

# **VARIABLE ANNUITY STATUTORY RESERVE AND CAPITAL REFORM**

## **QIS II EXECUTIVE SUMMARY**

FEBRUARY 12, 2018

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## 1. Background

Variable annuities (“VA”) constitute one of the most significant businesses in the US life insurance industry, with over \$2 trillion in industry assets under management. While originally designed as a vehicle for tax deferred accumulation, a sizable portion of VA contracts now contain guaranteed benefit riders that create exposures – in many instances material – to capital markets, policyholder behavior and mortality/longevity risks. The regulations to guide the determination of the reserves and required capital associated with these guaranteed benefits materially affect the balance sheet and capital management practices of VA manufacturers as well as the soundness of the US micro-prudential insurance regulatory system.

The National Association of Insurance Commissioners (“NAIC”) enacted its C3 Phase II initiative in 2006 to prescribe a set of standards for calculating Risk-Based Capital (“RBC”) charges for market risk within VA products. C3 Phase II was followed in 2009 by Actuarial Guideline XLIII (“AG 43”), which established the reserving standards for VA products. The complex interplay of these standards challenged VA statutory capital management and, in part, motivated VA writers to seek capital management solutions via captive reinsurers.

In response to the proliferation of VA captive reinsurers, the NAIC engaged Oliver Wyman to explore potential reforms of the VA statutory reserve and capital regulations. On September 10, 2015, Oliver Wyman provided the NAIC with a preliminary report outlining several ideas to improve the current AG 43 and C3 Phase II frameworks.

In 2016, the NAIC commissioned a Quantitative Impact Study (“QIS I”) to explore further the ideas for framework improvements. QIS I served two principal objectives:

- i. Validate hypotheses regarding the “root causes” of insurers’ VA capital management challenges;
- ii. Explore the efficacy and impact of potential alternatives to elements of the current regulatory standards.

Fifteen companies participated in QIS I, which ran from February to July of 2016. The completion of the QIS I validated challenges of the current statutory framework and informed a series of recommended revisions to AG 43 and C3 Phase II. Thereafter, Oliver Wyman recommended revisions to the Variable Annuities Issues Working Group (“VAIWG”) in August 2016, with redlined versions of the Actuarial Guideline and RBC instructions issued in the following month.

Thematic findings from QIS I underpinning the recommended revisions included:

- i. **Presence of penalties for economic-based hedging:** companies seeking to hedge the full fair value of VA guarantees experienced increases in both the level of capital requirements and volatility of the RBC ratio, the latter being a key signal of insurer financial health to many stakeholders, caused by misalignments between the multiple components of the reserve and capital calculations;
- ii. **Structural deficiencies in the Standard Scenario calculations:** aspects of the Standard Scenario calculation preclude alignment with the corresponding stochastic calculations they are intended to govern and result in non-economic capital volatility for many VA manufacturers;
- iii. **Lack of harmonization:** industry interpretations of the framework lacks consistency in areas where regulators may reasonably expect greater consistency, such as the projection of capital markets scenarios that materially influence the level and market-sensitivity of capital requirements.

Following a series of discussions with regulators, industry and Oliver Wyman, the NAIC commissioned a second Quantitative Impact Study (“QIS II”) to verify the efficacy of Oliver Wyman’s structural recommendations from 2016 and complete the specific parameterization of the recommended revisions to AG 43 and C3 Phase II.

