

Are We Ready For PBR

Jason Kehrberg FSA, MAAA

**ACSW Spring Meeting
8:10 - 9:00 AM, June 20, 2013**



POLYSYSTEMS, INC.
Actuarial Data & Software Solutions



Presentation Outline



- Background and Regulatory Update
- Methodology and Calculations Overview
- Company Planning and Implementation Challenges

Background and Regulatory Update



Background



- Newer product benefits/guarantees are complex (consumer driven, technology enabled), often requiring sophisticated assets and hedging strategies, and lead to very firm specific risk profiles on both sides of the balance sheet.
- New products don't lend themselves to formulaic reserves which:
 - Consider only a few contractual risks associated with benefits/guarantees;
 - Treat all companies the same when it comes to their risk management practices;
 - Require legislative action to make adjustments for new products or economic developments;
 - Restrict use of actuarial judgment; prescribed, deterministic assumptions.
- Regulators have attempted to modify the formulaic reserve requirements as new products are developed to address these issues, but with limited success, e.g., *Regulation XXX* (Term/UL), AG 38 (ULSG), AG 39 (VA).
 - Has led to some designing overly complicated products "around" the regulations.
- Some use of PBA: C3P1 (2000), C3P2 (2005), VA CARVM (2009).

Background (Continued)



- Many hope it will address perceived statutory reserve redundancy for level premium term and universal life with secondary guarantees.
- Regulatory approach to PBR
 - 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, not by state legislative action (i.e., model rule process replaced by model VM requirements); should lead to more state uniformity.
 - Develop detailed reserve requirements in the VM
 - Implemented in phases (e.g., *VM 20* for life insurance).
 - In addition to minimum reserves, the VM will also contain requirements for financial reporting, experience reporting and corporate governance.
 - Perfection not required

5

VM 00 Contents



- Introduction
- Reserve Requirements
- Actuarial Opinion and Report Requirements
- Experience Reporting Requirements
- Valuation Manual Minimum Standards
 - VM-01 Definitions for Terms in Requirements
 - VM-02 Minimum Nonforfeiture Mortality and Interest
 - VM-05 NAIC Model Standard Valuation Law
 - VM-20 Requirements for Principle-Based Reserves for Life Products
 - VM-21 Requirements for Principle-Based Reserves for Variable Annuities
 - VM-25 Health Insurance Reserves Minimum Reserve Requirements
 - VM-26 Credit Life and Disability Reserve Requirements
 - VM-30 Actuarial Opinion and Memorandum Requirements
 - VM-31 Reporting and Documentation Requirements for Business Subject to a PBR
 - VM-50 Experience Reporting Requirements
 - VM-51 Experience Reporting Formats
 - VM-Appendix A Reserve Requirements from Appendix A of APPM
 - VM-Appendix C Actuarial Guidelines
 - VM-Appendix G Corporate Governance Requirements for PBR
 - VM-Appendix M Mortality Tables

6

VM 20 Contents



1. Purpose and Definitions
2. Minimum Reserve
3. Net Premium Reserve
4. Deterministic Reserve
5. Stochastic Reserve
6. Stochastic and Deterministic Exclusion Tests
7. Cash Flow Models
8. Reinsurance
9. Assumptions
10. Appendices
 - A. Stochastic Exclusion Test Scenarios
 - B. Appendix 2 – Tables for Calculating Asset Default Costs and Asset Spreads, Including Basis of Tables

7

Key Dates



- AG 38
 - NAIC's Exec. Committee and Plenary voted on 9/12/12 to adopt revisions to AG 38 that will require some companies to calculate and report a modified version of VM 20's Deterministic Reserve this year-end.
- Valuation Manual
 - Adopted by NAIC 12/2/2012 (VM on NAIC website is 11/19/2012).
 - Requires 42 of 56 jurisdictions and > 75% of direct premium, then starts following January 1 with implementation phased in over 3 years. AZ was first to adopt, 9 other jurisdictions working it into 2013 legislative sessions. Could be effective as early as 1/1/2015, probably more likely to be 1/1/2016.
 - NY is not entirely on board yet with current document. NY issues include:
 - Actuarial: Serial DR for auditing; level of conservatism in mortality, asset credit quality, post level term period profits, prefers focusing efforts on best estimate assumptions rather than margins.
 - Superintendent: PBR in banking didn't work; reserves decrease → insolvency increases; unclear prices will decrease; regulators ill equipped; not sure PBR is the answer; at least wants 3 years of parallel testing.

