Principles-based Valuation Standard for Life Products

LRWG Report to LHATF
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Objectives of this Session

1. Discuss considerations for setting assumption margins under a principles-based system.
2. Discuss updated modeling results for 20-year level premium term product.

- Discuss areas in the Draft Model Regulation where actuarial judgment is required and further guidance is needed.
- Discuss considerations for application of principles-based reserving to in-force contracts.

Considerations for setting assumption margins under a principles-based system

1. This is a major issue!
2. Regulators need to determine the balance between prescribed standards and actuarial judgment.
3. The LRWG believes there are several reasons why different margins are justified compared to current formulaic approach
4. The LRWG has developed a tool that provides a quantitative comparison of the aggregate impact of all assumption margins on the reserve

Reasons for different assumption margins under a Principles-based approach:

1. Assumptions reflect risk characteristics of each company; no need to establish an "industry-based margin" to cover uncertainties between companies.
2. Assumptions are not "locked-in" at issue; less need for a provision for adverse deviation since assumptions can be revised in the future
3. Policyholder behavior is directly reflected,
   a) Through sensitivity testing
   b) Through dynamic assumptions
4. Assumptions bias toward lower reserves
5. Implicit margins are already built into the methodology
   a) Blending to an industry mortality table if experience not fully credible
   b) Removing mortality improvement is a margin
   c) Cash value floor is a margin

Possible approach to compare aggregate impact of all assumption margins

The LRWG is exploring the use of a number we are calling "Z" to provide for the quantitative comparison of the aggregate impact of all assumption margins. It is defined as follows:

$$Z = \frac{\text{Reserve held} - \text{Best estimate liability}}{\text{Present value of capital requirement}}$$

"Z" represents the amount by which the pre-tax return on capital is expected to exceed the return on invested assets:

$$ROC = Z + i \quad \text{(pre-tax)}$$

Possible approach to compare aggregate impact of all assumption margins

- Given this connection with the return on capital, one can determine whether the aggregate impact of all margins are within a reasonable range.
- For these illustrations, the level of capital was set equal to 100% of claims plus 5% of the reserve.
- "Z" could be used as a disclosure item to compare the aggregate impact of all assumption margins.

Modeling Results: 20-year Level Premium Term Product

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Modeling Results: 20-year level premium term product

Initial results were presented to LHATF in December

- Overall reserves were lower than current formulaic reserves
- However, concerns were expressed about the appropriateness of the high reserve levels in the early durations (higher than current formulaic)
- Upon review, the impact was due to high assumption margins that were used: in early years, impact of high margins has large effect on PV of benefits, but not PV of premiums.
- Conclusion: overall margin levels must be carefully considered under the PBA, especially for mortality (e.g. the loadings used for 2001 CSO may be too high.).

Recap of Results from December LHATF

Excerpts from Slide 9, of December term presentation

Numeric Summary – Impact of all margins on deterministic Reserve gross of reinsurance.

	Issue Age 45			Issue Age 65		
Policy Duration (EOY)	Deterministic Reserve With Margins	Current Formulaic	Ratio Deterministic/ Formula	Deterministic Reserve With Margins	Current Formulaic	Ratio Deterministic/ Formula
1	$9,636	$0	N/A	$30,965	$0	N/A
2	11,112	4,365	254%	41,722	27,874	149%
3	12,716	8,646	147%	53,234	55,200	96%
4	14,272	12,822	111%	64,787	81,895	79%
5	15,844	16,850	94%	76,149	107,823	70%

Modeling Results: 20-year level premium term product

- Decided that multiple scenarios using different assumption margins needed to be modeled
- Changes Made in Model since December
  - Policy terminates end of 20th year (removed option to renew)
  - Increased the premium level
  - Assumed mortality fully credible (no blending)
  - Modeled different assumption margins (primarily mortality margins)
  - Formulaic Reserves updated to use 2001 CSO

