



SOCIETY OF ACTUARIES

**Advanced Seminar on Principle-Based Capital
September 23, 2009**

Session 1: C3P3 Overview

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Overview of C3 Phase 3 for Life Products

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Presentation Outline

- C3 Phase 3 Chronology & Timeline
- Scope
- Overview of Calculation Methodology
- Differences from PBA Reserve Requirements (VM-20)
- Challenges and Issues



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Definition of Principle-based Approach

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



Overview of PBA Initiative

Variable annuities

Capital: C3 Phase 2
Reserves: AG43 (VACARVM)

In place since 2005
Effective 12/31/09

Life Products

Capital: C3 Phase 3
Reserves: VM-20

Proposed effective date: 12/31/2010
Earliest possible date: 12/31/2012

Fixed Annuities

Capital: C3 Phase 4
Reserves: VM-22

Possible effective date: 12/31/2010
Earliest possible date: 12/31/2012



C3 Phase 3 Chronology & Timeline

1. Academy Life Capital Work Group (LCWG) developed out of the Life Reserve Work Group (LRWG)
2. Initial Framework presented to NAIC in Sept. 2006
3. Framework updated throughout 2007 and 2008
4. C3 Work Group (merger of LCWG and Annuity Capital Work Group) is now leading the C3P3 project for the Academy
5. March 2009 Report was exposed for comment by the Life RBC Working Group (LRBC) of the NAIC
6. 12 comment letters were received. Based on this, the LRBC decided to defer the implementation of C3P3 from 12/31/09 to 12/31/10



C3 Phase 3 Chronology & Timeline

7. Comment letters discussed by LRBC on July 29, 2009, and responses communicated
8. Updated report to be submitted and possibly exposed for comment at September 2009 NAIC meeting
9. Target is to have substantially completed draft by December of 2009, to enable NAIC adoption with YE2010 effective date
10. Possible extension to fixed annuities to replace C3P1 (but effective date will not be before YE2010)



Scope

- Applies to all life insurance products inforce. No restriction to just new issues like VM-20
- C3WG recognizes there may be significant implementation issues in applying C3P3 to entire all inforce, however:
 - The RBC capital calculation only makes sense for all inforce
 - Separating new business from inforce works for reserves, but not capital
 - C3WG has strived to provide simplification options where appropriate
 - Stochastic Exclusion Test
 - Alternative Amount



Scope Recommendations

- Inclusion of Single Premium Life business in C3P3 and removal from scope of C3P1
- Adjustment for current C1 required capital on expense allowance for variable products within scope
- Adjustment for current C1cs amount on equities inforce at the valuation date which back the life product reserves
- Allocation of C3 RBC amount into interest rate and equity/market risk components, combined with existing C3a and C3c components respectively



C3 Phase 3 Calculation Approaches

Company selects one of four different approaches for different blocks of business to determine the total C3 charge:

CTE 90 Stochastic Calculation	→	Stochastic Amount	A
Stochastic Exclusion Test	→	Factor-based Amount	B
Amount Set by Actuary	→	Alternative Amount	C
De minimus Blocks	→	Non-modeled Amount	D
		C3 Amount	A+B+C+D

Calculation Alternatives

Stochastic Amount

- Equals Total Asset Requirement (TAR) less statutory value of liabilities
- TAR is:
 - Based on a run-off of cash flows under stochastically generated interest rate and equity scenarios
 - Uses Prudent Estimate Assumptions (conceptually the same as VM-20)
 - Based on GPVAD (Greatest PV of Accumulated Deficiencies)
 - Uses a 90 CTE level (average of 10% most adverse scenarios)
- May be based on data on date preceding valuation date with certain limitations
- Starting assets are set to be not less than 98% of reserves on projection date
- Federal income taxes are included in cash flows (VM-20 does not address federal income taxes)
- Specific guidance regarding modeling of:
 - Derivative Instruments
 - Reinsurance
 - Revenue Sharing

