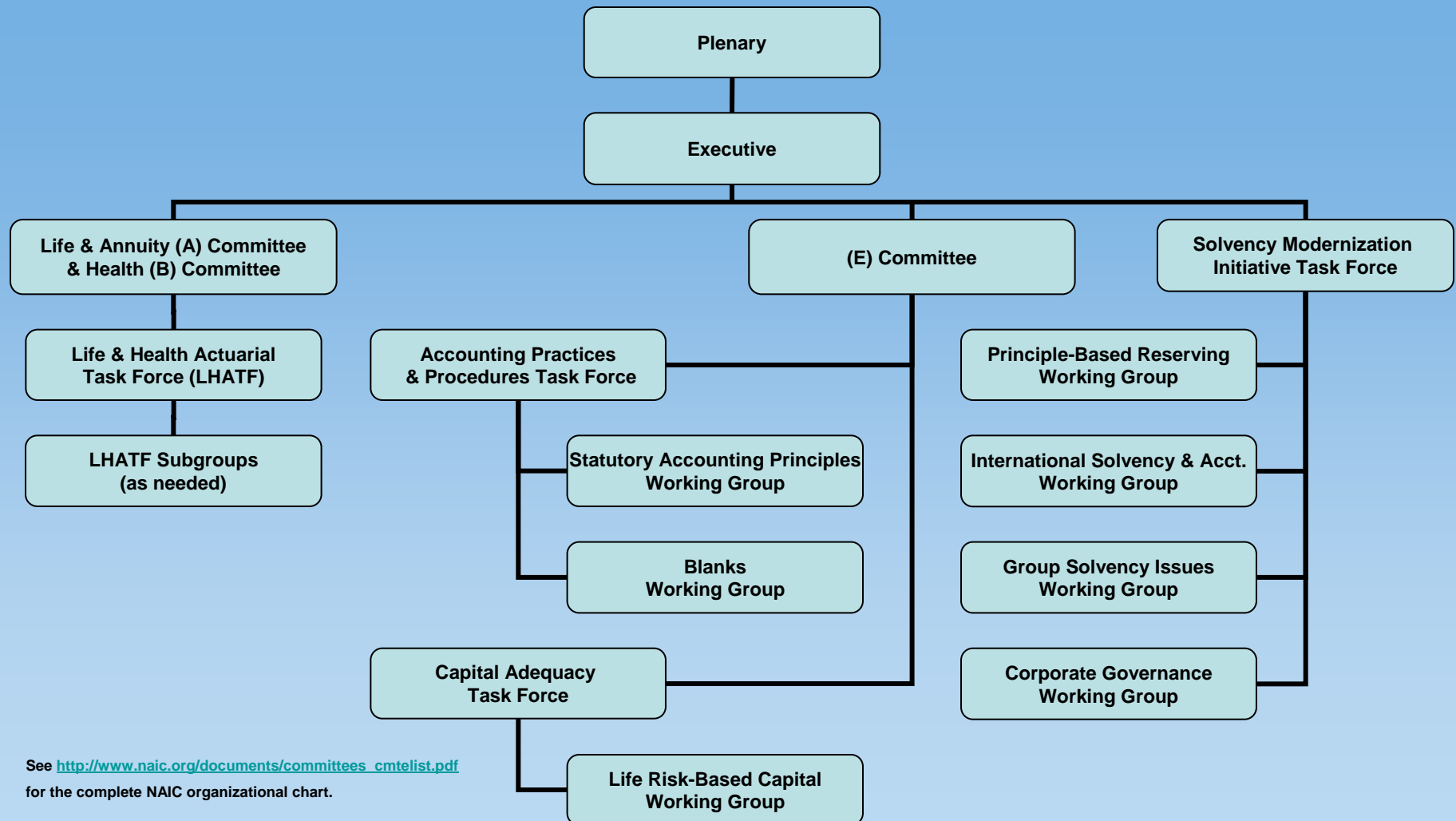
National Association of Insurance Commissioners (NAIC)

