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C3 Phase III

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American Academy of Actuaries
Life Reserves and Capital Practice Note Work Group

American Academy of Actuaries

Practice Note on C3 Phase III

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Life Reserves and Capital Practice Note Work Group

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This practice note is not a promulgation of the Actuarial Standards Board, is not an actuarial standard of practice, is not binding upon any actuary and is not a definitive statement as to what constitutes generally accepted practice in the area under discussion. Events occurring subsequent to this publication of the practice note may make the practices described in this practice note irrelevant or obsolete.

Introduction

This practice note covers principle-based risk-based capital practices ("RBC") for life insurance. The purpose of the practice note is to assist actuaries in the event that the NAIC implements model regulations along the lines set forth in the Report of the American Academy of Actuaries' C3 Life and Annuity Capital Work Group dated September 15, 2009, describing the proposed requirements for calculating C3 capital ("C3 Phase 3" or "C3P3") for life insurance products ("C3 Phase 3 Report" or the "Report"). Since the principle-based approach for life RBC is new, this practice note was not developed from a survey of current actuarial practices. The practices here represent the views of actuaries in industry, consulting, and public accounting firms that have been involved with the development of the proposed life RBC standards as set forth in the Report. All capitalized terms used herein and not otherwise defined herein shall have the meanings ascribed to such terms in the Report. The Report was submitted to the NAIC's Life RBC Working Group for consideration of inclusion in the RBC instructions for the NAIC Life and Health Annual Statement Blank and has been exposed by the NAIC for comments. Although this practice note references the Report, it is important to note that this practice note only discusses a proposal for C3 Phase 3, and the final requirements adopted by the NAIC may differ from the Report and may require additional or different guidance.

It should also be noted that the information contained in the practice note documents practice that the authors anticipate will be utilized by actuaries to determine C3 Phase 3 and is not a definitive statement as to what constitutes generally accepted practice in this area. Actuaries are not in any way bound to comply with this practice note or to conform their work to the practices described herein.

It is expected that actuarial practice for determining principle-based RBC for life insurance products will emerge over time. As this practice note is a description of what the authors expect actuarial practice will look like prior to the effective date of implementation by the NAIC, it is likely that additional actuarial practice will be developed that are not contained in this practice note. Additions and revisions to this practice note will likely be needed in the future as practices are further developed and issues that are not anticipated below are addressed. Thus, readers should keep in mind that this practice note is based solely upon the Report which has not yet been adopted by the NAIC.

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1. Details on Products Covered

Q1.1: For which products are C3 Phase 3 calculations required?

A: According to the Report, C3 Phase 3 applies to all in force life insurance policies that fall within its scope, including both policies subject to principle-based and formula-based reserves. The scope of C3 Phase 3 is listed in Section 3 of the C3 Phase 3 Report. Policies listed are the following:

All individual life insurance policies whether directly written or assumed through reinsurance, including:

1. Universal life insurance policies;
2. Variable life and variable universal life insurance policies;
3. Term life insurance policies;
4. Traditional whole life insurance policies;
5. Indexed life and indexed universal life insurance policies;
6. Individual life policies and individually underwritten certificates issued under a group life insurance contract; and
7. Combination policies that include other benefits such as annuity benefits or long-term care benefits in addition to life insurance benefits, but are filed as individual life insurance policies.

Q1.2: Do riders that are attached to life insurance policies fall under the C3 Phase 3 proposed requirements?

A: According to the Section 3.B of the C3 Phase 3 Report, risk-based capital proposed requirements for individual life policies, supplemental benefits, and riders on those policies that are not directly identified in the Report are to be determined on a basis that is consistent with the principles and methodologies defined in the Report. Therefore, riders on life insurance policies would be part of the scope of C3 Phase 3.

Q1.3: What are examples of products that are excluded from C3 Phase 3? For example, are combination products (e.g., products that have both life and annuity features or life and long-term care insurance) included in the scope?

A: As is discussed above, Section 3 of the C3 Phase 3 Report identifies the scope of the policies to be included. The descriptions are broad and some actuaries will include products in the calculation unless they clearly are not in scope. Combination products are specifically identified in the proposed C3 Phase 3 requirements as being in scope if they are filed as individual life insurance products. If there is a question of whether a product should be included in one of the principle-based C3 calculations (C3 Phase 1, Phase 2 or Phase 3), actuaries would normally include it in one of calculations after considering the risks of the product. They would not exclude it from all by taking the position that it is not technically covered in the scope of any of the principle-based C3 calculations as that is contrary to the principle of including all material risks in the principle-based RBC calculations.