8

NAIC Groups



- Life Actuarial Task Force (reports to Life Insurance and Annuities (A) committee).
 - Aggregate Margin subgroup – e.g., 85th percentile on interest, mortality, withdrawals and expenses may correspond to significantly higher percentile when combined.
 - Experience Reporting (*VM 51*) subgroup.
 - VM PBR Process & Coordination subgroup (changing annual statement blanks).
- PBR Implementation Task Force (reports to Executive (EX) committee).
 - Develop, maintain, and oversee Implementation Plan.
 - Draft plan available on NAIC website (more detail to come).
 - Conducted March 2013 survey of state regulators (40/56 replied) – conclusion is that PBR may not cause as much strain on state insurance department resources as some have thought.
 - State vs. centralized audit/review.
 - Create legislative educational package to assist states in adoption efforts (AAA also creating its own companion package).
- Solutions for captives and SPV within PBR.

9

NAIC Groups (Continued)



- Financial Analysis Working Group (reports to Financial Condition (E) committee)
 - Goals is to create level playing field across states by doing independent review and issue report to non-domestic states (hired two actuarial consulting firms to assist with 8D and 8E review).
 - 8D AOM's have just been received and are just beginning to be reviewed.
 - Over 100+ 8E policy forms have been reviewed.
 - Virtually all are method 1 (method 2 too complex), split evenly across 3 types.
 - Domestic states appear to be following the FAWG.
 - Requiring companies to submit/sign non-domestic state certification saying SG's are the same across states.
 - Average rate increase is 5–6%, range is 1–20% ... even higher for single premium (partly due to lower nonforfeiture rates).
- Emerging Accounting Issues Working Group (reports to Accounting Practices and Procedures Task Force of the E committee)
 - Responds to clarification questions that are generally narrow in scope.
 - Answered 20+ questions on 8D, 10+ on 8E (many questions on AOM).
 - Role going forward?

10

AAA and ACLI PBR Activity



- Life Reserves Work Group recently submitted amendment forms:
 - Clarification to the approach in *VM 20* to model policy loan cash flows in the deterministic reserve and stochastic reserve calculations (simplification).
 - Alternate approach to calculate the deterministic reserve called the Direct Iteration Method (easier way to calculate starting assets).
 - Modification to the treatment of the PIMR in the deterministic reserve (simplification).
- PBR Strategy Subgroup – Working on companion brief to NAIC’s legislative brief for state legislators.
- PBR Impact Task Force – Working on an appropriate response to the question received from many legislators regarding the expected dollar impact of PBR on total industry reserves.
- PBR Practice Note Work Group – Appears to favor cost of capital approach. Will continue evaluating and will make recommendation at NAIC’s August meeting.
- ACLI Issues: Net premium reserves; Aggregate margins; Mortality assumptions; (Re)investment assumptions; Starting assets and low interest rate environment.

11

Methodology and Calculation Overview



Actuarial Guideline 38 Section 8D



- Applies to ULSG with multiple sets of credits and/or charges.
- Exemptions for face < 2% or < \$1 billion.
- Primary methodology:
 - Reserve = max{current method; DR from VM 20};
 - Maximum is determined on aggregate, not seriatim, basis;
 - Excess of DR allocated seriatim by current method reserve.
- Alternative methodology:
 - Reserve computed on basis 11/1/11 LATF interpretation of AG 38;
 - DR mortality and lapse rates are same as DR from VM.
- Sensitivities:
 - Change reinvest. rate to valuation rate and recalculate DR and RBC;
 - Premium persistency sensitivities;
 - Hypothetical bond portfolio.
- Still have to do 8C asset adequacy test.