Stochastic Amount

Requires a Rigorous Cash Flow Model

- Asset Model is needed to project asset cash flows
- Expect most companies to use cash flow testing model
- Asset Model is used to determine:
 - Liability cash flows
 - Asset cash flows

Stochastic Amount - Assumptions

Cash flows based on prudent estimate assumptions

- C3P3 Report contains guiding principles underlying the determination of prudent estimate assumptions
- For policies valued under VM-20 requirements, use same prudent estimate assumptions used to determine VM-20 reserves
- For policies valued under current formula-based requirements, prudent estimate assumptions should be consistent with (but not necessarily the same as) assumptions developed under VM-20
- Equals the actuary's best estimate of the future, (i.e., "Anticipated Experience") plus a margin that includes a provision for adverse deviation and estimation error
- The resulting assumptions could differ by company, reflecting the different risk profiles of the company

Stochastic Amount - Assumptions

- **Anticipated experience assumptions** are generally based on the actual experience of the company, or if not known, on industry experience (or a combination of the two)
- **Assumption margins** will be determined by the actuary using professional judgment, subject to any guidelines established by the NAIC and ASOPs



Stochastic Amount - Margins

- Reflects the degree of uncertainty in the anticipated experience assumption
- Provides an element of conservatism
- Regulators are concerned about:
 - the degree of discretion given the actuary to establish margins
 - Whether margins are determined separately for each risk factor, or determined in the aggregate
 - What to do if there is a lack of credible experience data



Calculation Alternatives

Stochastic Amount – Other Assumptions

- Asset projections
 - Reflect company's reinvestment & disinvestment policies
 - Use prudent estimates for defaults
 - Spreads on reinvestments determined by actuarial judgment
- Treatment of Derivative Instruments
 - Will be directly reflected in the C3P3 calculation
 - Consistent with VM-20 requirements
 - Differs somewhat from Clearly Defined Hedging Strategy framework in C3P2
- Reinsurance
 - Include reinsurance cash flows in projections
 - Reflecting reinsurance cash flows is not dependent on satisfying current risk transfer rules

Calculation Alternatives

Stochastic Amount – Economic Scenarios

The stochastic scenarios used in the calculation of the stochastic amount must use either:

- Prescribed scenarios
- Prescribed scenario generators with prescribed parameters
- Company-generated scenarios that meet prescribed calibration criteria
- Proprietary scenario set (a limited number of scenarios determined by the company that adequately captures the associated risks of the product)

Prescribed calibration criteria (rather than prescribed scenario generators) are recommended in order to allow new techniques for modeling and hedging to emerge while still ensuring consistent results across companies

Calculation Alternatives

Stochastic Amount – GPVAD Methodology

The stochastic amount is determined using the Greatest Present Value of Accumulated Deficiencies (GPVAD) method:

- Project accumulated assets at the end of each future year
- Determine the accumulated deficiency at the end of each year equal to a defined “working reserve” less accumulated assets
- Working reserve is defined to be cash surrender value. If policy does not have a CSV, then use working reserve of zero
- Discount each accumulated deficiency for each future year back to time zero using discount rates equal to the path of one year after-tax Treasury rates times 105% (same as C3P1)
- Select the accumulated deficiency for the year that is the greatest on a PV basis

GPVAD Example

Starting Assets	1,000
Number of Scenarios	1,000
Projection Period	6 Years
Working reserve	Zero

GPVAD Example

	<u>Year:</u>	1	2	3	4	5	6
<u>Asset Earned Rates</u>							
Scenario #1		6.0 %	6.1 %	6.2 %	6.3 %	6.4 %	6.5 %
Scenario #2		5.9	5.8	5.7	5.6	5.5	5.4
Scenario #3		5.9	5.7	5.5	5.3	5.4	5.5
<u>Accumulated Assets</u>							
Scenario #1	\$1,000	\$950	\$903	\$857	\$815	\$774	\$735
Scenario #2	1,000	800	600	400	200	0	(125)
Scenario #3	1,000	775	550	325	100	(25)	50