- State Insurance Commissioners are responsible for regulating the business of insurance
- NAIC facilitates state-based regulation
 - Develops model laws and regulations for review and adoption by individual states
 - Accredits insurance departments' regulatory processes
 - Provides expertise, uniformity, resources to state insurance departments
- Operates through a vast committee structure including technical task forces:
 - Life & Health Actuarial Task Force (LHATF) develops reserving requirements
 - Capital Adequacy Task Force (CADTF) develops regulatory capital standards
 - Life Risk-Based Capital Working Group (LRBCWG) within CADTF develops technical capital requirements for life and annuities
- Often responds to technical proposals from the Academy and relies on the Academy and other interested parties for analysis and research



PBA Development and Implementation

NAIC PBA Structure



See http://www.naic.org/documents/committees_cmtelist.pdf for the complete NAIC organizational chart.



PBA Development and Implementation

Industry Participants

- American Council of Life Insurers (ACLI)
 - Most active industry representative
 - Represents 80% of life industry, all sizes of companies
- Affordable Life Insurance Alliance (ALIA)
- Group of North American Insurance Enterprises (GNAIE)
- Accounting profession representatives
- Individual companies (small and large)



PBA Development and Implementation

Consumers, Legislators and Treasury

- Consumers
 - Consumer groups offer input regarding individual proposals as well the development process
- State Legislatures
 - Legislatures adopt state-specific versions of model laws promulgated by the NAIC
- U.S. Treasury Department
 - Offers guidance as to how laws and regulations impact tax valuations



PBA Development and Implementation

Approach & Milestones

- Modify the Standard Valuation Law (SVL) to enable principle-based reserves (PBR)
 - New SVL references a Valuation Manual (VM)
 - VM will be amended as needed by the NAIC; state legislative action is not required
- Develop detailed reserve requirements in the VM
 - PBA will be implemented in phases
 - PBA will only apply to the specific products as provided in VM-00
- Develop principle-based capital requirements
 - Introduce in phases by risk type and product
 - Start with C-3 risk



PBA Development and Implementation

Standard Valuation Law (SVL)

- Enables a state to use minimum reserve requirements in the VM for products issued on or after VM operative date
 - Enables PBR for new business while leaving existing structure in place for business already in force on VM operative date
 - Products include life insurance contracts, annuity and pure endowment contracts, accident & health insurance contracts, and deposit-type contracts for issues on and after VM operative date
 - Both principle-based & non-principle-based reserves
- Authorizes the VM to provide requirements needed for PBR:
 - Minimum reserves
 - Financial reporting
 - Experience reporting
 - Corporate governance



PBA Development and Implementation

Standard Valuation Law (SVL)

- Allows the commissioner to engage a qualified actuary for additional analysis or independent peer review at company expense
- Allows the commissioner to require a company to change any assumption or method in order to comply with the requirements of the VM or the SVL
- Allows the commissioner to prescribe specific valuation requirements not provided by the VM or when the VM is not in compliance with the SVL
- Allows the commissioner to establish requirements for companies doing business only in that state (single state exemption)



PBA Development and Implementation

Valuation Manual (VM)

- Prescribes uniform reserve requirements and consistency with the Accounting Practices & Procedures Manual (APPM)
- Enables ongoing uniformity of valuation practices across states via VM changes
- Preserves state authority & control
- Provides to all stakeholders the efficiencies of having one set of requirements



PBA Development and Implementation

Coordination Among NAIC Groups

- Overall oversight and coordination is being provided by the NAIC Solvency Modernization Initiative Task Force and the NAIC PBR EX Working Group
 - Developing a centralized oversight process to review valuations filed by individual companies
 - Establishing a Statistical Agent function to monitor industry experience
- Statutory Accounting Principles Working Group (SAPWG) - to modify the Accounting Practices & Procedures Manual (APPM) to reference reserve requirements in the VM
- Blanks Working Group and SAPWG - to modify the annual statement blanks to reflect principle-based information
- “E” Committee – to modify examination procedures appropriate for principle-based reserves (PBR)



