Attachment Twelve
Life Actuarial (A) Task Force
4/1-2/16

Implementing Principle-Based Reserves for Life Insurers:

A Discussion Paper

March 28, 2016

Contents

1 INTRODUCTION

New York Life supports principle-based reserves (PBR). PBR promises to better align reserving requirements with product and market developments that have outpaced the old, formula-based rules. We see great potential in this development. We also recognize there are risks. As preparations for the implementation of PBR continue, we ask regulators to carefully review its key technical aspects.

In this paper, we focus on an important issue that needs attention before PBR takes effect: the formula-based guardrail referred to as the "net premium reserve." PBR requires an insurer to compare the net premium reserve with its modeling results. The model-based calculations reflect elements of company experience, and include more room for judgment. The insurer must hold the higher of the net premium reserve and the results of its model-based calculations.

In its current form, the net premium reserve formula fails to assure a reasonable reserve for term life insurance products. There are shortcomings in the formula that should be addressed before PBR becomes operative. Specifically:

- The formula includes several simplified assumptions, highlighted in this paper, that are inconsistent with industry experience. These assumptions are stopgaps, originally intended to compensate for excess conservatism in the 2001 CSO mortality table. When the less conservative 2017 CSO mortality table takes effect, these assumptions should be brought closer in line with industry experience. Doing so will avoid "double-counting" the removal of the excess conservatism within the 2001 CSO mortality table.

- There are technical shortcomings in the formula that create anomalous results. Irrespective of the level at which regulators choose to set the net premium reserve, the formula should be corrected to ensure that it follows sound actuarial principles.

The data presented in this paper illustrates these shortcomings, and also makes clear that they can be addressed without making the net premium reserve the predominant part of the principle-based reserve calculation of a typical life insurance company. In other words, addressing the shortcomings will not cause PBR to become a regime that is entirely formula-based, like the current system of reserving. Instead, it will remain a principle-based system that balances modeling and formula-based requirements in a reasonable manner.

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2 THE IMPORTANCE OF THE NET PREMIUM RESERVE

It is essential that regulators correct shortcomings in the net premium reserve formula in order to protect the integrity and effectiveness of PBR. The net premium reserve serves as an important safeguard within PBR. If designed correctly, it will ensure that there is a reasonable minimum reserve in all circumstances.

As the model based calculations within PBR increase judgment in setting reserves, companies may in some cases be tempted to adjust modeling assumptions to reduce reserves, despite potential long-run risks to solvency. The temptation will be greatest for those products where consumer demand is highly sensitive to price. Term life provides a good example. Companies will have an incentive to compete based on their ability to take advantage of the discretion inherent in the modeling process. Some will view any reserve higher than the net premium reserve as a lost opportunity. These companies may seek to set reserves no higher than the required formula-based minimum. A reasonable net premium reserve is needed to serve as a healthy check on this dynamic.

A reasonable net premium reserve is particularly important during PBR's early years. Regulators need time and resources to understand complex company models. Other open issues will also take time to resolve, including, for example, the treatment of reinsurance within PBR and ensuring appropriate guardrails for modeling assumptions in situations where credible data does not exist. A well designed net premium reserve will serve as a strong check against the risks of unusual or unreliable modeling results, or overly aggressive approaches to the model-based calculations, until companies and regulators have gained experience and have increased confidence in the modeling.

An "adequate" net premium reserve allows breathing room to address the remaining challenges within PBR, without sacrificing confidence that reserves are appropriate. "Adequate" does not necessarily mean conservative. Instead, it means only that the net premium reserve makes regulators comfortable that companies are holding a reasonable level of reserves.

3 ENSURING A REASONABLE NET PREMIUM RESERVE FOR TERM LIFE

In the discussion below, we identify stopgap measures in the net premium reserve formula that are inconsistent with industry experience, and demonstrate the significant reduction in the net premium reserve that will occur if these distortions are not corrected.

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3.1 The Current Formula Pushes the Net Premium Reserve Below the Level Originally Intended

Prior to the adoption of the valuation manual in 2012, regulators established the net premium reserve formula for term life insurance products at a level that would yield a minimum reserve relatively close to the modeled deterministic and stochastic reserves that regulators expected most life insurers to calculate. Doing so gave regulators and companies some confidence that the net premium reserve would not be inappropriately high or inappropriately low.

Because the net premium reserve originally relied on the overly conservative 2001 CSO mortality table, regulators made temporary, makeshift adjustments to the formula, leaving some of its components at levels inconsistent with sound actuarial principles and typical experience in the life insurance industry. These adjustments ensured that the formula did not stray too far from the expected modeling calculations. Examples of these makeshift adjustments include the following:

- Currently, the formula includes an expense allowance that, in many cases, is multiples of typical policy acquisition expenses, bringing the level of the net premium reserve down. Moreover, the structure of the expense allowance disproportionately and significantly reduces the net premium reserve for policies issued to younger customers, and for policies with shorter level premium guarantees.

- The formula assumes irrational behavior on the part of policyholders after the level premium period. The premium for a typical term product is guaranteed for an initial level term period (for example, twenty years). After the level premium period, there are substantial premium increases, often ten times or more of the premium in the level period. The formula presumes that policyholders will be willing to pay the increased premiums in a manner that seems to be inconsistent with industry experience.

- Related to the prior point, the formula assumes companies are able to earn significant profits on policies that persist beyond the level premium period, when premiums typically increase substantially. At the same time, rapidly advancing technology is improving the ability of consumers to access and process information, potentially leading to more efficient decision-making about the costs and benefits of these products. It is important to consider, in light of these developments, whether the industry should be permitted to reduce its reserves based on profits assumed after the level premium period.

- The formula also assumes policyholder lapse rates during the level premium period that are higher than the rates typically experienced in the industry. The higher assumed lapse rate reduces the net premium reserve because the product is typically lapse-supported.

- The formula uses a valuation interest rate of 4.5%. Long-term interest rates are currently low, and have persisted at low levels for an extraordinarily long time, resulting in a valuation interest rate under the Standard Valuation Law of 3.5% for life insurance. Using the higher 4.5% valuation interest rate lowers the net premium reserve for term products slightly, but in practice will have a larger impact on universal life insurance with secondary guarantees, as that product is even more sensitive to interest rates.

See Appendix A for additional detail explaining how current components of the net premium reserve formula diverge from sound actuarial practice and industry experience.