13

High Level AG 38 8D Steps



1. Identify life business with secondary guarantees that have multiple sets of interest rates, COI rates, or loads.
2. Size requirement – 8D applies if face > \$1B or > 2% of total individual permanent life.
3. Set up liability model for applicable policies.
4. Develop and code liability assumptions per VM 20.
5. Set up asset model, including estimated starting assets.
6. Develop and code asset assumptions per VM 20, including scenario 12 from VM 20 Appendix 1.
7. Run liability and asset projections.
8. Calculate VM 20's Deterministic Reserve, modifying investment returns and discount rates per AG 38 8D.

14

Actuarial Guideline 38 Section 8E



- Applies to most ULSG policies issued 1/1/2013+.
- Nine step reserve calculation process similar to current Section 8C, except for Step 1 (determining the minimum gross premiums), which offers two methods depending on product design.
- Method I (“safe harbor”) – must be certified by actuary.
 - Shadow account with single set of charges and credits – premium is such that shadow account is zero at BOY and EOY, using guaranteed charges and credits.
 - Cumulative premium with single set up charges and credits – premium is such that minimum required premium is satisfied at BOY and EOY.
 - Multiple sets of charges and/or credits – premium is that determined with set of charges and credits that produces lowest premiums.
 - Ignores the satisfying the secondary guarantee requirement.
 - Ignores contingencies that limit application of such charges/credits.

15

AG38 8E (continued)



- Limits on guaranteed credits Method I:
 - Must be met at filing and when changed;
 - Interest credits must not exceed Index + 3%.
 - Alternative Index values:
 - Moody’s monthly average of composite yield on seasoned corporate bonds for the month immediately preceding;
 - Moody’s monthly average of composite yield on seasoned corporate bonds for the 12 months immediate preceding.
- Index averaging period is chosen at filing and may not be changed.

16

AG38 8E (continued)



- Method II (i.e., “safe harbor” not met):
 - Complex and labor intensive;
 - Minimum premiums must keep the policy in force;
 - Minimum premiums must produce greatest deficiency reserve at issue, with X-factors set to 100%;
 - Premium patterns tested must include:
 - Level for life of SG;
 - Increasing over life of SG;
 - Combinations of above, e.g. higher initial premiums to get better charges and credits
- Note: Interstate Insurance Product Regulation Commission (IIPRC) gave 12/20/2012 notice that if the compact approves your filing it doesn't mean they approve your AG 38 8E methodology.

17

High Level VM 20 Steps



1. Determine and group in-scope policies.
2. Calculate the Net Premium Reserve:
 - A. New seriatim CRVM-like calculations for Term and ULSG;
 - B. Defaults back to CRVM for other products.
3. Perform Stochastic Reserve Exclusion Test (SRET).
4. Perform Deterministic Reserve Exclusion Test (not needed if you fail SRET or for ULSG).
5. Unless you passed both exclusion tests:
 - A. Set up liability models, and most likely asset models too;
 - B. Conduct experience studies and determine assumptions (there is much VM 20 prescription);
 - C. Calculate Deterministic Reserve – potentially seriatim GPV formula;
 - D. Stochastic Reserve (if failed SRET) – CTE 70 of GPVADs.
6. VM 20 Minimum Reserve is the maximum of the NPR, DR and SR (adjusted for any deferred premium asset).
7. Get comfortable with and explain results.
8. Document and disclose.