20 Year Term Product Description

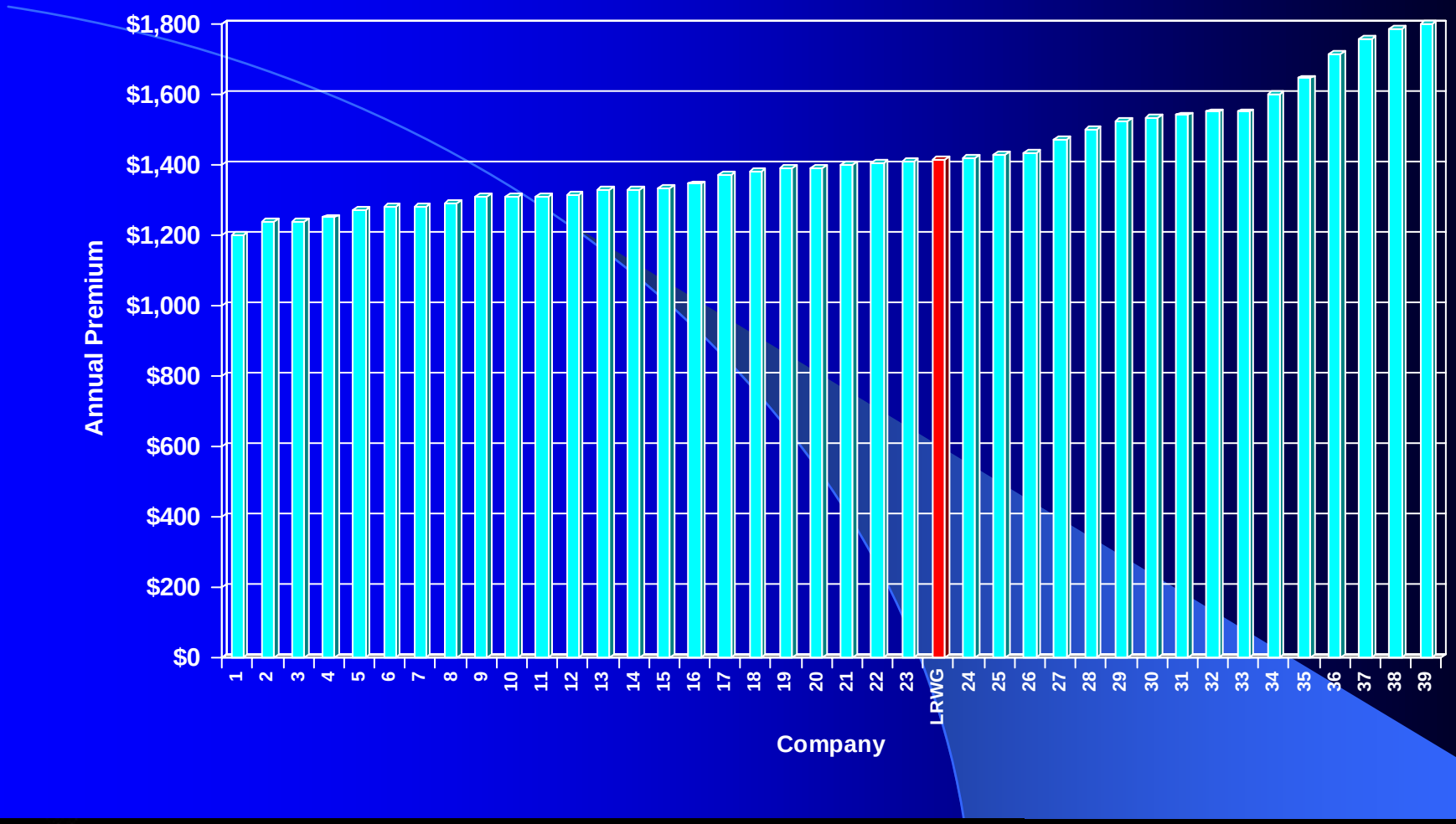
Plan of Insurance:	20 Year Level Term Guaranteed Premiums No Renewal Option after 20 yrs.
Gender/Issue Ages:	Male, 45 and 65
Risk Class:	Best Non Smoker Class

