

# Financial Summit 2013 – Session #9

## PBR Valuation

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# Agenda

- Current Valuation vs. PBR
  - Review of the basics
  - What are Principle-based Reserves?
- Status of PBR Implementation
- PBR Impact on Examination
  - Items to emphasize on Exam
  - Interviews
  - Risk Matrices



# Current Valuation vs. PBR

With a focus on universal life policies  
with a secondary guarantee



# Review of the Basics

- Life Insurance Reserve =  $PVFB - PVFP$ 
  - $PVFB$  = Present Value of Future Benefits
  - $PVFP$  = Present Value of Future Valuation Premiums
    - The reserve may need to be increased if the actual future gross premiums are less than the future valuation premiums (deficiency reserve)
  - Discounted at statutory interest and mortality



# Review of the Basics

- Term insurance policy
  - Provides a death benefit for a specified period as long as required premiums are paid
  - Required premiums may be level or may increase every one or more years



# Review of the Basics

- Term insurance policy example
  - Period (term) of coverage is 10 years
  - Issued to a female age 35
  - Death benefit is \$100,000
  - Premium required is \$400 per year



# Review of the Basics

- Universal life policy
  - Provides a death benefit as long as the account value is positive
  - Premium payments may be flexible
  - Account Value at the end of a policy year is equal to the Account Value at the beginning of a policy year
    - Plus premium paid during the year
    - Plus interest credited during the year
    - Minus COI charges
    - Minus other expense charges



# Universal Life Policy Secondary Guarantee

- May also be referred to as a no-lapse guarantee
- Guarantees the policy will not lapse as long as certain conditions are met. Common conditions are:
  - Cumulative premiums meet or exceed threshold
  - Shadow account remains positive
- If conditions are met, policy stays in force even if the policy Account Value is zero or negative





# Universal Life Policy Secondary Guarantee

- Example:
  - Policy is issued to a female age 35
  - Death benefit is \$100,000
  - Duration of secondary guarantee is 10 years
  - Required cumulative premiums:
    - \$400 first year
    - \$800 second year
    - ...
    - \$4,000 tenth year
  - Does this look familiar?



# Term policy vs. ULSG

<b>Term Policy (example)</b>	<b>UL Secondary Guarantee (example)</b>
Issued to female age 35	Issued to female age 35
Death benefit: \$100,000	Death benefit: \$100,000
Period of coverage: 10 years	Period of coverage: 10 years
Required premiums: \$400 per year	Required premiums: \$400 per year (cumulative)



# Valuation of Life Insurance Policies

## Model Regulation

- Also known as Regulation XXX
  - Imposed more consistent reserve requirements for policies that are designed differently from more traditional policies but that provide similar guaranteed benefits for the same required premiums
  - Requires that reserves be calculated for the secondary guarantee
  - Reserve for the ULSG policy is the greater of this reserve and the reserves determined according to other rules and regulations governing universal life insurance policies
  - Also allowed the use of X factors to be applied to mortality assumptions used to determine deficiency reserves



# Universal Life Secondary Guarantee

- Regulators began to wonder whether reserves should reflect a premium pattern different than the payment of the minimum premium necessary in each year to satisfy the secondary guarantee requirements
  - In previous example, this would mean payment of exactly \$400 each year
  - In other cases, it could mean payment of a premium that increases each year
  - Consideration was given to basing it on how the policy was sold; i.e., what premium pattern would be expected



# Actuarial Guideline XXXVIII (also known as AXXX)

- Regulators concluded that the reserves should reflect the amount of premiums actually paid to date
- The guideline specifies a series of steps for the calculation
  - The initial steps calculate an initial reserve based on the payment of minimum premiums
  - Then the later steps involve an addition to the initial reserve based on the portion of future benefits that were pre-funded by the payment of premiums in excess of the minimums



# Actuarial Guideline XXXVIII

## First Amendment

- The pre-funding was determined by a ratio
- There were certain policy designs for which the ratio did not properly reflect the amount of pre-funding
  - Typically the ratio was understated for these types of policy designs
  - This was typically due to an overstatement of the denominator due to penalties or less favorable charges or credits applied to premiums paid in excess of a threshold amount
  - This resulted in the first amendment to the guideline