18

PBR Assumptions and Margins



- Under PBR, valuation assumptions fall into 1 of 3 categories:
 - Prescribed Assumptions – Deterministic assumptions used for risks where companies have little control over the outcome.
 - Stochastically Modeled Assumptions – Used for risks that are more properly modeled through a stochastic process, i.e., interest rates and equity returns.
 - Prudent Estimate Assumptions – Used where companies have 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 and provide an element of conservatism. Since their determination involves actuarial judgment, they must be reviewed periodically and updated as appropriate.
- Key assumptions: mortality, lapse, withdrawals, expense, premium patterns and persistency, reinvestments, credited rates, benefit utilization.

19

The Net Premium Reserve



- Formulaic
- Seriatim
- CSV floor for each contract
- Prescribed assumptions
 - Net premiums now include an expense and lapse component.
- Net premium calculation
 - Reserve = PVFB – PVFP
- Although subject to change, it looks like there will be different methods for non-fund (Term) products and fund (UL) products.

20

The Deterministic Reserve



- $DR = PV(\text{benefits} + \text{expenses} - \text{premium} - \text{net GA/SA transfers} - \text{net policy loan CF} - \text{net reins. CF} - \text{net derivative liability program CF}) + SA_0 + LB_0$
 - Benefits – are before netting the repayment of any policy loans and include, but are not limited to, death and cash surrender benefits.
 - Expenses – exclude federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes.
 - Policy loans – include only if explicitly modeled.
 - Premium – gross premium and includes other applicable revenue.
 - Net reinsurance CF = net reinsurance discrete CF + net reins. aggregate CF.
 - SA_0 = policy AV invested in the SA at the valuation date.
 - $VM\ 20$ Discount Rate = Net Investment Earnings / Invested Assets
 - Net investment earnings = investment income + capital G/L – default costs – investment expenses.
- The Deterministic Reserve Exclusion Test – pass if sum of guaranteed gross premiums is greater sum of valuation net premiums.
- Use of compression currently being debated.

21

The Stochastic Reserve



- CTE 70 of greatest present value of accumulated deficiencies, captures tail risk.
- Calculated in the aggregate, allowing for risk offsets (although still floored at NPR and DR).
- Requires ALM model.
- Actuary is supposed to set up additional amount to capture material risk not captured elsewhere.
- Compression allowed.

22

The Stochastic Reserve Exclusion Test



- Requires calculating adjusted deterministic reserves (no margins) under 16 interest and equity scenarios and calculating a metric that measures their variability.
- If changes to interest and equity rates don't materially change the deterministic reserve, then the deterministic reserve adequately covers all the risks and you don't have to calculate the stochastic reserve.
- Test statistic = $\frac{\text{Largest Adjusted Deterministic Reserve} - \text{Baseline Adjusted Deterministic Reserve}}{\text{PVBEN}}$ adjusted for reins by subtracting ceded benefits.
 - Must be less than 4.5% to pass.

23

PBR Requires More Governance



- Flexibility in assumptions, methods, and models means new obligations to appropriately govern the process (VM-G). The use of projections in financial reporting will be a first for many companies.
 - Board must review summary results and process documentation and determine what additional actions, if any, are needed to rely on company's PBR processes. PBR assumptions, methods and models must be consistent with other company risk processes. Must certify effectiveness of internal controls with respect to PBR valuations.
 - Management provides information to the board, reviews results, adopts necessary internal controls, ensures adequate and competent resources, and functioning PBR processes.
 - Qualified actuary reviews/approves assumptions, methods and models, oversees calculation, and provides summary report to management and board.
 - Appointed actuary provides annual statement of actuarial opinion on adequacy of all reserves, PBR and formulaic.

24

Company Planning and Implementation Challenges



AG 38 8D Challenges



- Short time frame.
- First time assets integrated into statutory valuation for life insurance.
- Interpretation gray areas (e.g., reinsurance reserve credits).
- Internal communications.
- Risk sharing – will your reinsurance partner(s) still want to reinsure your business at rates that are acceptable to you?
- Mortality assumption – most companies didn't go as granular as their underwriting, keeping two bases for mortality (e.g., Sm/NS or M/F).