2. Available Information on Common Practice

Q2.1: Where will the regulatory requirements for C3 Phase 3 calculations be found?

A: The requirements for adopted risk based capital for life insurance products will be found in the instructions for the NAIC Life and Health Annual Statement Blank which can be obtained from the NAIC, in the event they adopt the recommendations from the Report.

Q2.2: What will be the relationship between C3 Phase 3 as described in the Report and proposed VM-20 if adopted as currently drafted?

A: There are no specific references in either of the two documents to each other. However, some actuaries may be familiar with exposure drafts of VM-20 and may make use of the information in VM-20 in making the calculations required by C3 Phase 3.

Q2.3: Which Actuarial Standards of Practice (ASOPs) would apply to the actuary when performing the tasks in conjunction with determining capital under C3 Phase 3?

A: While each actuary is ultimately responsible for determining which ASOPs are applicable to a specific task, the following ASOPs are among those the actuary may wish to consider:

No. 1 Nonguaranteed Charges or Benefits for Life Insurance Policies and Annuity Contracts.
No. 7 Analysis of Life, Health, or Property/Casualty Insurer Cash Flows
No. 11 The Treatment of Reinsurance transactions in Life and Health Insurance Company Financial Statements
No. 12 Concerning Risk Classification
No. 15 Dividend Determination for Participating Individual Life Insurance Policies and Annuity Contracts
No. 22 Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life and Health Insurers
No. 23 Data Quality
No. 38 Using Models Outside the Actuary's Area of Expertise
No. 41 Actuarial Communications

The Actuarial Standards Board is considering developing a new ASOP, Standards for Principle-based Reserves for Life Products, which the actuary may wish to also consider.

Q2.4: Are there other practice notes that cover topics relevant to C3 Phase 3 calculations as described in the Report?

A: The Practice Note for the Application of C3 Phase II and AG XLII as well as the Asset Adequacy Analysis Practice Note may contain relevant information for actuaries performing C3 Phase 3 calculations. There is also a Credibility Practice Note. These practice notes can be found at the American Academy of Actuaries web site at www.actuary.org.

Q2.5: Are there practices in other countries that an actuary can review for reference?

A: Published papers on capital calculations in other countries may provide useful information. **It should be noted that acceptable practice in other countries may not generally be viewed as a safe**

harbor for principle-based calculations in the U.S. U.S. actuaries using other countries' papers as a guide should make their own independent decision as to whether the techniques described in the papers are appropriate for their situation under principle-based methods. Some examples and references from other countries follow:

The Canadian Institute of Actuaries has prescribed a method for determining minimum capital requirements (called MCCSR in Canada); the value is based on a CTE measure. There are also Valuation Technique Papers (VTP) in Canada and educational notes that U.S. actuaries may wish to consider in order to better understand how Canadian actuaries calculate reserves and capital. There are some similarities to the Canadian valuation techniques and a review of the specific material described above may be helpful to identify specific issues that a U.S. actuary might want to consider in calculating principle-based RBC. For Canadian documentation see:

http://www.actuaries.ca/members/publications/2008/208078e.pdf

Emerging Solvency II standards of the IAIS (International Association of Insurance Supervisors)
The underlying principle of Solvency II is a three pillar monitoring of risk capital. The first pillar is a factor-based approach to determining risk capital. The second pillar is a detailed modeling of risk-related cashflows and the effects of risk-management techniques, whereby the company determines its own risk capital along the lines of an economic capital framework. The third pillar is for the regulator to review the relative modeling methodology and assessment techniques, and to evaluate whether additional amounts are to be required on top of the capital calculated by the individual companies.

http://www.fsa.gov.uk/pages/About/What/International/solvency/index.shtml

3. C3 Phase 3 Calculation

Q3.1: How would actuaries approach calculating life capital under C3 Phase 3 according to the Report?

A: Section 1 of the C3 Phase 3 Report describes the general approach for the main steps in performing the calculation. One approach for completing the calculation with the basic steps is outlined below. Other approaches are possible. Refer to the C3 Phase 3 Report for specific details.

1. Determine policies in scope of the C3P3 requirements.

2. Determine the Business Segments for all policies in scope of the requirements. Per the definition of Business Segment in Section 5 of the C3 Phase 3 Report, this determination will generally align with the company's asset segmentation plan, investment strategies or approach used to allocate investment income for statutory purposes. It should be noted that a Business Segment could be an entire block of business.

3. Build asset and liability populations in a Cash Flow Model. This Cash Flow Model may represent each Policy in force on the date of valuation or represent policies by grouping such policies into representative cells of model plans (see Section 5.G. of C3 Phase 3 Report).