Premium Information	***Age 45***	***Age 65***
Annual Rate per $1000	$1.35	$11.81
Policy Fee	$65.00	$65.00
Total Premium $1,000,000 Face	$1,415.00	$11,875.00
Pre-Tax IRR on Distributable Earnings (1)	10%	10%

(1) Reflecting capital of 100% of claims and 5% of reserves. Reserves using PBE assumptions

Market Perspective Premium Comparison

Issue Age 45, Best Class – Annual Premiums for $1,000,000 Face Amount



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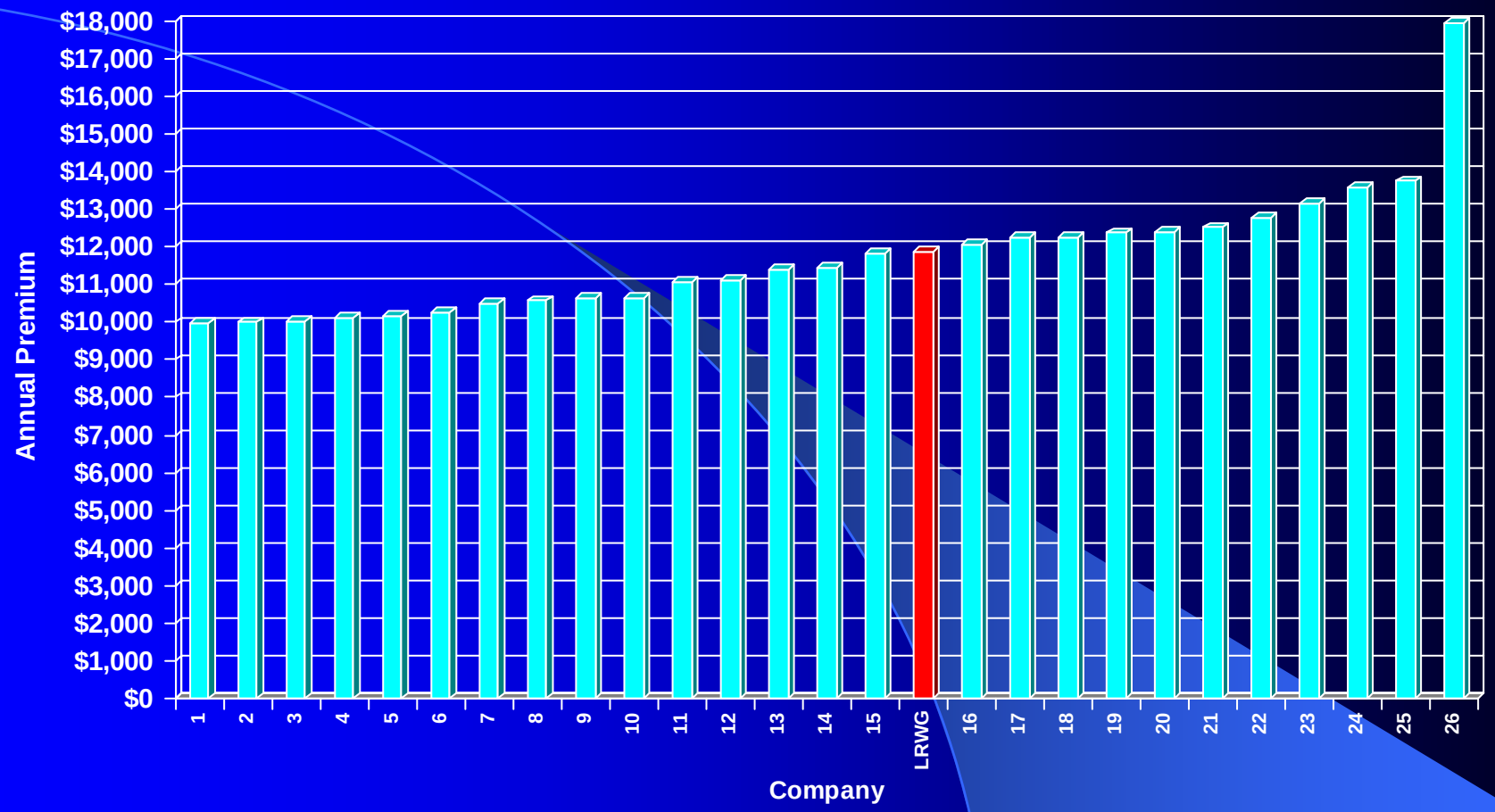