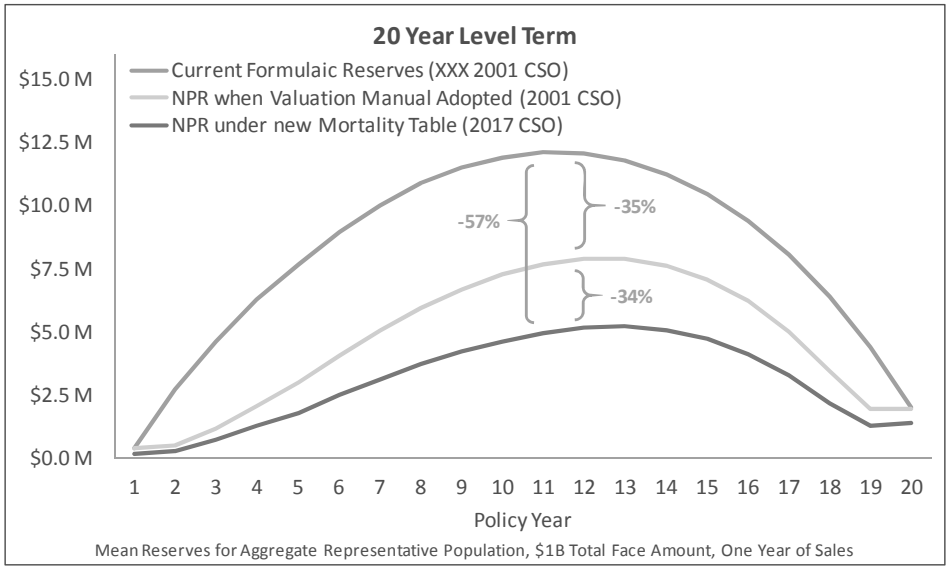
To illustrate the effect of the 2017 CSO mortality table, the chart below compares the current formula-based mean statutory reserves to the net premium reserve currently contemplated by PBR, without any adjustment to unwind the stopgap measures used to accommodate the 2001 CSO table. The data is based on a representative block of 20 year level premium term life insurance policies. In the chart:

- the blue line shows current statutory reserves;

- the yellow line shows PBR's net premium reserve, using the current components of the formula and the 2001 CSO mortality table in effect when PBR was first adopted by the NAIC and enacted by most state legislatures; and

- the red line shows PBR's net premium reserve using the current components of the formula and the 2017 CSO mortality table that will be in effect when PBR calculations begin in 2017.

See Appendix B for the mix of business assumed, which is based on 2014 LIMRA data.



This chart makes clear that PBR will bring a substantial reduction in formula-based reserve requirements. At the peak, PBR's formula-based minimum is:

- 57% lower than current statutory reserves; and
- 34% lower than the net premium reserve included within PBR when the NAIC adopted the valuation manual in 2012, and when most state legislatures enacted it into law.

There is widespread consensus that the current statutory standard (the blue line) produces overly conservative reserves for level premium term life insurance. Prior to adopting the valuation manual, the NAIC constructed the net premium reserve at the yellow line in order to establish a minimum required level of reserves that would be well below the current statutory standard, and relatively close to companies' expected model-based reserves. Had the less conservative 2017 CSO mortality table been operative when the NAIC originally constructed the net premium reserve, any makeshift adjustments would have been less impactful, and the result would have likely been a level similar to the yellow line.

Today, after adoption of the 2017 CSO mortality table, the net premium reserve formula still includes all of the stopgap measures that were intended to remove the excess conservatism in the 2001 CSO mortality table and reduce formula-based reserves to the yellow line. We believe this is

an inappropriate and unintended consequence of the mortality table update. To remedy this distortion, the components of the net premium reserve formula should be brought more in line with industry experience and sound actuarial practice.

If these stopgap measures are left unchanged, the substantial reduction in the net premium reserve will cause internal company modeling to play an unexpectedly large role in the determination of reserve levels. It is a role for modeling that is more pronounced than legislators and regulators likely intended when the valuation manual was initially adopted and shared with state legislatures.

3.2 Fixing Stopgaps Will Not Cause the Net Premium Reserve to Dominate PBR

In the course of discussing the net premium reserve, some companies have expressed concern that adjustments to the formula could result in an overly conservative formula-based calculation that overwhelms that model-based aspects of PBR. Too much emphasis on the net premium reserve risks a regression back to the old, ineffective system of formulaic reserves. Their fear, in essence, is that the net premium reserve could take the "P" and the "B" out of PBR.

While we recognize this risk, by the same token, there is also a risk of a net premium reserve that is too low to provide a meaningful guardrail. Regulators, companies and, most importantly, policyholders should all be completely confident that the "P" and" B" in PBR will lead to a reasonable reserve. Put another way, an appropriate net premium reserve can ensure that a company cannot take the "R" out of PBR.

With this debate in mind, we have evaluated data to determine whether there is scope to correct distortions in the net premium reserve without making it the predominant reserve calculation for a typical company.

The table below depicts a projected deterministic reserve amount that we have modeled using representative industry assumptions. These actuarial assumptions are derived from publicly available industry studies. We then compared that modeled deterministic reserve level to the net premium reserve calculation currently required by PBR, without any correction of the stopgap measures that are part of the formula. The results of this comparison are depicted in the chart below. The chart shows mean reserve calculations for one year of new 20 year level premium term life insurance business. In this chart:

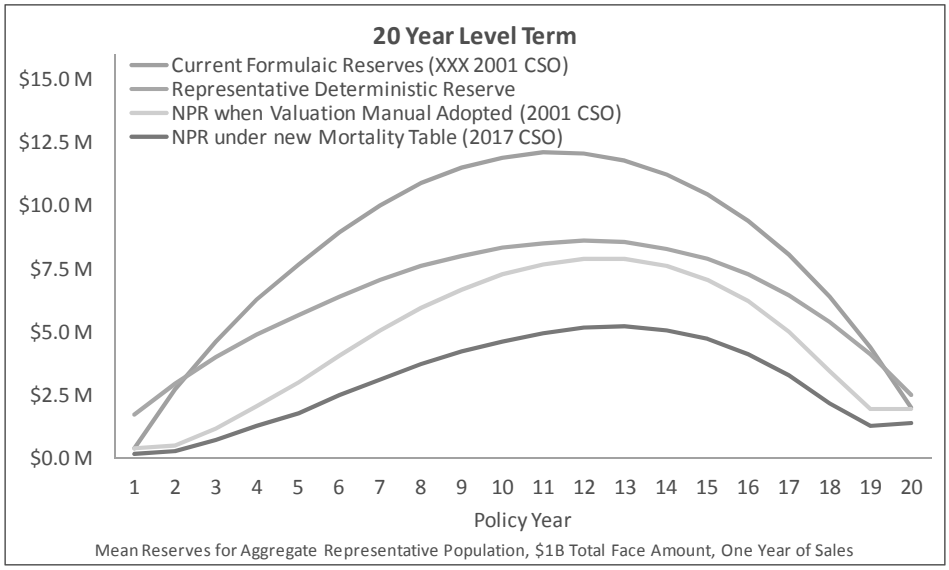
- the blue line shows current statutory reserves;