PBA Development and Implementation

Efficiencies Desired From VM Approach

- Greater uniformity in state requirements
- Easier implementation of requirements
 - Model rule process replaced by model VM requirements
 - One rule adoption by reference each year in the APPM is more efficient than separate rule adoption for each reserve change



PBA Development and Implementation

Outstanding Development Issues

- Determine scope/order of applicability for PBR
- Finalize VM technical details for life insurance including the following:
 - Net premium minimum
 - Treatment of reinsurance
 - Mortality margin determination
 - Assumptions for default costs, investment spreads
 - Scenario generator process
- Finalize capital requirements for life products (C3 Phase III)
- Finalize disclosure/reporting requirements in blanks
- Finalize any new ASOPs or practice notes



PBA Development and Implementation

Outstanding Implementation Issues

- Pass SVL/VM in each state
- Implement PBA in companies
- Establish auditing standards in public accounting firms
- Establish audit/review processes in states
- Establish NAIC statistical agent
- Establish NAIC centralized review process
- Establish NAIC feedback loop to facilitate review and refinement of PBA



PBA Development and Implementation

Monitor the Status

- The NAIC website provides information to help monitor current exposures and working drafts
 - http://www.naic.org/index_committees.htm
 - Final NAIC Models must be purchased from the NAIC
- The Academy website provides a complete archive of all Academy reports to the NAIC
 - <http://actuary.org/naic/life.asp>



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Appendix I – Reserve Methodology

The Basic Framework

- The reserve is the greater of:
 - A **deterministic component** assuming a single economic scenario
 - A **stochastically derived component** using multiple economic scenarios
- The following sections of the Valuation Manual contain additional detail regarding methodology:
 - VM-20 Life Insurance
 - VM-21 Variable Annuity



Appendix I – Reserve Methodology

The Deterministic Component

- Serves as a floor for the stochastic amount
- Is not designed to capture all risks
- Exact calculation form will differ by product



Appendix I – Reserve Methodology

The Stochastic Component

- Closer to a “true” principle-based reserve, since it more adequately captures risks related to the contract
- Multiple economic scenarios are used to capture “tail risk” (risks that could have high impact, but low probability)
- The amounts calculated for each economic scenario are ranked from highest to lowest, and the reserve is determined by taking the average of the highest amounts above a prescribed level, such as 70% (i.e., the average of the highest 30%) also known as “CTE 70” or Conditional Tail Expectation 70



Appendix I – Reserve Methodology

Requires a Sophisticated Cash Flow Model

- Cash flow model is needed to project all cash flows arising from the contracts and related assets
- Most companies will probably use their cash flow testing model, with appropriate adjustment to projection assumptions
- Cash flow model is used to determine:
 - Liability cash flows (death benefits, surrender benefits, expenses, etc.)
 - Asset cash flows (investment income, asset maturities, asset defaults, etc.)



Appendix I – Reserve Methodology

The Assumptions

- Under PBR, valuation assumptions will fall into one of three categories
 - Prescribed Assumptions
 - Stochastically Modeled Assumptions
 - Prudent Estimate Assumptions



Appendix I – Reserve Methodology

Prescribed Assumptions

- **Prescribed assumptions** are deterministic assumptions used for risks where the company has very little or no influence or control over the outcome
- For these types of risks, all companies will be required to use the same assumptions



Appendix I – Reserve Methodology

Stochastically Modeled Assumptions

- **Stochastically modeled assumptions** are used for risks that are more properly modeled through a stochastic process
- Currently, only interest rate movements and equity returns are required to be modeled stochastically



Appendix I – Reserve Methodology

Prudent Estimate Assumptions

- **Prudent estimate assumptions** are used where the company has some degree of influence on the outcome of the risk factor
- Equals the actuary's best estimate of the future (anticipated experience) plus a margin for adverse deviation and estimation error
 - Margins reflect the degree of uncertainty in the anticipated experience assumption
 - Margins provide an element of conservatism
 - Margins are generally required for each assumption
 - Determination of margins can be complicated if there is a lack of credible experience data
 - Determination of margin involves actuarial judgment
- Must be reviewed periodically and updated as appropriate



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Appendix II – Capital Methodology