## 2. Overview of QIS II

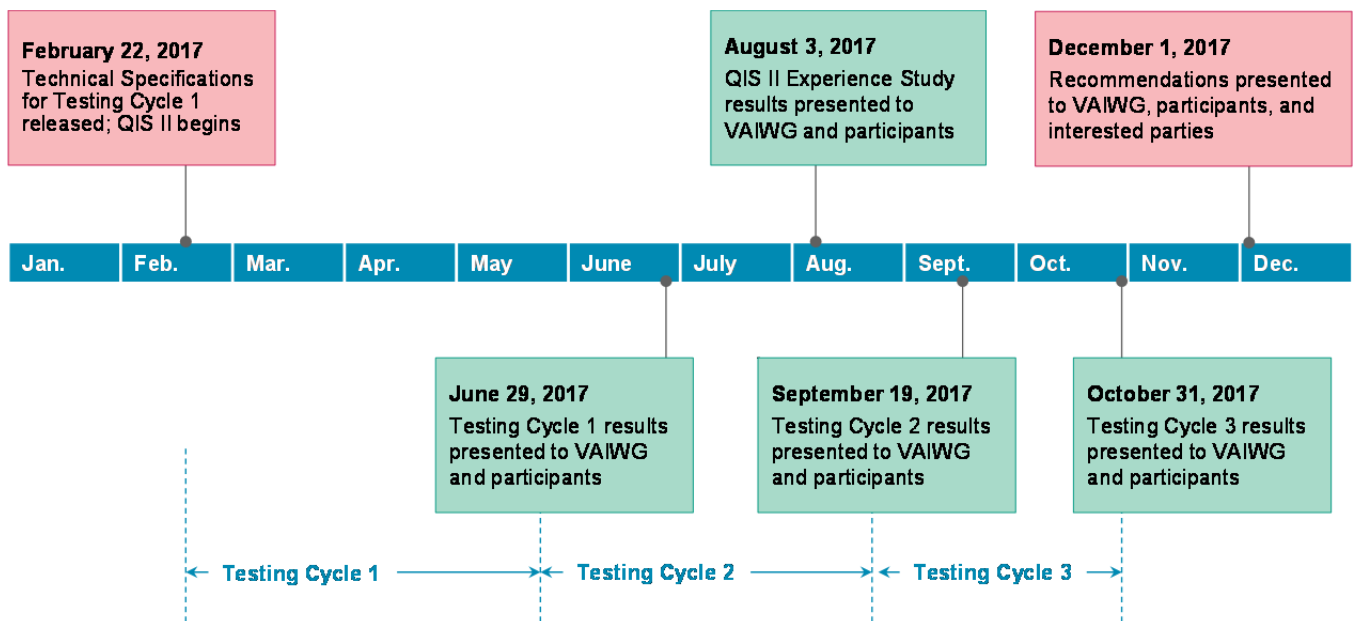
QIS II shared many aspects of QIS I in focusing on empirical testing of the proposed revisions, culminating in a set of recommended revisions to the framework. However, QIS II differs from QIS I in four principal ways:

- i. **Full solution testing:** all proposed framework revisions were analyzed in tandem, whereas QIS I tested many framework revisions in isolation from other potential revisions;
- ii. **Parameterization:** while Oliver Wyman's 2016 recommendations elaborated a series of important structural revisions, several critical parameters were left provisional – noting that further industry testing was necessary to calibrate the parameters. QIS II supplied analysis to inform the parameterization;
- iii. **Research:** Oliver Wyman's 2016 recommendations identified several areas for which revisions required further primary research. Resources during QIS II were earmarked to conduct primary research into these topics to inform a prudent solution – e.g., policyholder behaviour prescriptions within the Standard Scenario;
- iv. **Iteration:** QIS I consisted of a single round of testing. QIS II consisted of three “cycles” of testing which were, in essence, each their own QIS – albeit each with different focus areas.

Given its expanded scope and objectives, the timeline for QIS II was longer than QIS I by approximately two months. Moreover, instead of delivering recommendations during the NAIC’s annual Summer Meeting, recommendations were delivered at the NAIC Fall Meeting.

The specifics of the QIS II timeline are described below in **Figure 1:**

**Figure 1: QIS II timeline**



Seventeen companies participated in QIS II. Because of confidentiality concerns expressed by both the NAIC and the QIS participants, meeting notes and QIS II outputs were withheld from all parties excluding the VAIWG and participant group; instead, a series of monthly public calls was used to inform interested parties of progress and major developments.

### 3. Structure of QIS II

The prior section noted that QIS II consisted of three distinct cycles of testing. This iterative Testing Cycle approach allowed Oliver Wyman, the VAIWG, and participants jointly to refine the testing scope and parameterizations in light of emerging insights.