- the green line shows the projected representative deterministic reserve, which represents what an average insurance company should hold;

- the yellow line shows PBR's net premium reserve using the current components of the formula and the 2001 CSO mortality table in effect when PBR was first adopted by the NAIC and enacted by most state legislatures; and

- the red line shows PBR's net premium reserve using the current components of the formula and the 2017 CSO mortality table that will be in effect when PBR calculations begin in 2017.

Representative industry assumptions for the deterministic reserve calculation, and the underlying data sources, are listed in Appendix B.



These results demonstrate that the net premium reserve using the current formula components and the 2017 CSO mortality table is significantly lower than a projection of an average modeled deterministic reserve based on reasonable assumptions.

Therefore, a decision to change the net premium reserve formula in order to increase the red line during the early years of PBR's implementation should not affect the total reserves held to support

the term life insurance business of a typical life insurance company. Instead, such a decision would only strengthen PBR's formulaic backstop, creating a more robust check against the possibility that some companies may work within the valuation manual rules, and before companies and regulators have significant "real world" experience with PBR, to reduce their reserves to potentially imprudent levels.

3.3 Shortcomings in the Formula Can Produce Anomalous Results

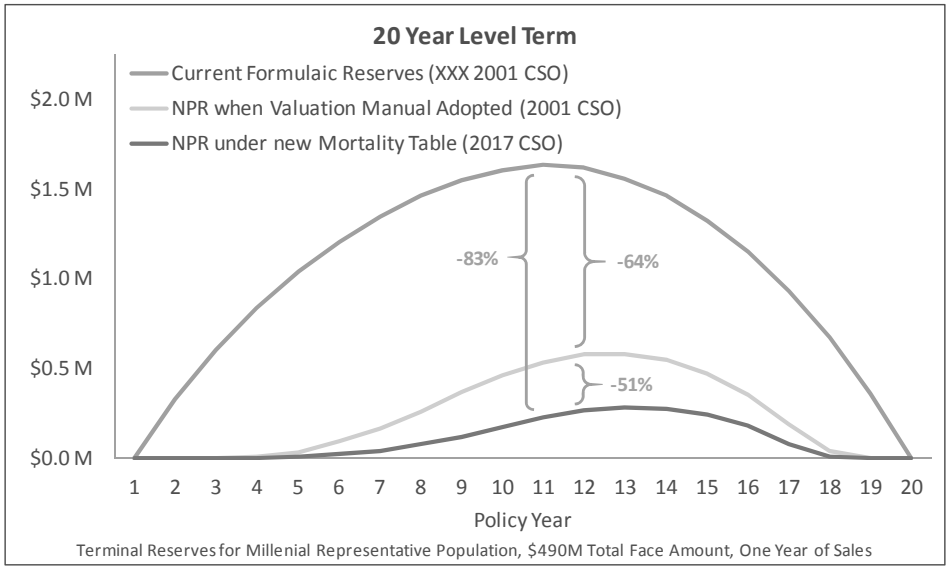
In some situations, the stopgap measures in the net premium reserve formula for term life insurance result in very strange and unintended results. These stopgap measures should be addressed irrespective of the decision regarding the appropriate overall level of the net premium reserve.

For example, the net premium reserve for younger customers is particularly low, even for longer-duration term insurance. Customers in this "millennial" generation represent a key strategic market for many insurers. Sales are expected to shift materially to this market in the coming years, making it all the more important that regulators address this issue.

The chart below shows the terminal reserve calculation for a representative block of 20 year level premium term life insurance policies issued to customers aged 35 and under. We are showing terminal reserves in order to more clearly see the anomalies in the formula. In practice, companies will hold mean reserves, which are shown in Appendix C. In the chart below:

- the blue line shows current statutory reserves;
- the yellow line shows PBR's net premium reserve using the current components of the formula and the 2001 CSO mortality table in effect when PBR was first adopted by the NAIC and enacted by most state legislatures; and
- the red line shows PBR's net premium reserve using current components of the formula and the 2017 CSO mortality table that will be in effect when PBR calculations begin in 2017.

See Appendix B for the mix of business assumed in this chart, which is based on 2014 LIMRA data.



For these younger customers, the net premium reserve is extremely low for the entire duration of the policy's level premium period. In this important and growing market segment, there is only a minimal formula-based requirement to serve as a check on internal company models. This result is a by-product of the makeshift adjustments that were made to the formula to compensate for the excess conservatism in the 2001 CSO mortality table.

In the early durations, the reserve remains zero for five years primarily due to the structure of the expense allowance in the net premium reserve formula, which does not vary by age as is typical for other life insurance contracts. This expense allowance structure results in a net premium reserve that is too low for younger ages. It is also possible that it could lead to a reserve that is too high for older ages. As a result, the net premium reserve formula could end up inappropriately affecting the price of term insurance at younger and older ages.

At the later durations, the zero net premium reserve reflects the impact of the assumption that policies will generate significant profits after the end of the level premium period. In a typical term life insurance product, there is a large premium increase after the level premium period. Sometimes, premiums can increase by 1000% or more. Many customers will simply let the product lapse at this point. Those who choose to keep the policies in force, despite the substantial price increase, are more likely to generate a claim. By assuming significant profits after the level premium period, the formula is, in effect, assuming that policyholders will behave inefficiently.