Scope

- The current phase of the principle-based approach for capital involves a review of the interest rate and market risk (C3) component for all life insurance products.
- Scope of the work does not include review of C1, C2 or C4 components
- C-3 Phase III (C3P3) is seen as the next step toward a future comprehensive principle-based approach to capital



Appendix II – Capital Methodology

Scope

- C3P3 capital requirements recommended to apply to all life insurance products inforce
- C3P3 shifts some capital elements within the risk components of RBC, such as shifting requirements for single premium life business from C3P1 to C3P3
- Also provides for offsets where methodology results in double-counting of risks
- Scope of companies and products affected by new capital requirements is influenced by simplified calculation methods
 - Stochastic Exclusion Test
 - Alternative Amount



Appendix II – Capital Methodology Framework

- Framework developed with substantial consideration of methodologies used for Life PBR, C3P1, C3P2, and International Solvency direction
- C3P3 calculation based on a methodology for C3 requirements common to all products
- C3P3 calculation based on framework and methodology consistent with the calculation of principle-based life reserves, but not identical
 - Uses a cash flow projection model
 - Projects cash flows over a number of economic scenarios
 - Uses prudent estimate assumptions
- Actuarial Certification and Actuarial Report are required
- Anticipated effective date: December 31, 2011
 - Scope may be limited initially to certain products



Appendix II – Capital Methodology

Determination Process

- Total C3P3 capital is the arithmetic sum of four pieces:

■ Stochastic Exclusion Test	→	Factor-Based Amount	A
			+
■ CTE90 Stochastic Scenario Calculation	→	Stochastic Amount	B
			+
■ Other Equivalent Methods	→	Alternative Amount	C
			+
■ De minimus Blocks	→	<u>Unmodeled Amount</u>	D
		Total C3 Amount	<u>A+B+C+D</u>

- Capital requirements for A, C, and D are subject to a minimum equal to the current formula factors



Appendix II – Capital Methodology

Calculation Basis For Stochastic Amount

- C-3 component of risk-based capital = TAR^* – statutory value of liabilities included in TAR calculation
- TAR
 - Recommended to be set consistent with regulatory capital requirements for variable annuities (CTE90)
 - An after-tax calculation reflecting stochastic interest rate and equity scenarios
 - Calculated as the greatest present value of accumulated deficiencies, same as life PBR methodology

* Total Asset Requirement



Appendix II – Capital Methodology

Key Differences From Reserve Calculation

- Applies to all inforce individual life insurance policies
- No dual-track calculation, as in the life PBR “greater of stochastic or deterministic amount”
- After-tax calculation
- Discounting
- Working Reserve
- Reinvestment Spreads
- Reinsurance Credit
- Stochastic Modeling Alternative (Alternative Amount)



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Appendix III – U.S. vs. International

U.S. and International Frameworks

- PBA approach contains many elements likely to be included in most regulatory reforms (U.S. and global)
- U.S. has taken a bottom-up approach; EU has taken a top-down approach:
 - Concepts are similar; differences arise in implementation
 - Generally, international reform based on a total balance sheet framework
 - U.S. PBA will be implemented one product at a time
 - International standards and U.S. PBA are both based on a projection of a company's asset and liability cash flows in different economic scenarios
 - Projection model reflects company experience + margin
 - Reported value based on modeled results subject to a floor
- In both the U.S. and EU, significant debate has taken place over the technical aspects of the calculations
- U.S. PBA has been developed over several years in cooperation with industry, regulators, and actuarial profession



Appendix III – U.S. vs. International Differences Between U.S. and International Frameworks

Includes, but is not limited to the following:

- Scope
 - International framework encompasses entire balance sheet
 - U.S. framework is more product & risk specific
- Time Horizon
 - International looks at both long-term and short-term
 - U.S. looks at long-term, using greatest present value
- Financial Reporting Basis
 - International is market-value based; the EU capital standard, Solvency II, is based on mark to market concepts where future cash flows are based on margins consistent with current market values
 - U.S. is book-value based; U.S. PBA standards are based on projected cash flows based on real world economic scenarios and margins based on realistic expectations plus a margin for adverse deviation