Five Margin Levels

Level 1: Deterministic interest scenario, 2001 CSO mortality margins, 30% lower lapse rates

Level 2: Same as level 1, but mortality margin of 9.375 deaths per 1000 divided by e_x

Level 3: Same as level 1, but mortality margin of 3.5 deaths per 1000 divided by e_x

Level 4: Deterministic interest scenario, mortality margin of 3.2%, no other margins

Level 5: Deterministic interest scenario, mortality margins of 2.1%, 10% lower lapse rates

Best Estimate reserve (no margins) is also shown

Modeling Results: 20-year level premium term product

Observations

- None of the 5 levels assumed mortality improvement.
- Level 4 and Level 5 margins give a near zero reserve at time 0, which is close to a "no gain or loss at issue" scenario
- The reserve at the end of the first year always decreases from time 0, due to acquisition expenses
- But the reserve is not "forced" to be zero at the end of the first year, since there is no FPT adjustment as under the current formulaic approach
- Cash value floor would come into play (reserve is negative) in early durations for Levels 3, 4 and 5.
- Deterministic reserve is about the same as the stochastic reserve.

Modeling Results: 20-year level premium term product

Observations (cont.)

- Current formulaic reserves start with small “Z”, but then “Z” gets very large, due to impact of mortality margin on PV of benefits and net premiums.
- Level 4 and Level 5 margins produce a “Z” value close to 4%, consistent with a 10% IRR assumption (that is, 4% over investment return)
- Levels 1, 2 and 3 margins have significantly higher “Z” values (in excess of 20%).