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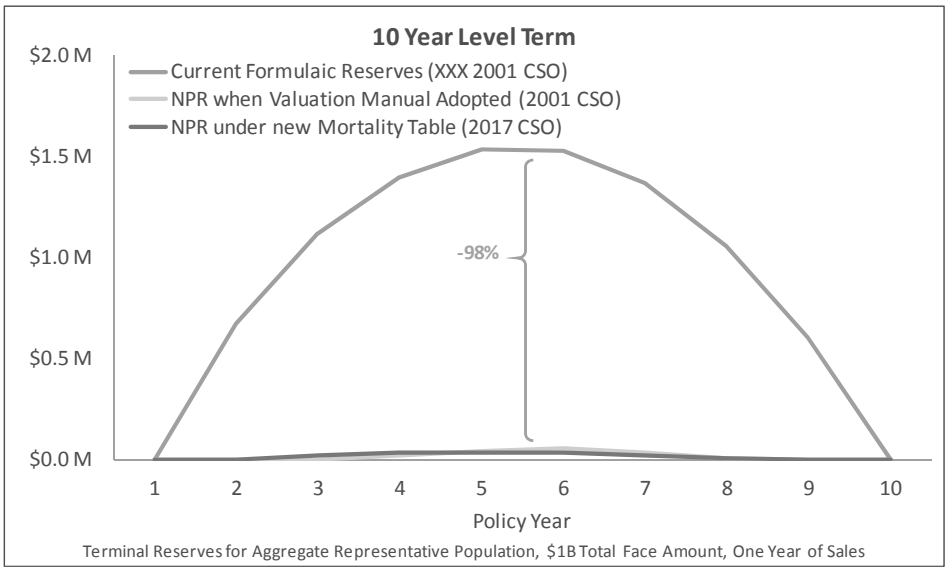
However, over time it is very possible that policyholders will become more efficient due to rapidly improving technology and information that gives consumers increased insight into their health situation and the status of their term policies. As a result, although it is possible that insurers will achieve a certain amount of profit after the level term period, including such an assumption in the statutory reserves is questionable.

The reduction in the net premium reserve is even more dramatic for 10 year level premium term life insurance policies. The data shown below are terminal reserves based on a representative block of such policies. Mean reserves for 10 year level premium term are shown in Appendix C.



The above graph clearly demonstrates the shortcomings of the current formula. The near zero level of reserves is driven by the combination of the expense allowance and post-level term profits. The lack of a "hump" shape in the net premium reserve means that an insurer is not required to pre-fund any future policyholder death claims. In fact, for a large number of 10 year term life insurance policies, the terminal reserves are zero in all years. In other words, the current structure of the net premium reserve permits a "pay-as-you-go" approach, which is antithetical to sound actuarial science.

Appendix D shows net premium reserve results for 20 year term life and 10 year term life for males and females at various ages. This data further demonstrates the anomalous results generated

by the expense allowance and post-level term profit assumption in the current net premium reserve formula.

3.4 Other Financial Regulators Impose Reasonable Constraints on Modeling

Some may also argue that the net premium reserve is not really intended to serve as a formula-based check on company modeling. We disagree. There is a clear regulatory need for a minimum formula-based requirement. Developing best practices among other financial regulators confirm this view. Indeed, state regulators are not alone in trying to strike the right balance between prescription and discretion. Other financial regulators have been grappling with similar issues for years. Their examples are instructive, and provide one possible way for state regulators to benchmark their own preparations for PBR. Consider Solvency II in Europe. Solvency II relies heavily on internal company models. As protection against the risk of over-reliance on the companies' model developers, Solvency II requires that European insurance regulators vet the models before they can be used.[1]

The banking sector provides other examples. In the years preceding the financial crisis, the U.S. Securities and Exchange Commission (SEC) established a supervisory program allowing the five largest U.S. investment banks to calculate required group capital on the basis of internal company models. As the Financial Crisis Inquiry Commission noted in its final report, the SEC's program "was widely viewed as a failure."[2] In the midst of the financial crisis, one of the five participating banks became bankrupt, two others merged out of existence in distressed circumstances, and the last two converted into bank holding companies supervised by the Federal Reserve. The causes of these outcomes were complex and varied, but it seems clear that the SEC's shift to modeling came at an inopportune moment. In some cases, banks used modeling results to justify risk-taking rather than to understand risk. Modeling of this kind gave little signal of trouble until the crisis was at hand.

In the same way that the SEC increased reliance on models during a period of growing risks for investment banks, state insurance regulators are now on the cusp of a shift to modeling during a period of elevated stress for life insurance companies. The extraordinarily persistent low interest

[1] For a discussion that sheds light on the detailed vetting process for internal models under Solvency II, *see* Sam Woods, Executive Director Insurance, Bank of England Prudential Regulatory Authority, *Reflections on the 2015 Solvency II Internal Model Approval Process* (January 15, 2016), available at http://www.bankofengland.co.uk/pra/Documents/solvency2/edletter15jan2016.pdf.

[2] U.S. Financial Crisis Inquiry Commission, *Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States*, p. 154 (2011).

rate environment in particular has created significant headwinds for the industry. While modeling of reserves may yield improved insights into the risks created by persistent low rates, regulators will need to exercise caution to ensure that PBR's models do not open the door to unjustified increases in risk-taking. A reasonable net premium reserve will keep this door closed.

Not surprisingly, since the financial crisis, bank regulators have re-examined the wisdom of heavy reliance on internal company models. In the last few years, they have brought leverage ratios and standardized margin requirements into bank capital calculations.[3] These are relatively simple formulas that supplement models. More recently, some bank regulators have suggested discarding the internally modeled risk assessments that are included within Basel II. In the words of Federal Reserve Governor Tarullo, the model-based approach to bank capital creates "manifold risks of gaming, mistake, and monitoring difficulty," and "contributes little to market understanding of large banks' balance sheets, and thus fails to strengthen market discipline."[4]

To be clear, despite the challenges, banking regulators have not discarded modeling altogether. Models continue to play an important role in banking regulation. For example, modeling is an integral part of periodic bank stress tests overseen by the Federal Reserve. However, model oversight and validation have become an important area of focus for bank regulators, just as they are for European regulators implementing Solvency II. Federal Reserve stress testing models, for instance, are controlled by the Federal Reserve and reviewed by an independent, external panel of experts.[5] While we are not advocating prior approval of models within PBR, the emphasis on model review and validation provides a useful point of reference for state regulators as they organize resources for their review of PBR models. Moreover, the focus on establishing reasonable constraints for models certainly suggests that state insurance regulators will be in good company by taking a careful approach to calibration of the net premium reserve.