# Actuarial Guideline XXXVIII

## First Amendment

- Simplified example:
  - If no excess premiums were paid as of the valuation date:
    - The secondary guarantee benefit can be fully funded by a payment of \$100 each year for the next five years
    - The secondary guarantee benefit can be fully funded by a single payment of \$800 due to loads on premiums paid in excess of \$200 in a single year (50% load)
  - The policyholder has already paid an additional \$100, so only four more payments of \$100 are necessary
    - The pre-funding ratio should be 20% rather than 12.5%



# Actuarial Guideline XXXVIII

## Third Amendment

- About December of 2010 regulators became aware of secondary guarantees containing multiple sets of charges and/or credits. The interpretation of Regulation XXX and of Actuarial Guideline XXXVIII followed by some insurers resulted in reserves being calculated based on the assumption that future premiums would be significantly higher than premiums the policyholders would actually be required to pay to maintain the secondary guarantee.





# Actuarial Guideline XXXVIII

## Third Amendment

UL Secondary Guarantee (example)	Premiums required in policy years 2-10 if only \$400 paid in year 1	Premiums required in policy years 2-10 if more than \$400 paid in year 1
Issued to female age 35	\$1500	\$400
Death benefit: \$100,000		
Period of coverage: 10 years		
Required premium in year 1: \$400		
Valuation premium years 2-10: \$1000		



# Actuarial Guideline XXXVIII

## Third Amendment

- Although a policyholder may have paid \$500 in the first year and would therefore be subject to the lower subsequent premiums, the initial steps in the reserve calculation would assume a payment of \$400 in the first year, and therefore (some companies argued) much higher premiums in subsequent years



# Actuarial Guideline XXXVIII

## Third Amendment

- The guideline was amended in 2012 to address this issue.



# What are Principle-based Reserves?



# Principle-based Reserves (PBR)

- Stochastic Reserve
- Deterministic Reserve
- Net Premiums Reserve
- PBR Reserve is greatest of the three (after adjustment for any deferred premium asset)



# Stochastic Reserve

- For ULSG:
  - Based on stochastically generated scenarios
  - Each scenario reserve is based on the projection period resulting in the highest amount
  - Reserve is based on CTE(70): the average of the 30% scenarios having the highest results
  - Includes reinsurance cash flows
  - Done on an aggregate basis
  - ULSG may be exempt if it meets the exclusion requirements



# Deterministic Reserve

- For ULSG:
  - Based on a single economic scenario
  - Equals the present value of benefits and expenses less the present value of gross premiums
  - Some assumptions prescribed
  - Includes reinsurance cash flows
  - Done on an aggregate basis
  - ULSG cannot be exempt from this calculation



# Net Premium Reserve

- For ULSG:
  - Calculate a reserve for the base policy, ignoring the secondary guarantee, similar to the method currently required but with different assumptions, with recognition of lapses, and with no deficiency reserve component
  - Calculate a reserve for the secondary guarantee based on the amount of future benefits that have been pre-funded on the valuation date
  - The Net Premium Reserve is the larger of the above two amounts
  - There is a cash surrender value floor





# Current Valuation Impetus for Change

- Reserve methods or assumptions may differ among states due to variations in the effective dates of new or revised laws or regulations
- Reserve methods may not work properly for new policy designs
  - Policies with similar risks may be subject to different reserve requirements
- Formula reserves for some products may be redundant while for others they may be inadequate



# Current Valuation General

- Company reserves are subject to asset adequacy analysis
  - This typically involves cash flow testing for products such as universal life insurance with secondary guarantees
  - The purpose is to test whether the formula reserves are adequate in light of the supporting assets
  - Can lead to additional actuarial reserves but not to lower reserves



# PBR

## General

- The Revisions to the Standard Valuation Law point to an NAIC Valuation Manual for the detailed reserve requirements
  - Promotes uniformity among the states regarding reserve requirements
  - Promotes uniformity among the states regarding the timing of new reserve requirements



# PBR General

- Applies only to new business
- Reserves for policies subject to PBR would be included in the company-wide asset adequacy analysis
- Projected cash flows from reinsurance agreements would only be included in the deterministic and stochastic reserve calculations if they complied with risk transfer requirements or if the impact was to reduce surplus
  - Most likely impact is to the assuming company



# PBR

## General

- Ultimate goal is to have a reserve that is more “right-sized” and that properly reflects the financial risks, benefits, and guarantees associated with the policies being valued



# Summary of Differences

## Rule-based

- Formula for broad categories of products – many not keep up with specific risks
- Same assumptions (and margins) for all companies
- Calculated using formula for each policy
- Locked in at issue date