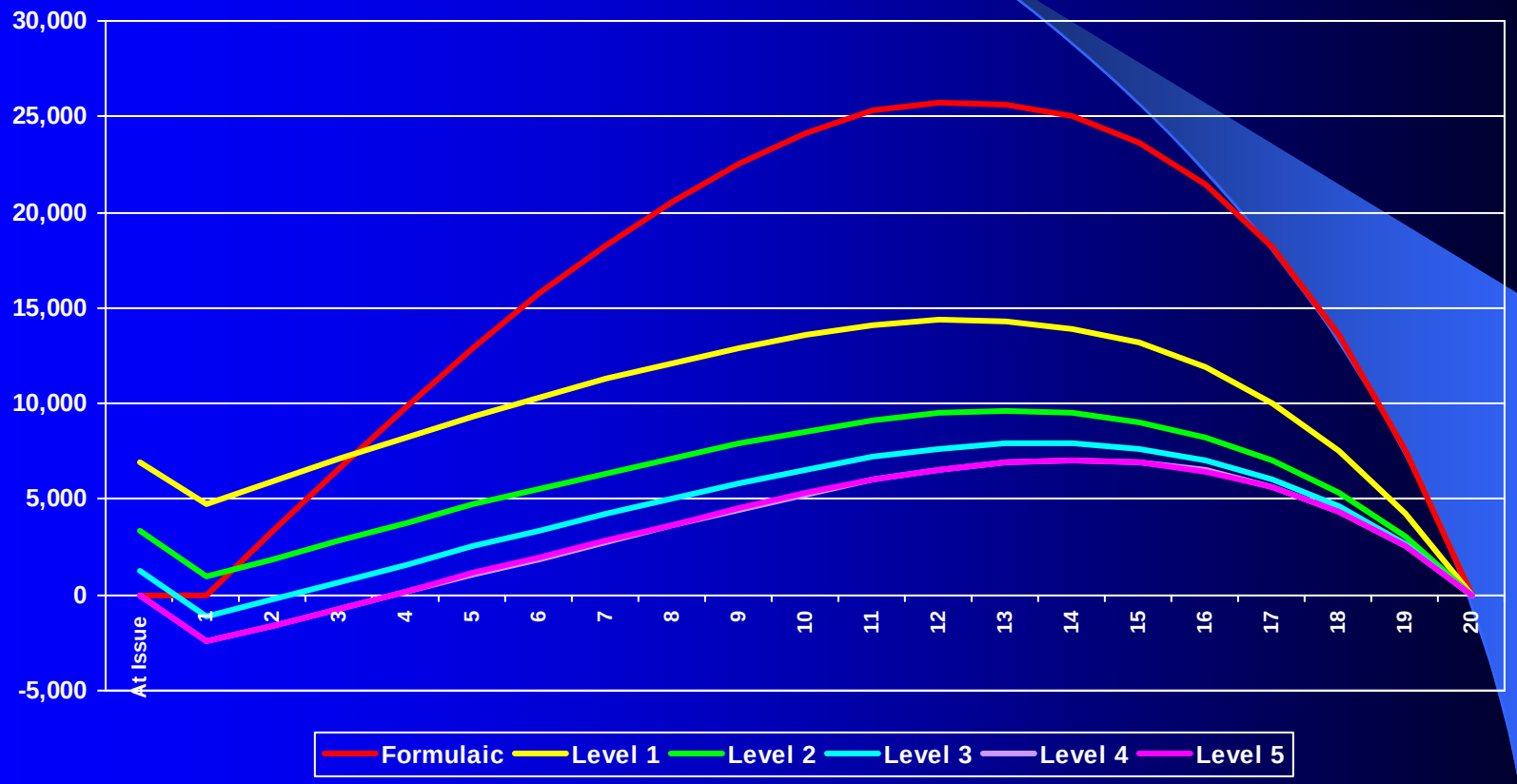
20 Year Term Examples: Deterministic Terminal Reserves at Different Margin Levels

Male, 45, Best Class, $1,000,000, Annual Premium of $1,415.00.

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Year-End	*Formulaic*	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*	*Estimate*
At Issue	$ 0	$ 6,931	$3,309	$1,249	$3	$2	$(362)
1	$ 0	4,785	947	(1,143)	(2,448)	(2,436)	(2,834)
2	3,386	5,956	1,888	(239)	(1,618)	(1,588)	(2,026)
3	6,673	7,081	2,813	667	(760)	(717)	(1,184)
4	9,859	8,214	3,752	1,591	130	181	(309)
5	12,892	9,328	4,699	2,536	1,063	1,118	611
…	…	…	…	…	…	…	…
10	24,145	13,583	8,554	6,554	5,263	5,292	4,791
15	23,686	13,156	9,068	7,653	6,956	6,905	6,567
Discount Rate Margin		Deterministic	Deterministic	Deterministic	Deterministic	Deterministic	None
Mortality Margin		2001 CSO	0.009375/ex	0.0035/ex	3.2%	2.1%	None
Lapse Rate Margin		30%	30%	30%	None	10%	None

20 Year Term Examples:
Deterministic Terminal Reserves at Different Margin Levels

Male, 45, Best Class, $1,000,000, Annual Premium of $1,415.00.



20 Year Term Examples:
Comparison of Z Levels and Deterministic Reserve Margins

Male, 45, Best Class, $1,000,000, Annual Premium of $1,415.00.