4 TACKLING OTHER CHALLENGES WITHIN PBR

We do not intend to suggest in this paper that the net premium reserve for term life insurance is the only aspect of PBR that merits attention as regulators and companies prepare for implementation. We have focused on term life insurance for the sake of simplicity. However, the need for a careful approach to modeling extends to other life insurance products as well, particularly universal life insurance products with secondary guarantees.

3 *See* Code of Federal Regulations, Title 12, §§ 217.10, 249 (2016).

4 Daniel K. Tarullo, *Rethinking the Aims of Prudential Regulation, Remarks at the Federal Reserve Bank of Chicago Bank Structure Conference*, p. 14 (May 8, 2014).

5 *See* http://www.federalreserve.gov/aboutthefed/mvc.htm.

Moreover, regardless of the product involved, there are additional challenges that life insurers and regulators should tackle in connection with PBR's implementation. For example:

- Oversight of models will require significant time and additional resources. Models can be complex and sometimes challenging to understand. Flawed assumptions, data limitations and coding errors can lead to misleading modeling results. Strong practices need to become firmly established regarding such items as the validation of models, and the approval, documentation and appropriate use of assumptions. In a number of states, regulators are working hard to marshal the additional resources they will need to oversee company models. The NAIC is also doing important work to prepare to serve as a resource. Regulators are right to prioritize resources as they prepare to take on new responsibilities under PBR.

- Opinions differ about the extent to which life insurers might continue to use captives to finance reserves after PBR takes effect. In some cases, companies may propose using captives to raise traditional, high quality assets in the capital markets, with full risk transfer and appropriate matching of the duration of assets and liabilities. In other cases, however, insurers could seek new ways to finance PBR reserves with assets that fail to meet traditional standards of quality and safety. This latter category, if allowed, would threaten to undermine the integrity of both PBR and the NAIC's interim solution for life insurer captives – Actuarial Guideline 48.

- The portions of the valuation manual that address reinsurance credit remain underdeveloped and, in some instances, ambiguous. Actuarial Guideline 48 recognized this gap by adopting a temporary, formulaic solution for PBR reinsurance credit. The work needed for a permanent solution has yet to be undertaken.

- Modeling assumptions merit further attention. For example, the judgment of company actuaries will play a significant role in the development of assumptions relating to expected lapse rates and policyholder behavior. In many economic scenarios, there will be limits to the credible data that can support these assumptions, including scenarios in which today's historically low interest rates persist well into the future. When assumptions are not substantiated by credible data, or are simply unknowable because there is no data, company judgment plays an outsized role. Without adequate safeguards, competitive situations may cause some actuaries to take increasingly aggressive positions, leading others to feel pressure to follow suit.

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PBR will likely take effect on January 1, 2017. It is unrealistic to expect that all of PBR's remaining open issues can be fully addressed within that timeframe. It is not desirable to "rush" to find solutions to some of the complex issues, risking that those solutions could prove in the future to be inappropriate. In many cases, PBR's challenges will be much easier to evaluate and address with the benefit of several years of experience with new principle-based calculations.

Ensuring that the net premium reserve is set at a reasonable level can serve as an essential first step. A reasonable net premium reserve will allow regulators and insurers time to resolve open issues within PBR and become comfortable with its operation. In the meantime, they can sleep soundly knowing that there is a reasonable minimum reserve that will be required in all circumstances.

5 CONCLUSION

The data presented in this paper shows that the current net premium reserve formula, if applied to the 2017 CSO mortality table, has significant shortcomings that should be addressed before PBR becomes operative.

The oversight of complex internal models places significant new demands on state regulators. No two company models will be the same. PBR will only have prospective effect, but its influence on the industry's financial condition will grow as new business comes onto the books. The potential impact could be significant in future years.

A reasonable net premium reserve within PBR during the early years will help regulators manage these pressures. As companies and regulators gain comfort with the models, and gain confidence that the right resources are dedicated to the task, the net premium reserve can be ratcheted down if necessary. Future steps to ratchet down the net premium reserve need not be prospective only. Instead, if appropriate, the changes could apply retrospectively to all business written since the introduction of PBR.

In contrast, if regulators were to decide in the coming years that a higher net premium reserve should have been included within PBR at the outset, they would face the unappealing choice of either forcing retroactive increases in the formula-based reserves, or tolerating potentially deficient reserves for business written between the time of PBR's introduction and the decision to revise the net premium reserve. To avoid this outcome, regulators should take care now to ensure that PBR includes a reasonable net premium reserve when it first takes effect.

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Appendix A
Comparison of Net Premium Reserve Formula Components to Industry Experience

The VM-20 net premium reserve (NPR) was originally calibrated using the 2001 CSO mortality table. The conservatism in the 2001 CSO mortality rates resulted in certain other NPR assumptions (lapse rates, expense allowance, etc.) being set at levels that did not represent industry experience in order to calibrate the NPR to the desired level. This appendix sets forth some of the key deviations between NPR components and reasonable experience assumptions.

Shock Lapse Rates

The NPR calculation uses a single shock lapse rate in the year following the level period, which varies by the percentage increase in post-level period premiums. A recent RGA/Society of Actuaries study[6] found that the level premium term shock lapse emerges as an initial large lapse rate at the end of the level period, followed by additional elevated lapse rates in the subsequent few years. The lapse rates in the study are illustrated in the tables below for both 10 and 15 year level premium term products. Cumulative rates have been added as well as the associated VM-20 rates:

10 Year Level Premium Term

Shock Lapse Rate	RGA / SOA Study[7]				Current NPR Formula			
Year 11 / 10 Premium Jump Band	First Year	Second Year	Third Year	Cumulative	First Year	Second Year	Third Year	Cumulative
1.01x – 2x	16.6%	13.4%	7.2%	33.0%	70.0%	10.0%	10.0%	75.7%
2.01x – 3x	30.6%	22.9%	8.6%	51.1%	70.0%	10.0%	10.0%	75.7%
3.01x – 4x	52.4%	37.3%	15.0%	74.6%	70.0%	10.0%	10.0%	75.7%
4.01x – 5x	65.1%	47.2%	19.8%	85.2%	80.0%	10.0%	10.0%	83.8%
5.01x – 6x	76.4%	53.9%	24.0%	91.7%	80.0%	10.0%	10.0%	83.8%
6.01x – 7x	82.0%	60.0%	26.3%	94.7%	80.0%	10.0%	10.0%	83.8%
7.01x – 8x	84.0%	61.1%	27.8%	95.5%	80.0%	10.0%	10.0%	83.8%
8.01x – 9x	85.2%	63.3%	28.7%	96.1%	80.0%	10.0%	10.0%	83.8%
9.01x – 10x	86.6%	67.9%	37.3%	97.3%	80.0%	10.0%	10.0%	83.8%
10.01x – 12x	88.6%	70.1%	34.7%	97.8%	80.0%	10.0%	10.0%	83.8%
12.01x – 14x	89.2%	71.0%	35.0%	98.0%	80.0%	10.0%	10.0%	83.8%
14.01x – 16x	89.8%	74.4%	42.3%	98.5%	80.0%	10.0%	10.0%	83.8%
16.01x +	93.2%	81.2%	45.7%	99.3%	80.0%	10.0%	10.0%	83.8%

[6] Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014), available at https://www.soa.org/Research/Experience-Study/Ind-Life/Persistency/research-2014-post-level-shock.aspx.