The three Testing Cycles focused on the following topics, as outlined in **Table 1**:

**Table 1: topics of focus for each Testing Cycle in QIS II**

Cycle	Topics of focus
1	Revisions to the Stochastic CTE Amount and C3 charge calculations
2	Revisions to the Standard Scenario Amount calculation
3	Alternative parameters for calculating the revised CTE Amount and C3 charge Alternative construct to calculate the Standard Scenario Amount Aggregate impact of all framework revisions, if implemented simultaneously

In parallel, Oliver Wyman also facilitated three separate Working Groups to explore certain statutory framework enhancement proposals that either (i) required additional operational capabilities to complete, or (ii) were relevant for only a subset of QIS II participants. Within each Working Group, Oliver Wyman collaborated with the participating companies to design additional analyses to assess the efficacy and appropriateness of additional or alternative framework revisions. These Working Groups, in turn, brought relevant insights from the additional analyses back to the broader QIS II participant group to inform the final framework revision recommendations.

The three Working Groups and their charges were as follows:

**Table 2: charges for each Working Group in QIS II**

Working Group	Working Group charges
Behavioral Assumptions	<ul style="list-style-type: none"> <li>Determine revisions to the 2016 Oliver Wyman Standard Scenario behavior prescriptions by analyzing industry-aggregate policyholder behavior experience data</li> <li>Develop a “hybrid governance model” for Standard Scenario policyholder behavior assumptions that specifies prescribed methods to apply to certain company-specific data – instead of prescribed assumptions – to set behavior assumptions</li> </ul>
Economic Scenario Generation	<ul style="list-style-type: none"> <li>Determine the role of proprietary economic scenario generators in the capital markets scenario generation</li> <li>Develop recommendations to enhance regulator governance of company proprietary scenario generation</li> </ul>
Reinsurance Issues	<ul style="list-style-type: none"> <li>Identify potential unintended and undue consequences of framework revisions for reinsurers of VA portfolios</li> <li>Ensure recommended revisions are sufficiently clear for reinsurers to apply the intended methodologies</li> </ul>

## 4. Major recommendations

QIS II covered a comprehensive set of topics spanning all aspects of the reserve and capital standards, the details of which may be found discussed in the accompanying *Variable Annuity Statutory Reserve and Capital Reform: QIS II Public Report* (the “Public Report”). This section discusses:

- i. A subset of the most material and controversial aspects of the recommendations that Oliver Wyman presented during the public VAIWG meeting on December 1, 2017;
- ii. The positions or concerns voiced by participants and regulators; and
- iii. The rationale behind the Oliver Wyman recommendations in light of the various inputs and considerations.

The findings are organized based upon whether they pertain to the stochastic Conditional Tail Expectation (“CTE”) calculation or the Standard Scenario calculations.

### Stochastic calculation

- A. **Prescribe use of the VM-20 interest rate scenario generator:** interest rate scenarios constitute the “core” of many economic scenario generators, providing necessary information to inform items such as the returns for separate account bond funds and insurer general account investments (which function effectively as “discount rates” on liability cash flows). In particular, the level and dispersion of these interest rate paths is of paramount importance when one recognizes that the cash flows for many VA guarantees extend more than 40 years into the future.

QIS I identified a number of findings related to interest rate scenarios in the CTE calculation, including:

- i. A lack of harmonization of industry interest rate scenarios, with some participants setting long-term target mean interest rate levels as high as 6.5% and others below 4.0%;
- ii. A low level of volatility in – or dispersion across – interest rates scenarios generated in low interest rate environments, caused by an assumption within the current VM-20 interest rate generator (a commonly used scenario generation tool) that interest rate volatility is effectively proportional to the interest rate level. In present conditions this relationship projects few “low for long” interest rate scenario paths that are similar to those experienced in Japan and leading European economies over the past decade.

In 2016, Oliver Wyman recommended testing both the current VM-20 generator and a version of the VM-20 generator modified to allow for both (i) greater interest rate volatility in low interest rate environments and (ii) the possibility of negative interest rates. However, on November 29, 2016 – prior to the start of QIS II, the VAIWG on a split vote decided not to test the modifications to VM-20 proposed by Oliver Wyman; instead, a VAIWG consensus agreed to conduct QIS II testing using the existing VM-20 interest rate generator. Absent any testing data using a modified VM-20 interest rate generator and given the VAIWG desire to harmonize capital markets scenarios, Oliver Wyman recommended prescription of the current VM-20 interest rate generator as a revision to AG 43 and C3 Phase II, thus addressing a foremost concern regarding harmonization of capital markets scenarios.