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Z Values	***Formulaic***	***Level 1***	***Level 2***	***Level 3***	***Level 4***	***Level 5***	***Estimate***
At Issue	**4.5%**	**90.7%**	**45.7%**	**20.0%**	**4.5%**	**4.5%**	**0.0%**
At 10 Years	**228.4%**	**103.7%**	**44.4%**	**20.8%**	**5.6%**	**5.9%**	**0.0%**
Discount Rate Margin		Deterministic	Deterministic	Deterministic	Deterministic	Deterministic	None
Mortality Margin		2001 CSO	0.009375/ex	0.0035/ex	3.2%	2.1%	None
Lapse Rate Margin		30%	30%	30%	None	10%	None

RESERVES IN EXCESS OF BEST ESTIMATE (subject to floor of zero)

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Year-End	*Formulaic*	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*	*Estimate*
At Issue	362	7,293	3,671	1,611	364	364	0
1	2,834	7,619	3,782	2,834	2,834	2,834	0
2	5,412	7,982	3,914	2,026	2,026	2,026	0
3	7,858	8,266	3,997	1,851	1,184	1,184	0
4	10,169	8,523	4,061	1,900	439	491	0
5	12,281	8,717	4,088	1,925	452	507	0
…	…	…	…	…	…	…	…
10	19,354	8,791	3,763	1,763	471	501	0
15	17,120	6,589	2,501	1,086	390	338	0

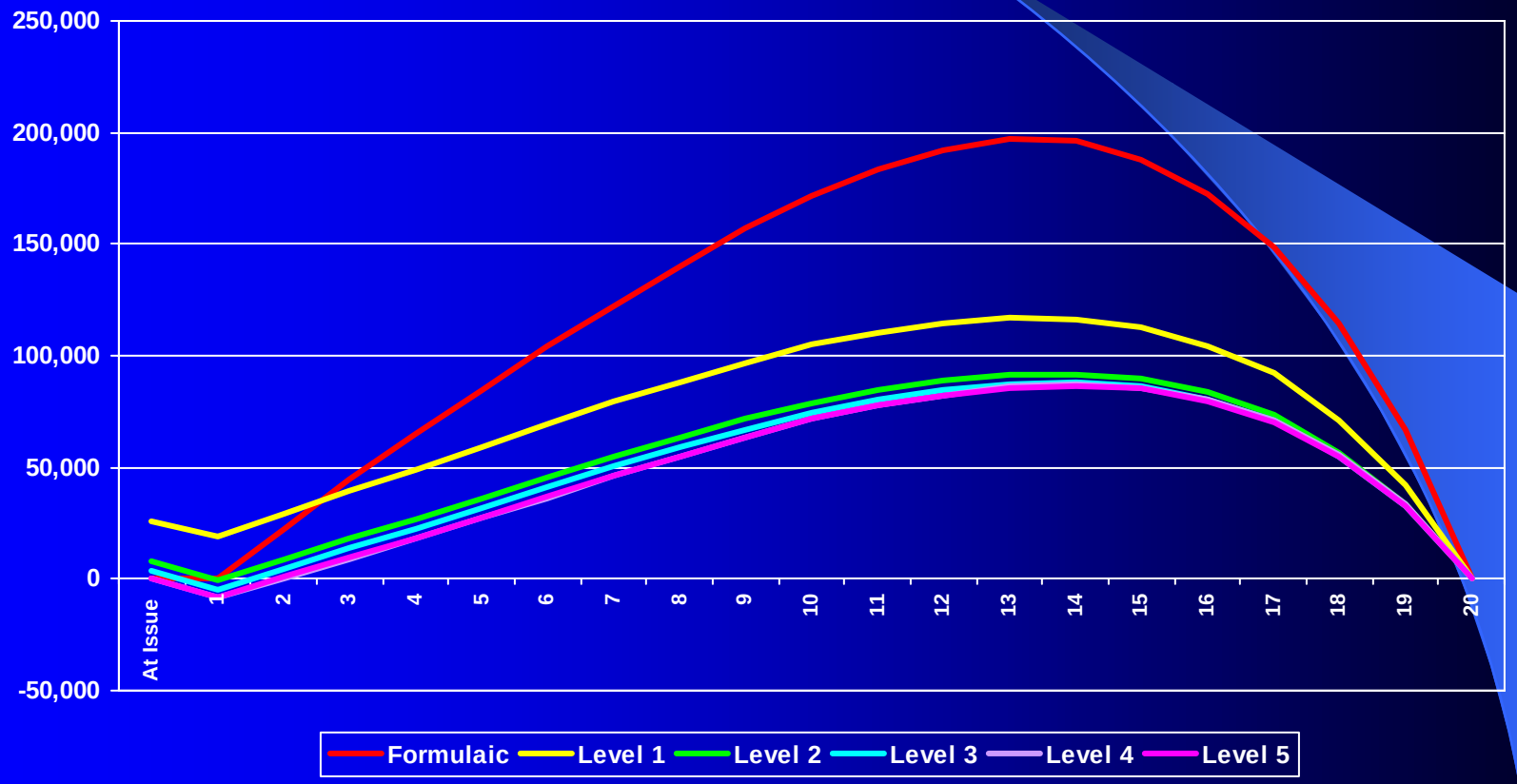
20 Year Term Examples:
Deterministic Terminal Reserves at Different Margin Levels