[7] Page 21 of the Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014).

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The highlighted areas represent rates from the study that are greater than the VM-20 rates.

15 Year Level Premium Term

Shock Lapse Rate	RGA / SOA Study[8]				Current NPR Formula			
Year 16 / 15 Premium Jump Band	First Year	Second Year	Third Year	Cumulative	First Year	Second Year	Third Year	Cumulative
1.01x – 2x	15.4%	9.0%	4.8%	26.7%	70.0%	10.0%	10.0%	75.7%
2.01x – 3x	30.8%	15.8%	7.2%	45.9%	70.0%	10.0%	10.0%	75.7%
3.01x – 4x	48.4%	24.3%	6.8%	63.6%	70.0%	10.0%	10.0%	75.7%
4.01x – 5x	61.9%	34.1%	11.2%	77.7%	80.0%	10.0%	10.0%	83.8%
5.01x – 6x	72.7%	40.0%	17.8%	86.5%	80.0%	10.0%	10.0%	83.8%
6.01x – 7x	77.7%	44.4%	20.1%	90.1%	80.0%	10.0%	10.0%	83.8%
7.01x – 8x	78.5%	42.4%	14.8%	89.4%	80.0%	10.0%	10.0%	83.8%
8.01x – 9x	79.7%	47.9%	21.1%	91.7%	80.0%	10.0%	10.0%	83.8%
9.01x – 10x	78.8%	53.8%	20.9%	92.3%	80.0%	10.0%	10.0%	83.8%
10.01x – 12x	78.8%	51.2%	24.3%	92.2%	80.0%	10.0%	10.0%	83.8%
12.01x – 14x	83.5%	66.3%	*	> 94.4%	80.0%	10.0%	10.0%	83.8%
14.01x – 16x	84.1%	62.1%	*	> 94.0%	80.0%	10.0%	10.0%	83.8%
16.01x +	88.9%	67.5%	*	> 96.4%	80.0%	10.0%	10.0%	83.8%

*Insufficient data, according to the RGA/SOA study. This results in cumulative shock lapse rates that only capture two years rather than three years.

Post-Level Premium Period Profits

It is questionable actuarial practice to reduce statutory reserves due to accumulated profits after the level term period, as is permitted under the current term net premium reserve formula. Doing so means including an assumption of significant policyholder inefficiency in the reserve. Although it is possible that some profits will be earned by insurers after the level term period, a reasonable assumption would exclude these amounts when setting reserves.

Section 3.B.4. of VM-20 allows a company to assume that profits made after the shock lapse can fund the level premium period reserve, thereby reducing level period reserves.

In contrast, the recent RGA/Society of Actuaries study mentioned previously contains information regarding mortality deterioration following the level period. The study found that the "mortality increase can be primarily attributed to adverse selection of unhealthy policyholders choosing to persist after a large increase in their premium."[9]

This degree of this adverse selection can reasonably be expected to worsen in the future as customers (a) gain increased access to information about their own health and (b) experience

[8] Page 23 of the Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014).

[9] Page 63 of the Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014).

improved communication about the status of their existing term policies. As a result, it is entirely possible that profits after the level term period will actually be negative. Nevertheless, a reasonable assumption for reserving is that the post-level term profits are zero.

Given the mortality deterioration that follows the shock lapse, the allowance of a 35% margin (premium in excess of death benefits) is not supportable.

Expense Allowance

The current NPR formula provides for an expense allowance of $2.50 per $1,000 of death benefit, in addition to a separate percent-of-premium expense allowance. The structure of the $2.50 per $1,000 expense allowance is a shortcoming of the net premium reserve that disproportionately reduces reserves for younger issue ages and shorter level premium periods. This is not consistent with the way the expense allowance is handled for other life insurance contracts. Instead, it would be preferable to align with typical practice, using an expense allowance that varies by the level of net premium.

Furthermore, this $2.50 expense allowance can be compared to the 2016 GRET analysis conducted by the SOA,[10] which provides information regarding industry expenses for term products. According to Appendix B of the 2016 GRET memorandum, the median acquisition expense per policy for term life insurance has historically been $196 per policy, and the acquisition expense per $1,000 face amount has been $0.59. The table below shows the summation of these expenses, expressed as an amount per $1,000 death benefit. The range of $250,000 – $500,000 face amount is based on the median face amount for term according to 2014 LIMRA data.

	$500,000 Face	$250,000 Face	Current NPR Formula
Median Term Acquisition Expense	$0.98	$1.37	$2.50

This information indicates that a VM-20 NPR expense allowance of $2.50 per $1,000 is much higher than typical industry expenses.

Valuation Interest Rate

The NPR for term insurance and universal life with secondary guarantees uses a valuation interest rate that exceeds the standard valuation law (SVL) interest rate. For example, the current SVL

[10] Society of Actuaries 2016 GRET Memorandum, available at https://www.soa.org/Research/Research-Projects/Life-Insurance/research-2016-gret-recommendation.aspx.

rate for 20 year term is 3.50%, and the NPR valuation interest rate is 4.50%. In the current economic environment, 4.50% may exceed the yield earned on assets held in support of reserves.

Level Period Lapse Rate

A publicly available Society of Actuaries / LIMRA study[11] covers policy lapse data during the period of 2007-2009. The graphical information provided in this study indicates that the level period lapse rates on 15 and 20 year level term products are materially lower than the 6.0% NPR assumption, particularly in later durations.