- B. **Prescribe use of the VM-20 equity scenario generator, but recalibrated based on a historical calibration window of 1926-2016:** along with interest rate scenarios, projected returns on VA separate account assets – much of which are invested in equities – represent a central determinant of framework properties – e.g., the level and market sensitivity of reserves and capital, risk management incentives.

Many characteristics of VA separate account returns are governed by principles outlined in the guidelines, but US equity returns are subject to an additional set of “calibration criteria” that specify explicit minimum or maximum cumulative nominal equity returns:

- i. At various future timeframes – e.g., 5-year, 10-year, 20-year; and
- ii. For a variety of percentiles – e.g., 2.5<sup>th</sup> percentile, 5<sup>th</sup> percentile, 95<sup>th</sup> percentile, 97.5<sup>th</sup> percentile.

Under the current regulations, these calibration criteria are fixed over time – i.e. they are held constant irrespective of prevailing capital markets conditions.

Following a QIS I observation that company hedge instruments contain materially greater interest rate-sensitivity than their stochastic CTE-based capital requirements, and given the prevalence of “excess return”-based equity models both within QIS II participants and in academic theory, Oliver Wyman recommended in 2016 that equity calibration criteria indexed to the level of long-term interest rates should be tested in QIS II. Specifically, this recommendation aimed to:

- i. Help insurers who, under the current framework, struggle to manage the alignment between the interest rate sensitivity of their hedge portfolio with their statutory liabilities; and
- ii. Afford a degree of prudence to reserve and capital levels in very low interest rate scenarios, when the cost of hedging the liability on a fair value basis tends to increase sharply.

Early in QIS II, the VAIWG voted not to test the interest rate-sensitive calibration criteria recommended by Oliver Wyman in 2016; instead, the VAIWG decided to test an alternative set of equity scenarios determined by historical US equity return data over a longer time period. Specifically, the current equity calibration criteria were determined based on US equity return history from 1955 to 2003, while the VAIWG wished to include data from prior to 1955 – and notably, from the Great Depression – in testing.

Many industry participants criticized the expansion of the calibration window, arguing that (i) different roles of the Federal Reserve in the economy and (ii) structural differences in the S&P index rendered the pre-1955 data less relevant than the post-1955 data. Oliver Wyman contended that multiple factors justify the expanded time window, including:

- i. In discussions regarding the interest rate-sensitive calibration criteria recommended by Oliver Wyman in 2016, Oliver Wyman presented primary research demonstrating a high correlation between prevailing long-term interest rates and prospective equity returns – e.g., between the 10-year US Treasury rate at a given point in time and the cumulative equity return over the next ten years – from 1957 to 2016. Participants presented counterarguments – using historical data from 1871 to 2016 – illustrating that such correlation does not exist if the study period were extended to prior than 1957. This data was given strong consideration by the VAIWG, signaling to Oliver Wyman that VAIWG finds it valuable to consider historical evidence from this time period in forming decisions on the structure of the equity scenarios;
- ii. The equity calibration criteria represent nominal equity returns. Interest rate levels in 1955-2003 were substantially higher than today and in most previous historical periods, which may have affected nominal equity returns in this time period and would not be captured given the VAIWG’s decision not to link equity calibration criteria with prevailing interest rates;
- iii. Substantial differences in calibration criteria would be observed if foreign equity return data in recent years were included in the calibration data;
- iv. The current calibration criteria were determined assuming a mean equity return of 8.75%; given present interest rate levels, this would imply a large equity risk premium. In the American Academy of Actuaries’ (the “Academy”) report on C3 Phase II presented to the NAIC’s Capital Adequacy Task Force in June 2005 supporting the current equity calibration criteria, the Academy noted that based on average 3-month US Treasury bill returns, that that 3.5-3.75% per annum



does not seem excessive. However, this was based on the Academy's determination that "over the last 50 and 20 years, respectively, the average returns on 3-month Treasury bills were approximately 5.30% and 5.15% ... hence, taking a long-term perspective ... the range 5-5.25% seems sensible for future risk-free rates",<sup>2</sup>

- v. There is substantial uncertainty present in the model specification and parameterization of any "real world" scenario generator, particularly in the long-term tail scenario outcomes that drive reserves and capital in the CTE calculation. In addition, using any calibration window within a historical data-based calibration approach contains an element of arbitrariness.