Male, 65, Best Class, $1,000,000, Annual Premium of $11,875.00.

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Year-End	*Formulaic*	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*	*Estimate*
At Issue	$0	25,916	7,717	3,849	(73)	346	(3,966)
1	$0	18,732	(438)	(4,422)	(8,631)	(8,144)	(12,734)
2	22,483	29,126	8,862	4,741	187	758	(4,129)
3	44,193	39,322	18,067	13,833	9,082	9,694	4,614
4	65,059	49,208	27,094	22,777	17,942	18,562	13,382
5	85,058	59,255	36,375	31,993	27,192	27,784	22,566
…	…	…	…	…	…	…	…
10	171,494	104,894	79,045	74,521	71,648	71,526	66,854
15	187,852	112,903	89,834	86,121	85,876	85,127	81,877
Discount Rate Margin		Deterministic	Deterministic	Deterministic	Deterministic	Deterministic	None
Mortality Margin		2001 CSO	0.009375/ex	0.0035/ex	3.2%	2.1%	None
Lapse Rate Margin		30%	30%	30%	None	10%	None

20 Year Term Examples:
Deterministic Terminal Reserves at Different Margin Levels

Male, 65, Best Class, $1,000,000, Annual Premium of $1,415.00.



20 Year Term Examples:
Comparison of Z Levels and Deterministic Reserve Margins

Male, 65, Best Class, $1,000,000, Annual Premium of $11,875.00.

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Z Values	***Formulaic***	***Level 1***	***Level 2***	***Level 3***	***Level 4***	***Level 5***	***Estimate***
At Issue	**4.5%**	**34.1%**	**13.3%**	**8.9%**	**4.5%**	**4.9%**	**0.0%**
At 10 Years	**113.0%**	**41.1%**	**13.2%**	**8.3%**	**5.2%**	**5.0%**	**0.0%**
Discount Rate Margin		Deterministic	Deterministic	Deterministic	Deterministic	Deterministic	None
Mortality Margin		2001 CSO	0.009375/ex	0.0035/ex	3.2%	2.1%	None
Lapse Rate Margin		30%	30%	30%	None	10%	None

RESERVES IN EXCESS OF BEST ESTIMATE (subject to floor of zero)

Policy	*Current*	*Principles-based with Margins*					*PBA Best*
Year-End	*Formulaic*	*Level 1*	*Level 2*	*Level 3*	*Level 4*	*Level 5*	*Estimate*
At Issue	3,966	29,882	11,683	7,814	3,966	4,311	-
1	12,734	31,466	12,734	12,734	12,734	12,734	-
2	26,613	33,255	12,991	8,870	4,316	4,888	-
3	39,580	34,709	13,453	9,220	4,469	5,081	-
4	51,677	35,826	13,712	9,395	4,560	5,180	-
5	62,492	36,689	13,809	9,428	4,627	5,218	-
…	…	…	…	…	…	…	…
10	104,641	38,040	12,192	7,667	4,794	4,672	-
15	105,975	31,025	7,956	4,243	3,999	3,249	-