[11] U.S. Individual Life Insurance Persistency, A Joint Study Sponsored by Society of Actuaries and LIMRA, available at https://www.soa.org/files/research/exp-study/research-2007-2009-us-ind-life-pers-report.pdf.

Appendix B
Representative Industry Data and Assumptions

The following representative assumptions underlie the representative reserves demonstrated in this paper.

1) **Mortality**: Industry average based on 2015 VBT. Relative risk factors were determined based on data presented to the NAIC's Life Actuarial (A) Task Force on March 26, 2015 by the Society of Actuaries and the American Academy of Actuaries. When combined with the population distribution assumption, overall assumed mortality is 93% of industry average.

Risk Class	Relative Risk (RR) Table*
Super Preferred Non-Smoker	77% of NS
Preferred Non-Smoker	98% of NS
Residual Non-Smoker	120% of NS
Preferred Smoker	87% of SM
Residual Smoker	119% of SM
Overall Mortality (by claims)	*In aggregate, 93% of VBT mortality rates.*

*Mortality rates were linearly interpolated between the two nearest RR tables. For example, Super Preferred Non-Smokers use a mortality rate that is a blend of 30% NS RR70 and 70% NS RR80.

Mortality Credibility: Industry median (95% Buhlmann) based on a 50 company study discussed on the September 17, 2015 Life Actuarial (A) Task Force call.

2) **Level Period Lapse**: Industry average based on 2012 Society of Actuaries/LIMRA U.S. Individual Life Insurance Persistency Study, with -0.50% margin.

Shock Lapse: Industry average (95%, inclusive of margin) based on the 3 year cumulative shock lapse rate shown in the 2014 RGA/Society of Actuaries Post Level Term Lapse & Mortality Report.

Post Level Period Lapse: Industry average (10% per annum) as indicated by the RGA/Society of Actuaries report cited above.

Post Level Period Profits: To comply with VM-20 Section 9.D, none assumed.

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3) **Expenses**: Industry average annual per policy expense ($45) based on 2016 GRET table.

Expense Inflation: 3.5% per annum (2.5% base assumption plus 1.0% margin).

4) **Population**: Industry average for term sales, from 2014 LIMRA distribution statistics by face amount:

Gender	Distribution	Issue Age	Distribution	Risk Class	Distribution
Male	65%	25	17%	Super Preferred Non-Smoker	50%
Female	35%	35	32%	Preferred Non-Smoker	24%
		45	29%	Residual Non-Smoker	22%
		55	22%	Preferred Smoker	2%
				Residual Smoker	2%

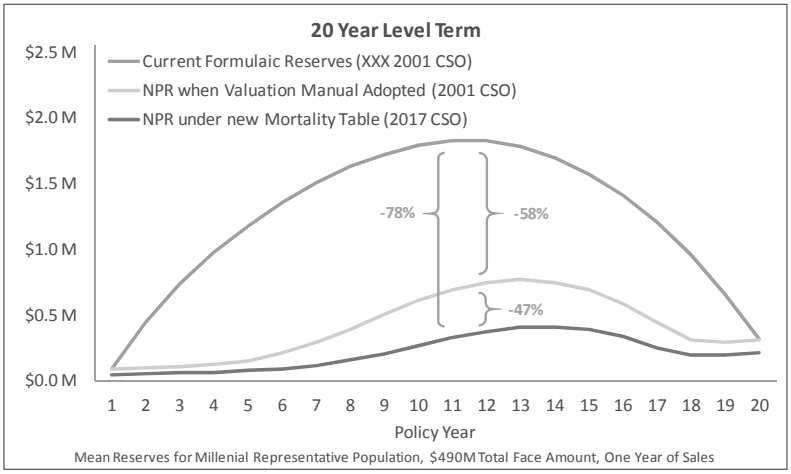
5) **Level Period Premium Rates**: Industry median based on a survey of 18 large term insurance carriers. Sample 20 year level term annual premiums (industry median) for Male, Best Risk Class, $500K Face:

Issue Age	Premium
25	$265
35	$300
45	$628
55	$1,558

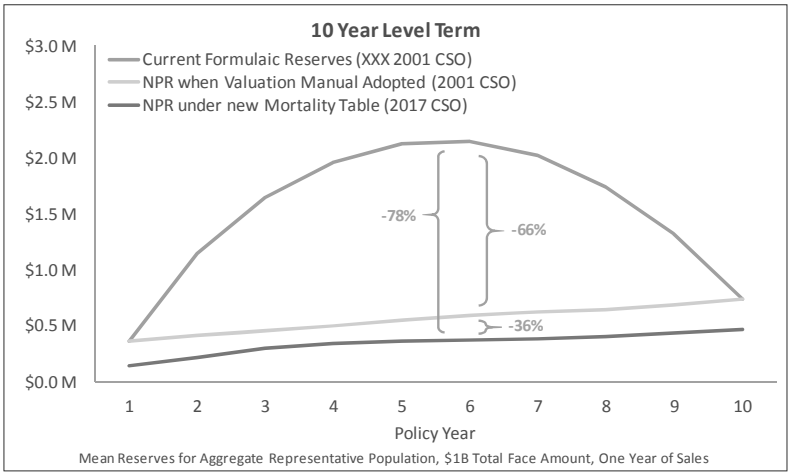
6) **Net Asset Earned Rate**: Simplified assumption of 4.50% in all projection years.

Appendix C
Exhibits Based on Mean Reserves

The chart below shows the mean reserve calculation for a representative block of 20 year level premium term life insurance policies issued to customers aged 35 and under.



The chart below shows the mean reserve calculation for a representative block of 10 year level premium term life insurance policies.