GPVAD Example

	<u>Year:</u>	0	1	2	3	4	5	6
<u>PV Accumulated Assets</u>								
Scenario #1		1,000	896	802	718	642	573	511
Scenario #2		1,000	755	533	335	158	-	(87)
Scenario #3		1,000	731	489	272	79	(19)	35
<u>PV Accumulated Deficiency</u>								
Scenario #1		(1,000)	(896)	(802)	(718)	(642)	(573)	(511)
Scenario #2		(1,000)	(755)	(533)	(335)	(158)	-	87
Scenario #3		(1,000)	(731)	(489)	(272)	(79)	19	(35)

GPVAD Example

Greatest PV Accumulated Deficiency

Scenario #1	\$ (511)
Scenario #2	87
Scenario #3	19

All 1000 Scenarios

Min	(800)
Max	330
CTE 90	35 (Average of highest 100)

Stochastic Amount = starting assets plus GPVAD = 1,000 + 35 = 1,035

Calculation Alternatives

Factor-based Amount

Current C3 factor (.5% times reserves) can be used on policies that pass a Stochastic Exclusion Test

- Optional
- Very similar to VM-20 exclusion test
- Permits the use of cash flow testing assumptions for policies not subject to VM-20
- Additional stand-alone reserve adequacy requirement
- Test performed annually
- May be performed prior to year-end
- Subsequent re-determination upon “material subsequent event”

Calculation Alternatives

Alternative Amount

- Amount is determined by actuary using actuarial judgment, subject to demonstration requirements and a minimum floor
- Blocks must be included in company's asset adequacy analysis to be eligible
- Minimum floor depends on whether Actuarial Opinion is qualified or not
 - If qualified: floor = .75% of reserves
 - If non-qualified: floor = existing C3 factor minimum = .5% of reserves
- Demonstration requirements
 - Document that C3 amount is greater than or equal to CTE90
 - Conclusion that amount addresses variability of cash flows to interest and market movements
 - Product description and analysis of C3 risks
- Annually re-determine if conditions are met and the amount to be held



Calculation Alternatives

Non-modeled Amount

- Recognizes there may be de minimus blocks for which company has no cash flow model
- Applies factor to determine C3 amount on such blocks
- Factor is higher of:
 - existing C3 factor (.5% of reserves)
 - average factor imputed from Stochastic Amount and Alternative Amount calculations



Differences from VM-20

- Applies to entire inforce
- No deterministic floor
- Includes FIT
- Working Reserve = CV in GPVAD (VM-20 uses zero)
- Default costs and reinvestment spread assumptions set by company (not prescribed)
- Reinsurance agreements not subject to risk transfer rule
- Can use company's own scenario generator
- More alternatives to avoid the stochastic modeling requirement

Generally, there is greater flexibility and more actuarial discretion in C3P3 than VM-20

Summary of Comment Letters on C3P3

- Stochastic Exclusion Test threshold should be increased so that stochastic modeling is limited only to policies posing the most significant risk
- Add a materiality test for products with low level of C3 risk relative to total C1-C4 risks (default to current C3 factor)
- More guidance needed for Alternative Amount
- More guidance needed to adjust modeling results if performed prior to valuation date
- More guidance on determining the number of scenarios to use
- Small changes in assumption lead to large changes in C3 charge
- Documentation requirements should be streamlined

C3P3 Challenges / Issues

- Completing stochastic modeling in time for reporting deadlines
- Determining margins for Prudent Estimate Assumptions
- Reflecting the new C3P3 amount in pricing
- Determining which products go to each of the 4 alternative approaches
- Modeling derivatives
- Satisfying demonstration requirements for Alternative Amount
- Determining the number of scenarios to use
- Satisfying generator calibration criteria requirements
- Uncertainty surrounding differences from VM-20 that may be eliminated, leading to less actuarial discretion



QUESTIONS?