20 Year Term Examples:
Model Office Reserve Levels – Aged 20 Years

- Current Formulaic Reserve: $121,301

- Comparative Deterministic Reserves
  - Level 2: $ 50,564 (42% of Formulaic)
  - Level 4: $ 41,095 (34% of Formulaic)

- Stochastic reserves not materially different

Areas Where Further Guidance is Needed When Actuarial Judgment is Required

Areas Where Further Guidance is Needed

1. To assist both the valuation actuary, and the reviewing actuary conducting an independent review, guidance is needed whenever actuarial judgment is required.
2. This guidance is not to be viewed as prescriptive, since it is not intended to define hard and fast rules.
3. The guidance would describe considerations and principles and should be taken into account when exercising actuarial judgment.
4. The draft documents exposed for comment by LHATF in December of 2005 attempted to incorporate these guidelines where appropriate. However, we believe there are a number of places where further guidance is needed.

Areas Where Further Guidance is Needed

5. To address this need, the LRWG concluded that a three-step process should be followed:

   - Identify all the places in the 4 documents (Model Regulation and 3 Actuarial Guidelines) where additional guidance is needed
   - Decide where to best place this new guidance (e.g. in the model reg/AG itself, or an ASOP, or in a practice note)
   - Develop the specific wording that provides the actual guidance, which will depend in part on where it will be located.

Considerations for Application of Principles-based Reserving to In force Contracts

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Arguments for the Application of PBR to All In Force Contracts

1. Measures the risks of a company more appropriately than current formulaic reserves
   - Provides a consistent methodology for all business.
   - Consistent with international actuarial and accounting directions
   - Constitutes a more rigorous approach for all blocks of business
   - Provides better information for regulators
2. Reduces those reserves that are redundant under current regulation and strengthens those reserves that are inadequate under current regulation, and will tend to lessen dependence on complex reinsurance and financing solutions

Arguments for the Application of PBR to All Inforce Contracts

3. Consistent with Enterprise Risk Management in that:
   - Incorporates risk of the entire block of business
   - The reserve will allow some offset of covariant risks
   - Reserves are set using the same or similar models to those that should be used to manage the business.
4. Allows the entire asset portfolio to be reflected in the reserve calculation, reducing the subjectivity involved in allocating assets between PBR and non-PBR liabilities
5. Mitigates the change in the pattern of margins under PBR as compared to the current formulaic approach
6. Potentially reduces *on-going* costs by not requiring companies to maintain multiple reserve approaches

Arguments Against the Application of PBR to All Inforce Contracts

1. Potential for large reserve discontinuity if inforce block is large relative to new business
2. May have significant tax implications
   - Retroactive changes in reserve method are not permitted for tax purposes
   - Increase in reserves will not increase tax-deductible reserve, but decrease in reserves will likely decrease tax-deductible reserve
3. Does not allow for as long a "learning period" with respect to the overall application, systems, and peer review before the approach is applied to a large block of business

Arguments Against the Application of PBR to All Inforce Contracts

4. System implications and training may *initially* lead to large implementation costs.
5. Most, but not all, past changes in reserve methodology have not been applied to in force business.
6. Some blocks may be very small or the reserves may already be equal to the Cash Surrender Value, creating a lot of additional work for little or no value.

Application of PBR to Subset of In Force

- Three recent dates with significant changes to formulaic reserves:
    1. January 1, 2000 – Reg "XXX"
    2. January 1, 2003 – AG38, section 8
    3. July 1, 2005 – revised AG38, section 8
- In force contracts subject to these reserve standards are possible subsets that could be subject to application of PBR
    - Some of the arguments against application to in force contracts are mitigated
    - But many of the problems described above dealing with the application to in force contracts still exist

Phased-in Application of PBR

- Another option is to phase in the application to in force contracts over time (or phase-in the effect over time).
- For example, initially PBR would be prospective only, and then all or a portion of inforce contracts would be phased in over X years.
  - Some of the arguments against application to in force contracts are mitigated
  - But many of the problems described above dealing with the application to in force contracts still exist