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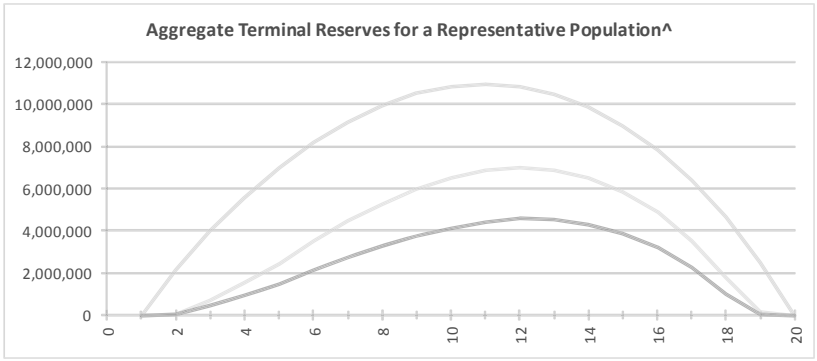
Appendix D
Net Premium Reserve Anomalies Demonstrated By Single Cell Terminal Reserve Patterns

A. 20 Year Level Premium Term Life Insurance

Chart Series: XXX (2001 CSO) | NPR (2001 CSO) | NPR (2017 CSO)



Population Distribution Summary^

Sex: M/F
65%/35%

Issue Age: 25/35/45/55
17%/32%/29%/22%

Risk Class: SP/P/NS/PSM/SM
50%/24%/22%/2%/2%

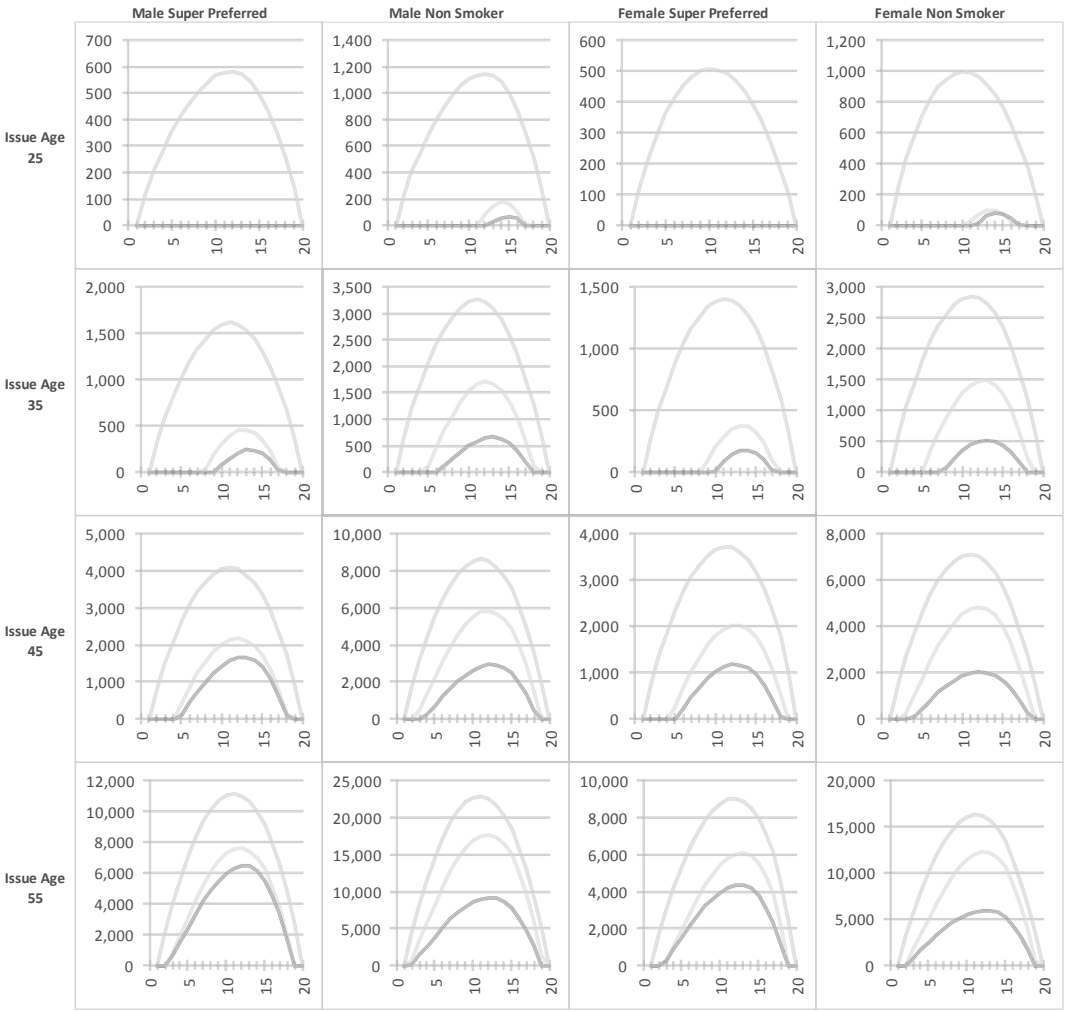
^Representative Population Based on 2014 LIMRA Sales Data, $1B Total Face Amount, One Year of Sales

Continued on the next page.

20 Year Level Premium Term Life Insurance (*Cont.*)

Terminal Reserves for Single Cells – Face Amount $500,000

Chart Series: XXX (2001 CSO) | NPR (2001 CSO) | NPR (2017 CSO)



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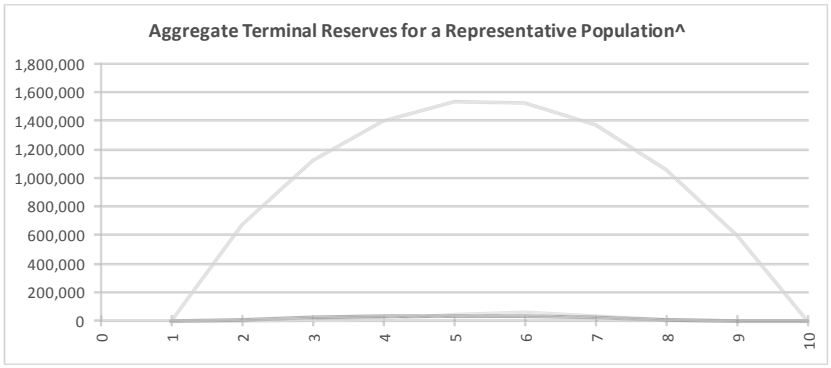
B. 10 Year Level Premium Term Life Insurance

Chart Series: XXX (2001 CSO) | NPR (2001 CSO) | NPR (2017 CSO)



Population Distribution Summary^

Sex: M/F
65%/35%

Issue Age: 25/35/45/55
17%/32%/29%/22%

Risk Class: SP/P/NS/PSM/SM
50%/24%/22%/2%/2%

^Representative Population Based on 2014 LIMRA Sales Data, $1B Total Face Amount, One Year of Sales

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Ten Year Level Premium Term Life Insurance (*Cont.*)

Terminal Reserves for Single Cells – Face Amount $500,000

Chart Series: XXX (2001 CSO) | NPR (2001 CSO) | NPR (2017 CSO)