## Principle-based

- Model-based calculations for groups of policies
- Reflects Company experience in assumptions
- Margin based on uncertainty of experience and level of tail risks
- Reflects specific risks in products
- Reflects Risk Management business practices
- Assumptions can be unlocked to reflect changes in experience



# PBR Legislation

- The model law to implement PBR and the Valuation Manual includes:
  - 2009 NAIC adopted amendments to the SVL (Model 820); and
  - 2012 NAIC adopted amendments to the SNFL (Model 808)
- Legislation to implement PBR is being considered by a number of jurisdictions for the first time during the 2013 legislative sessions
  - Arizona was the first state to pass this legislation
  - Approximately nine other jurisdictions (so far) are considering this legislation in their 2013 legislative sessions
- PBR and the Valuation Manual will become operative on the January 1<sup>st</sup> following legislative adoption by at least 42 jurisdictions representing at least 75% of direct written premium as provided in the SVL
- Effective date is currently projected to be 1/1/16 at the earliest



# Status of PBR Implementation





# Enabling Legislation Process

- State legislatures will only be considering adopting the SVL that enables the Valuation Manual (VM). They are not be adopting the VM itself
- NAIC is drafting a briefing document to help state legislatures understand the enabling SVL and its relationship to the VM
- Briefing document will include:
  - Summary of PBR requirements and other information in the VM
  - Companion changes in the Standard Nonforfeiture Law for Life Insurance to coordinate mortality assumptions and interest rates



# PBR Implementation (EX) Task Force

- Review and Update Process and Resources
- Updates to Blanks
- Standardized Examiner and Analyst tools for regulators
- Support for Statistical Agent Process & Analysis (experience data collection)
- Training, Accreditation, Captives and Special Purpose Vehicles



# What does this mean?

- PBR will significantly impact how companies calculate reserves
- PBR will impact how regulators monitor companies
  - How risks are identified
  - How risks are measured
  - How risks are mitigated
  - The process of calculating reserves is an important piece
  - What will be emphasized on exam



# Impact on Companies

## ■ Challenges

- Develop sources of experience
- Modeling expertise
- Enhanced controls/governance
- Explaining changes in reserves/volatility

## ■ Opportunities

- Link Pricing, ERM and reserves
- Flexibility in product designs to reflect risk appetites
- Reserve efficiency and uniformity



# Impact on Regulators

- Challenges – enforcing rules
  - Verifying model reserves for complex and riskier products;
  - Understanding changes in reserves/volatility
- Opportunities
  - Ties into Risk Focused Examinations
  - Better sources of industry data
  - Since models reflect product design, expected reduction in need for new reserve regulations

But if needed:

- Ability to address situations with requirements more quickly and uniformly than current process



# VM-Governance

- Greater judgment offered by PBR led to regulators' desire for more formal governance standards
- VM-G provides guidance for the roles of:
  - Board of Directors
  - Senior Management
  - The Appointed Actuary
- VM-G is not intended to create new duties for these groups but rather emphasize & clarify the roles and responsibilities of the above



# Guidance for the Board

<b>The existing oversight role of the Board</b>	<b>Application to PBR</b>
Receive & review reports with respect to internal controls	Responsible for implementing controls around PBR models
Interacts with Senior Management to resolve questions and collect information	Understands the product risks identified in the PBR process
With respect to the valuation function established by Senior Management	Understands PBR reserve in relation to the overall risks borne by the company



# Guidance for the Board

- The Board's oversight process with respect to the actuarial function under PBR should include:
  - Support to senior management in its oversight role
  - The infrastructure in place to implement and oversee the PBR process
  - The process senior management undertakes to identify and correct material weaknesses in the PBR process
  - The documentation of review and action taken by the board relating to the PBR function





# Case Study

- Interview of Board Member



# Guidance for Senior Management

- Senior management is responsible for the oversight of the PBR valuation function
- Ensure that adequate infrastructure has been established
  - Adequate resources are made available
  - Policies, procedures, controls, risk tolerances are put in place
- Review of the PBR elements
  - Including models, assumptions, methods
- Report to the to the board
  - Valuation results, critical risk elements, effectiveness of controls, risk management strategies



# Case Study

- Interview Member of Senior Management



# Guidance for Qualified Actuaries

- Qualified Actuary is responsible for reviewing and approving models, methods and assumptions
- Must provide summary report on PBR to senior management and board
- Appointed Actuary continues to opine on all reserves – both formula-based and PBR
- Must disclose to regulators and external auditors any significant unresolved issues related to PBR