Acquiring Necessary Expertise



- Location of expertise – can be viewed as part valuation, part modeling.
- Ideally at least one person at your company familiar with the *VM 20* document and industry practice.
- Resources:
 - *VM 20* document (and related amendments, letters, etc.);
 - Draft ASOP, *Standards for Principle-Based Reserves for Life Products*;
 - AAA Practice Note;
 - SOA Practitioner's Guide;
 - Webinars, seminars, conferences;
 - SOA Research Study: "A Survey of Actuarial Modeling Controls in the Context of a Model-Based Valuation Framework" (15 key steps to improve the control environment).
- Even with the right expertise, expect difficulties during implementation.

27

Leveraging Staff, Systems and Models



- Where to start?
 - Buy vs. build, new vs. existing.
 - More than just projecting cash flows.
 - What do you expect to produce for *VM 20*?
 - Develop straw-man approach.
 - Inventory available staff and systems/models (Valuation, CFT, etc.).
- Actuarial gap analysis
 - Required calculations – Net Premiums Reserve, exclusion test statistics, defaults, stochastic first principle calculations, solver.
 - Experience studies.
 - Setting up models and sensitivities.
 - Approximations typically used in CFT projections may not be appropriate for PBR.
- Information Technology (IT) gap analysis
 - Data, hardware, software, run time (cost?).
 - Evaluate need for an asset model, cell compression, etc.
 - Robust production environment to ensure adequate controls, model integrity, and access to grid.
 - No time for manual intervention.
 - Required flexibility?

28

Setting Assumptions and Margins



- Importance of experience studies.
 - **Your** experience studies, not regulatory prescription, will be the basis of key valuation assumptions.
 - Evaluate the state of your experience studies (frequency, quality, documentation).
 - Affects assumptions as well as margins.
- VM 20 mortality is particularly difficult.
 - High amount of prescription.
 - Prescribed method has been revised.
- ULSG lapses.
- Relatively little guidance on margins.
 - Each non-prescribed assumption requires its own margin; correlation offsets allowed.
 - Still some contention on exactly how to handle.
 - Start with a simple approach since rules/guidance may change and industry practice is still evolving.

29

Dealing with Volatility in Results



- How do you become comfortable results are correct?
- With PBR comes volatility (if not holding NPR).
- Can't materially reduce volatility.
 - Valuation actuaries often focus on producing results that pass a quick reasonableness check.
 - Will need to be spend much more time understanding results and being able to quantify and explain changes.
- But can use tools to help manage and communicate volatility.
 - Sensitivity analysis.
 - Attribution analysis – requires good assumption set management and version control.
 - Leverage hardware and automation – reduces runtime and leaves more time for analysis.
- In general, PBR results will be more sensitive to level of integration between valuation and risk/capital management.

30

Documenting and Reporting



- External *VM 20* documentation requirements are substantial and still not well understood.
- Internal documentation is just as important as external.
- Document process and report on results.
- Automate via production reports.
- Will likely need new reports for *VM 20*, but leverage existing reports where possible.
- Good version control is key.

31

Other Thoughts on Implementing *VM 20*



- Benefit from doing some things now:
 - Assign a champion to learn and follow *VM 20*, and take lead in your firm's interpretation of *VM 20*;
 - Decide upon scope, aggregation and model segments;
 - Determine whether you'll pass the exclusion tests;
 - Determine gaps in experience studies – takes time to develop exposure.
- Conduct a dry run:
 - Take a piecemeal approach – use placeholders;
 - Lower expectations – trial and error, with lots of error.
- Leverage hardware and automation to reduce runtime.
- Develop relationship with IT.
- Eventually need to project *VM 20* reserves for pricing and corporate planning (address nested stochastic issue).
- Interpretation – key to statutory conservatism is defining moderately adverse.
- Whether or not (and how) to model hedges.
- Compression (didn't turn out well in impact study).

32

Questions?