An additional concern expressed by the VAIWG and championed by Oliver Wyman was preserving the incentive to hedge for an insurer with a low RBC ratio in jeopardy of regulator takeover. QIS II results showed that, particularly in low interest rate environments, companies who reflected hedging of the fair value of guarantees would experience increases in their Total Asset Requirement – i.e., level of funding required for a 100% RBC ratio, prior to diversification – relative to not reflecting any hedging at all. Accordingly, there exists under the current equity calibration criteria an incentive for a hypothetical weakly-capitalized company to reduce or remove hedging in order to lower the Total Asset Requirement and improve its RBC ratio.

Oliver Wyman considered this property highly unfavorable. Apart from the conceptual basis – i.e., increasing the amount of market risk retained by a company should ordinarily lead to a weaker measure of capital strength, allowing this framework weakness to be unmitigated increases the reliance upon the regulator to monitor the actions of a hypothetical weakly-capitalized company. The latter consequence substantially increases the regulator's burden given (i) the substantial complexity of many company portfolios and hedge programs and (ii) the speed with which capital markets conditions can change during periods of elevated market volatility.

QIS II showed that the range of interest rate conditions in which this framework property persists can be reduced by the use of the alternative equity scenarios. As such, the concern that a hypothetical, weakly-capitalized company may improve its statutory capital position by reducing or altogether removing hedging – thereby increasing their market risk profile and risk of a substantially larger loss of a potential receiver – coupled with the increased regulatory burden compelled Oliver Wyman to recommend the use of the alternative equity scenarios. Oliver Wyman encourages the NAIC to consider how such a change would affect other equity-sensitive businesses, such as Variable Universal Life, but expects the effects to be materially smaller in comparison to the impact on businesses subject to AG43 and C3 Phase II.

Lastly, many industry participants expressed concern that rating agencies, which often re-purpose stochastic CTE results within their own proprietary rating assignment frameworks, would not alter their rating standards if the equity scenarios were changed (as Oliver Wyman has done with the CTE High parameter). However, as outlined later in this section, regulators had previously prioritized the soundness of statutory funding requirements over other considerations, including rating agencies. Oliver Wyman also anticipates that rating agencies – many of whom follow closely the VA reform process – will recognize the overt increase in stringency of the alternative equity scenarios, should they be adopted, and re-calibrate their own rating standards accordingly.

- C. **Use CTE 95 and a scalar of 25% to set the C3 charge under the alternative equity scenarios:** the C3 Phase II framework specifies the pre-diversification C3 charge as the difference between the Total Asset Requirement and statutory reserve. Oliver Wyman recommended in 2016 that the C3 charge be calculated based on the difference between a CTE Amount with a higher confidence level ("CTE High") and the statutory reserve, both calculated on the same distribution of projected deficiencies. However, the CTE High parameter was only provisionally set to CTE 98, denoting its specific calibration as subject to verification through further testing.

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<sup>2</sup> "Recommended Approach for Setting Regulatory Risk-Based Capital Requirements for Variable Annuities and Similar Products – Presented by the American Academy of Actuaries' Life Capital Adequacy Subcommittee to the National Association of Insurance Commissioners' Capital Adequacy Task Force", June 2005.



Early in QIS II, we established that a principal target property for CTE High was that it would allow hedging to reduce a company's total funding requirement at a typical target RBC ratio. At CTE 95 under the alternative equity scenarios, QIS II results indicated that hedging would reduce the total funding requirement at the 400% RBC level – before diversification benefits – for most participants that submitted results under interest rate conditions similar to or higher than 2016YE levels. Lower CTE confidence levels did not meet this target property for most participants, and substantial additional increases in the CTE confidence level would be required to make all participants observe reductions in total funding requirement from hedging under 2016YE market conditions.

QIS II results also indicated that CTE 98 under the existing equity calibration criteria produced similar funding requirements as CTE 95 under the alternative equity scenarios, indicating that a company targeting a CTE 98 or similar capital level would not need to alter their capital position materially if they adjusted their capitalization target to CTE 95 in response to the change in equity calibration criteria.