# SCOPE and Application

- VM applies to all business
- VM-20 applies to new Life business only
- 3-year transition period
- Provides Exemption Criteria for single state companies or simpler, less risky products
- Products to be most impacted:
  - Universal Life with Secondary Guarantees
  - Term Life



# Case Study

- Interview Actuary on Scope



# The Minimum Reserve

(section 2 of VM-20)

- Three components:
  - Stochastic Reserve (calculated in the aggregate)
  - Deterministic Reserve (calculated in the aggregate)
  - Net Premium Reserve (calculated seriatim and summed)
  
- The company may elect to exclude one or more groups of policies from the stochastic reserve (SR) and/or the deterministic reserve (DR) requirements.
  
- Must pass defined exclusion tests



# Exclusion Tests

## ■ Stochastic Exclusion Test

- Block for which exclusion elected
- Method used for election
- Results of the 16 scenarios and the test ratio
- Rationale for using the demonstration method

## ■ Deterministic Exclusion Test





# Case Study

- Actuary Interview Continues on Topic of Exclusion Tests



# The Minimum Reserve

(section 2 of VM-20)

- The minimum reserve is:
  - For policies that pass both the SR and DR exclusion tests:  
**The net premium reserve**
  - For policies that pass the SR exclusion test but fail the DR exclusion test:  
**Greater of (DR + deferred premium asset) or net premium reserve**
  - For all other policies:  
**Greater of (SR + deferred premium asset) or (DR + deferred premium asset) or net premium reserve**



# Net Premium Reserve

(section 3 of VM-20)

- Serves as a minimum floor
- Should fit within current tax code requirements
- Fully prescribed reserve
- Seriatim calculation
- Comparison is made to the Cash Surrender Value
- VM-20 defines NPR for term and UL/ULSG products; for all other products, NPR equals current CRVM



# The Deterministic Reserve

(section 4 of VM-20)

- A Gross Premium Valuation = present value of benefits and expenses less the present value of premium and other revenue cash flows
- Uses cash flow model to project revenue, benefits, and expenses
- Is an aggregate reserve, and can use same modeling cells as the stochastic reserve calculation to model cash flows
- Cash flows are projected in compliance with later sections of VM-20 (Cash Flow, Reinsurance, and Assumptions Sections)



# Deterministic Reserve Calculation

- Cash flows are projected under a single prescribed economic scenario (interest rate movements and equity returns)
- Present values are calculated using discount rates that equal the path of projected Net Asset Earned Rates (i.e., the company's projected portfolio rate)
  - Different Net Asset Earned Rates are determined for each “model segment” that reflect the company's investment strategies for different products
  - Net Investment Income is not included in the cash flows; investment earnings are reflected in the reserve via the discount rate



# The Stochastic Reserve

## (section 5 of VM-20)

- Similarities to the Deterministic Reserve
  - Both project cash flows using cash flow models
  - Both project cash flows in compliance with later sections of VM-20 (Cash Flow, Reinsurance, and Assumptions Sections)
- Differences with the Deterministic Reserve
  - Focus is on Tail Risk
    - Risks that have high impact but low probability
  - Uses GPVAD method, not Gross Premium Reserve
  - Discount rate is prescribed, not the company's projected portfolio rates



# Stochastic Reserve Calculation

- Cash flows are projected under multiple prescribed economic scenarios
- The Scenario Reserve = the Greatest Present Value of Accumulated Deficiency (GPVAD) for each scenario
  - At the valuation date, and at the end of each projection year, calculate the projected accumulated value of assets (may be positive or negative) for all model segments; include starting assets
  - Accumulated deficiency each year is the negative of accumulated assets
  - Discount the accumulated deficiencies at the end of each projection year to the valuation date
  - Discount rate = 105% of 1-year treasury rate
  - Scenario Reserve = the largest of discounted values
- SR = average of highest 30% of Scenario Reserves



# Summary of PBR Disclosure Requirements

- Provide regulator with adequate information to assess the appropriateness of the principle-based reserve calculation
- Goal: a standardized format for all companies
- Executive summary is required
  - Gives key drivers and results (similar to the RAAIS for the Actuarial Opinion and Memorandum)
  - Provides the regulator with information on the areas that may require further analysis