Appendix III – U.S. vs. International

Differences Between U.S. and International Frameworks

- Governance
 - International recognizes governance may be country-specific
 - U.S. is considering integrating the approach to governance with the financial examination process
- Risk Metrics
 - International metrics may vary by country or be MV based
 - U.S. establishes reserve and capital requirements based on stochastic results, calculated as the average of the results in the tail scenarios (i.e., CTE(90) for TAR)



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Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00 The Foundation:
 - I. Introduction
 - II. Reserve Requirements
 - III. Reporting Requirements
 - IV. Experience Reporting Requirements
 - V. Valuation Manual Minimum Standards



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00. I. Introduction
 - Authority and Applicability
 - Background
 - Description of Valuation Manual
 - Operative Date of Valuation Manual
 - Process for Updating Valuation Manual
 - Overview of Reserve Concepts
 - Corporate Governance Requirements



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00. II. Reserve Requirements
 - Life Insurance Contracts
 - Annuity Contracts
 - Deposit-Type Contracts
 - Health Insurance Contracts
 - Credit Life and Disability Contracts
 - Riders and Supplemental Benefits
 - Claim Reserves



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00. III. Reporting Requirements
 - Provides for actuarial opinion and memorandum requirements in VM-30
 - Provides for principle-based disclosure requirements and standardized template in VM-31 (confidential report)



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00. IV. Experience Reporting Requirements
 - Provides experience reporting requirements in VM-50
 - Provides experience reporting formats and additional instructions in VM-51



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00. V. Valuation Manual Minimum Standards
 - VM-01 Definitions
 - VM-05 SVL
 - VM-20 Life Insurance - PBR
 - VM-21 Variable Annuity - PBR
 - VM-25 Health Insurance
 - VM-26 Credit Life & Disability



Appendix IV – Valuation Manual Detail

VM Table of Contents

- VM-00.V. Valuation Manual Minimum Standards (continued)
 - VM-30 AO & Memorandum Requirements
 - VM-31 PBR Reporting Requirements
 - VM-50 Experience Reporting Requirements
 - VM-51 Experience Reporting Formats
 - VM-Appendix A: Non-PBR Requirements
 - VM-Appendix C: Actuarial Guidelines
 - VM-Appendix G: Corporate Governance



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Appendix V – Governance

PBA Requires Governance

- Flexibility in assumptions, methods, and models used to determine reserves means:
 - New obligations for company boards, management and actuaries to assure they are appropriately governing the processes by which these reserves are determined
 - New obligations for regulators to obtain assurance that the results are appropriate and consistent with the legal requirements
- VM-G is the section of the valuation manual addressing corporate governance of PBA



Appendix V – Governance

Governance Within the SVL

- The SVL primarily points to the VM for governance, but does specifically:
 - Require that PBR assumptions, methods and models be consistent with (but not necessarily identical to) those used in other company risk assessment processes
 - Require that the company annually provide to the commissioner and the board a certification of the effectiveness of internal controls with respect to the PBR valuations



Appendix V – Governance

Governance Within the Valuation Manual

- Provides guidance for governance responsibilities of the board, company management, and qualified actuaries with respect to PBR
- Oversight is the responsibility of the Board of Directors:
 - Reviews summary results and other information on PBR processes
 - Determines the additional steps, if any, that are needed to rely on PBR processes of the company



Appendix V – Governance

Governance Within the Valuation Manual

- Company management responsibilities for PBR
 - Provide information to the Board
 - Review PBR results
 - Adopt internal controls over PBR valuations
 - Ensure that resources are adequate and competent
 - Ensure that PBR processes operate as intended



Appendix V – Governance

Governance Within the Valuation Manual

- Qualified actuary's responsibilities for PBR
 - Oversee determination of PBR
 - Review and approve the assumptions, methods, models, and internal standards
 - Provide a summary report (to board, management)
- The Appointed Actuary provides an annual Statement of Actuarial Opinion on adequacy of all statutory reserves (PBR as well as formulaic reserves)