Separately, QIS II results indicated a greater quality of minimum capital requirements under the revised criteria. While a company's likely "target" funding requirement at an undiversified 400% RBC level would be similar between CTE 95 under the alternative equity scenarios and CTE 98 under the current equity calibration criteria, CTE 95 under the alternative equity scenarios would produce a greater Total Asset Requirement. As the Total Asset Requirement represents a 100% RBC ratio pre-diversification, it is highly relevant in the event of receivership.

In Oliver Wyman's recommended C3 charge calculation, a scalar applied to the difference between CTE High and statutory reserve, thereby determining the level of voluntary reserves that can fully eliminate the C3 charge. Oliver Wyman believed that, to preserve the meaningfulness of the RBC ratio in judging the financial health of a company and to identify weakly-capitalized insurers, regulatory prudence should require the C3 charge to remain non-zero until a company's funding level for its VA portfolio is equivalent to a typical capitalization target for a healthy US life insurer – e.g., 400% RBC. Therefore, Oliver Wyman recommended the scalar to be 25% to keep the C3 charge non-zero unless a company's VA funding level equals or exceeds a pre-diversification 400% RBC level. Oliver Wyman acknowledges that, should the standard for a well-capitalized insurer deviate materially from 400%, the NAIC should revisit the scalar parameter to ensure a company holding CTE High level of capitalization achieves a desirable RBC ratio.

- D. More realistic revenue sharing recognition with prudence applied to affiliated funds:** revenue sharing represents the portion of fund revenue collected by managers of separate account funds rebated back to the insurance operating entities, customarily in recognition of insurer activities including (i) marketing/selling of the contracts containing the funds and (ii) customer service administration (e.g., fund statement provision).

Revenue sharing is an important source of cash inflows to the insurer to support profits and help fund eventual benefits, with common levels of revenue sharing at or above 50 basis points per annum of fund assets under management. The level and timespan of such sharing may or may not be guaranteed to the insurance operating entity by the asset manager, creating separate pools of fund revenue denoted "guaranteed" and "non-guaranteed". It is up to the insurer to determine whether a fund revenue agreement should be categorized as guaranteed; if fund revenue is determined to be guaranteed, then the insurer may recognize its full best-estimate amount.

The level of non-guaranteed revenue sharing recognized by insurers is governed by conflicting standards within the current AG 43 and C3 Phase II frameworks. AG 43 requires a reduction in the recognition of revenue sharing of up to 50% of the insurer's best-estimate; C3 Phase II requires that companies account for uncertainties in revenue sharing income but does not specify explicit numerical limits. However, Oliver Wyman's revised C3 charge calculation, which uses a single distribution of scenario deficiencies to calculate both CTE High and statutory reserve, requires the selection of a single revenue sharing recognition approach.

To inform the discussion, during QIS II the American Council of Life Insurers ("ACLI") prepared an experience study to capture the cumulative experience regarding the risk to revenue sharing gained since the formulation of AG 43 and C3 Phase II. This study bolstered support for smaller reductions to

companies' best-estimates of non-guaranteed revenue sharing. Select regulators expressed concerns about the validity of the ACLI study, in particular noting the absence of certainty that the study contained data only for non-guaranteed revenue sharing streams.

However, in related discussions of the broader risks of non-guaranteed revenue sharing, select regulators expressed concerns regarding a potential risk of affiliated funds which, in the view of Oliver Wyman, justified a separate governance mechanism. Specifically, the regulator concern arose in circumstances where the fund manager and insurance operating entity share a common management team or beneficial owner. In a situation where the fund revenue would be more valuable to the beneficial owner retained in the asset manager than ceded to the insurer, the beneficial owner may take efforts to retain the fund revenue within the asset manager. Consequently, Oliver Wyman recommended applying the less stringent C3 Phase II guidelines on non-guaranteed revenue sharing to non-affiliated funds, but maintain the more stringent AG 43 restrictions for affiliated funds in light of the risk described and to incentivize affiliated fund managers to provide guarantees of revenue sharing to safeguard against this risk.