# PBR Disclosure Requirements

## ■ Summary of Results (Executive Summary)

- Description of policies using a PBR reserve
- Table of products issued and if using PBR
- Table of reserves under PBR
- Method to determine experience assumptions
- Significant changes in method from prior year
- List of key elements to monitor
- Method to determine margins for each material risk factor
- Significant changes in method from prior year
- Valuation assumptions different from used in risk analysis
- Any other considerations



# PBR Disclosure Requirements

## ■ Cash Flow model description

- Modeling system for each major line
- Rationale for the model segments
- Description of grouping in deterministic reserve
- Description of grouping in stochastic reserve
- Length of projection period
- Modeling of policy loans
- Grouping of general account equities
- Grouping of separate account equities



# PBR Disclosure Requirements

- **Detailed report** will be provided for each major product line (life, annuity, etc.)
- For life products, this detail will include:
  - Cash Flow Model description
  - Mortality Assumptions
  - Policyholder Behavior Assumptions
  - Expense Assumptions
  - Asset Assumptions
  - Reinsurance Assumptions
  - Non-Guaranteed Elements Assumptions
  - Other Disclosure Information



# Assumption Requirements

- Under PBR, valuation assumptions will fall into one of three categories:
  - Prescribed Assumptions (Default assumptions, Reinvestment spreads)
  - Stochastically Modeled Assumptions (Interest rate movements and Equity returns)
  - Prudent Estimate Assumptions = the actuary's best estimate of the future (anticipated experience) + a margin for adverse deviation and estimation error (Mortality; Policyholder Behavior; Expenses)



# Assumption Requirements

- Margins reflect the degree of uncertainty in the anticipated experience assumption and 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



# The Assumptions

- Mortality
- Policy Holder Behavior
- Expense
- Asset Assumptions
- Other



# Case Study

- Actuary Interview Continues on Topic of Modeling and Assumption Setting



# Sample Risk Matrix

## Other Than Financial Reporting Risks (section 3 examination repositories: Reserves - Life)

Identified Risk	Branded Risk	Exam Asst.	Control Best Practices	Possible Test of Controls	Possible Detail Tests
The Board of directors is not involved in establishing and/or reviewing the insurer's overall reserving policy and methodology.	ST RV	Other	The insurer's Board of Directors adopted and/or reviewed the reserving policy and methodology. The insurer monitors and revises its reserving policy and methodology as needed.	Verify that the insurer has an established policy/methodology adopted or approved and reviewed by board. Obtain copy of revisions and verify that they were reviewed/approved by the board,	Obtain copy of the overall reserving policy for independent review. Review board minutes for discussion of reserving. Discuss with board members their level of involvement in monitoring the implementation of policy and any updates.
The insurer is not following the policy adopted/reviewed by the board.	OP RV ST	Other	Board review of results annually; Qualified actuary appointed by board and presents to board.	Obtain copy of board minutes to verify report given to board, including discussion of results and impact of changes.	





# Sample Risk Matrix

## Financial Reporting Risks (section 3 examination repositories: Reserves - Life)

Identified Risk	Branded Risk	Exam Asst.	Control Best Practices	Possible Test of Controls	Possible Detail tests
In force data used in reserving is not accurate	OP RV	CO AC	Company has established controls over the input and maintenance of in-force data. Internal audit periodically tests data for accuracy and completeness.	Perform tests to verify the effectiveness of the control procedures.  Review internal audit reports relating to the testing of in-force data or related controls.	Obtain a copy of the detail listing and perform procedures using samples to verify data. Obtain comparisons from actuaries of validation of model or valuation data to administration data.
Assumptions and methodologies are not accurate	RV	VA AC PD	Company has controls in place to test accuracy of assumptions in models and reserve calculations produced by reserve software.	Perform tests to verify the effectiveness of the control procedures.	Obtain results of independent reviews; Utilize the exam actuary to perform independent verification.
Methodologies are not appropriate	RV	VA PD	The insurer uses consistent methodologies based on the requirements of the Valuation Manual, adequately documented and approved by senior management.	Verify senior management review of reports from actuaries and that reports include reserve analyses of all major lines of business.	Review VM-31 documentation supporting exclusion tests; PBR applicability.



# Additional Resources

- [January 11](#) and [May 6](#) comment letters on [NAIC Draft PBR Implementation Plan](#)
- [NAIC Principle-Based Reserving Implementation \(EX\) Task Force](#)
- [American Academy of Actuaries Life Practice Council and Principle-Based Approach Project](#)



# Questions

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