### **Standard scenario**

Early in QIS II and at the request of participants, the VAIWG articulated that the purpose of the Standard Scenario is to govern companies' actuarial assumptions and modeling choices within the principles-based CTE calculation. Oliver Wyman interpreted this guidance to indicate that for effective governance of companies' actuarial assumptions and modeling choices, the Standard Scenario Amount should exceed the CTE Amount if and only if:

- i. A company uses assumptions or practices that substantially deviate from industry experience or accepted practices (unless such deviations can be justified by the company); and
- ii. Such deviations result in materially-lower CTE-based reserve.

This important precept guided the subsequent testing and ultimate recommendations, the highlights of which are summarized below:

- A. **Replace the fixed capital markets path with either (i) a company-specific scenario or (ii) full stochastic CTE scenarios:** the current AG 43 and C3 Phase II Standard Scenarios each prescribes distinct market paths applicable to all companies. QIS II testing determined that these market paths produce Standard Scenario Amounts that are equivalent to widely divergent CTE levels across participants and market conditions, *even if the prescribed assumptions within the Standard Scenario were changed to match the participants' own assumptions used in the CTE calculation*. This indicated that the current Standard Scenario construct does not, in effect, govern exclusively assumptions and model choices. Subsequent testing demonstrated that no single market path, however configured, would produce the same "equivalent CTE level" across participants, a property attributable to divergent characteristics of companies' liability portfolios.

To allow the Standard Scenario to serve its intended purpose and to remove non-economic balance sheet volatility that companies face today from the existing Standard Scenario, Oliver Wyman proposed two alternative Standard Scenario constructs that allow specific calibration to each company's portfolio:

- i. *Proposal A:* the Standard Scenario Amount is calculated as the Greatest Present Value of Accumulated Deficiency ("GPVAD") along a single market path under prescribed actuarial and expense assumptions. The single market path would consist of an initial stress that can be selected individually by each company – following a strictly-defined method to eliminate company judgment on scenario selection – and a recovery path standardized across the industry;
- ii. *Proposal B:* the Standard Scenario Amount is calculated as the CTE Amount under prescribed actuarial and expense assumptions instead of under companies' own assumptions (i.e. requires use of a full stochastic scenario set).

Subsequent testing indicated that, for all but one QIS II participant, these two methods produced substantially similar Standard Scenario Amounts, supporting the Oliver Wyman recommendation to allow companies to choose from the two constructs in calculating the Standard Scenario Amount.

- B. Prescription of CTE 65 as the target confidence level:** during QIS II, the VAIWG elaborated on their articulation of the purpose of the Standard Scenario to express a desire only to “catch outliers” in the establishment of company-defined model assumptions and choices.

Oliver Wyman interpreted this statement to indicate that regulators are willing to give “the benefit of the doubt” to companies when it pertains to company-defined assumptions and model choices that deviate modestly, but not meaningfully, from the prescribed assumptions. Within a CTE-based solvency framework, this indicates that the Standard Scenario’s confidence level should be below CTE 70 when calculated using the prescribed assumptions, thereby establishing a reserve “buffer” equal to the difference in stochastic reserves between the chosen CTE level and CTE 70.

Oliver Wyman selected CTE 65 as the target confidence level for the Standard Scenario Amount, as:

- i. QIS II testing indicated that this buffer was prudent in size, never exceeding for any QIS II participant 2% of its cash surrender value under any tested market conditions;
- ii. Had value as a regulatory precedent, as CTE 65 was an initial proposal for the AG 43 CTE confidence level before being later revised to CTE 70.

Empirically, several QIS II participants saw Standard Scenario Amounts that had equivalent CTE levels falling between the CTE 65 and CTE 70, indicating partial use of the buffer.

- C. Consistency in reflection of the hedge program with the CTE “adjusted” calculation:** the company assumptions and model choices governed by the Standard Scenario can be divided into two classes: those pertaining to the projection of the liability cash flows in the CTE calculation, and those pertaining to the projection of the hedge program in the CTE calculation.

The current Standard Scenario calculation requires liquidation of all hedge assets at the end of the first projection year – a prescription unlikely to mimic actual company behavior. QIS II testing indicated that governing hedge program reflection within the CTE calculation is best achieved through a set of principles and disclosures, similar to governance of most of the separate account investment return assumptions. These principles and disclosures are intended to flag any company whose hedge program appears to outperform the market relative to the hedged liability to an unusual level.

The recommended Standard Scenario calculation thus focuses exclusively on governance of liability assumptions and model choices. For reflecting the hedge program, Oliver Wyman recommended that the reflection be aligned with that recommended by Oliver Wyman for the CTE (“adjusted”) calculation – i.e., existing hedges are either (i) run off until maturity with no purchases or sales, or (ii) replaced with other general account assets prior to the projection. As the Standard Scenario Amount is ultimately compared with the CTE Amount (“adjusted”) to determine if additional reserves are needed under Oliver Wyman’s recommendation, the Standard Scenario calculation would not introduce unwanted non-economic volatility into the balance sheet from reflection of the hedge program.

- D. Revisions to prescribed policyholder behavior assumptions:** the prescribed policyholder behavior assumptions defined within the current AG 43 and C3 Phase II Standard Scenarios were formulated prior to the emergence of meaningful experience data for the most modern and riskiest VA guarantees written predominantly after 2000. Consequently, these assumptions were structured and parameterized without grounding in actual industry experience or recognition of the subtleties distinguishing guarantees within a given class – e.g., the substantial difference in risk profile of benefits with and without guaranteed “roll-ups” in their benefit bases.

QIS II devoted substantial resource to a policyholder behavior experience study involving nine participants’ actual experience data to verify the appropriateness of the prescribed assumptions

recommended by Oliver Wyman in 2016. In parallel with the Oliver Wyman-led QIS II experience study, the ACLI engaged Ruark Consulting, LLC (“[Ruark](#)”) to conduct an independent, industry-aggregate experience study using the industry-aggregate dataset that Ruark had separately collected and maintained via its prior engagements with individual companies.

Results of the Oliver Wyman-led QIS II study indicated that most of Oliver Wyman’s recommendations from 2016 on policyholder behavioral assumptions aligned well with participant experience where such experience was available. Several components of the recommended assumptions required revision to align more closely with experience data, though most of the revisions were parametric – instead of structural – in nature. Separately, the findings of the Ruark study largely corroborated the findings of the Oliver Wyman study; accordingly, no changes were made to the revised recommendations in light of the Ruark study.

Further details of the study and its results are available in the document titled *Variable Annuity Statutory Reserve and Capital Reform: QIS II Public Report* (the “[Public Report](#)”).

## 5. Additional details

Oliver Wyman has released a second document titled *Variable Annuity Statutory Reserve and Capital Reform: QIS II Public Report* (the “[Public Report](#)”) that provides a more detailed review of all aspects of QIS II, including:

- i. The structure and timeline of the QIS, as well as the process undertaken to conduct the QIS;
- ii. Technical specifications of the quantitative testing that was performed;
- iii. Comprehensiveness of data received for each set of quantitative tests, and procedures for data verification followed prior to discussion of results;
- iv. Analytical methodologies followed in assessing participant results;
- v. Overview of discussions held with the participants and VAIWG on the implications of testing results, as well as the manner in which the testing results informed Oliver Wyman’s ultimate recommendations;
- vi. Additional analyses and discussions conducted in separate Working Groups of the QIS – including details of a policyholder behavior experience study that was conducted as part of a Working Group to inform recommendations on the prescribed behavioral assumptions within the Standard Scenario;
- vii. Meeting agendas and conclusions from 21 trilateral meetings held between Oliver Wyman, the VAIWG, and participants throughout the course of QIS II.

To protect the data confidentiality of participant submissions and – given the highly technical nature of the subject matter evaluated during QIS II – to prevent analyses from being misconstrued, Oliver Wyman has agreed with the participants that release of quantitative testing results from QIS II would need to be approved by participants who have furnished the relevant data. As of the publication date of the Public Report, we have not yet obtained the necessary approval; accordingly, the Public Report does not contain quantitative testing results. However, we are currently in conversations with the participants on the potential release of select quantitative testing results at a later date, and expect to publish a supplement to the Public Report should we obtain the necessary approvals.

Unless otherwise stated, the interpretations, conclusions, and views presented in this document and in the Public Report represent Oliver Wyman’s views and are not necessarily endorsed by the QIS II participants, the VAIWG, or the NAIC.

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