4. Set Anticipated Experience Assumptions for all Risk Factors. Alternatively, the actuary can use the cash flow testing assumptions to perform the Stochastic Exclusion Test if the policy's reserves are not determined using a principle-based approach.

5. Perform Stochastic Exclusion Test (if elected) and Determine Factor-Based Amounts
    a. This may be performed for any block of policies for which this test is deemed appropriate (See question 3.2 and section 15 below).
    b. Run projections using Starting Assets not less than 98% of the statutory reserve using Anticipated Experience assumptions along the specified Stochastic Exclusion Test Scenarios.
    c. Calculate the Stochastic Exclusion Test ratio.
    d. If the ratio is less than 4%, the company has the option of calculating a Factor-Based Amount for the policies by applying a factor to the statutory reserve.

6. Determine the Stochastic Amount for Business Segments for which the stochastic analysis is required or deemed appropriate.
    a. Determine policy groupings, if applicable. Projections may be performed for each policy in force on the valuation date or by grouping policies into representative cells of model plans, per Section 6.G.5. of the C3 Phase 3 Report.
    b. Establish Prudent Estimate Assumptions for all Risk Factors.
    c. Project cash flows for Business Segments as described in Section 6.C., D. and E. of the C3 Phase 3 Report. The Starting Assets should be an amount equal to at least 98% of statutory reserve and other liabilities balance on the policies being valued.
    d. Calculate the path of Discount Rates for each Business Segment along each Scenario per Section 6.F of the C3 Phase 3 Report.
    e. Determine the Scenario Amount for each Scenario in the analysis. Note this step may include aggregating results across Business Segments
    f. Make any adjustments necessary to reflect differences between modeled and actual tax reserves (Section 6.G.6.a.5 of the Report.)

g. Calculate the Stochastic Amount by ranking the Scenario Amounts from lowest to highest and taking the average of the highest 10% of these Scenario Amounts.
h. If necessary, add amounts to the Stochastic Amount to capture any material risk included in the scope of the requirements but not already reflected in the Stochastic Amount.

7. Determine the Alternative Amounts, if any. (See question 3.3 and section 16 below).

8. Determine Non-modeled Amounts, if any.

9. The company's Total Asset Requirement is the sum over all Business Segments of:
    a. Stochastic Amounts
    b. Alternative Amounts
    c. Factor-based Amounts
    d. Non-modeled Amounts

10. Per Section 6.L. of the C3 Phase 3 Report, the company's Reported Amount is the minimum required amount as of the Valuation Date for policies within scope of the requirements. The Reported Amount equals the Total Asset Requirement less the statutory value of the liabilities included in the determination of the Total Asset Requirement. There are other adjustments the company may wish to make, as appropriate, to the Reported Amount. These are also detailed in Section 6.L. of the C3 Phase 3 Report.

11. Reduce Reported Amount by factor-based C1 on equities supporting the liabilities at the valuation date, but not less than zero.

12. The Reported Amount is floored at zero.

13. Complete documentation and certification requirements.

Q3.2: What is the Stochastic Exclusion Test?

A: The actuary may perform the Stochastic Exclusion Test for blocks of policies that do not have significant sensitivity to interest rate or market risk. The Stochastic Exclusion Test is covered in Section 10 of the C3 Phase 3 Report, and Section 15 of this practice note.

Q3.3: What is the Alternative Amount?

A: Per the C3 Phase 3 Report Section 6.H, an Alternative Amount may be calculated in lieu of the Stochastic Amount. Section 16 of this practice note has additional information about the Alternative Amount.

Q3.4: What is the Non-modeled Amount?

A: The Non-modeled Amount is part of the Total Asset Requirement to take into account immaterial liabilities that are not calculated through either the Stochastic Amount, the Alternative Amount or the Factor-based Amount. Some examples of items that may be included in the Non-modeled Amount include new business issued after the Projection Start Date, Accidental Death Benefits, Waiver of Premium, Guaranteed Insurability Option, and other liabilities that are part of the in force but not included in the model.

Q3.5: How would the actuary calculate the Non-modeled Amount?

A: Section 6.J. of the C3 Phase 3 Report describes the calculation for the Non-modeled Amount.

Q3.6: How does an actuary determine a Business Segment?

A: Section 5.F. of the C3 Phase 3 Report defines a Business Segment as a grouping of assets and policies which generally follows the company's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes. Some actuaries might also consider how Non-Guaranteed Elements are set in determining Business Segments. It should be noted that a Business Segment can be an entire block of business.

Q3.7: What considerations should be taken when deciding on acceptable levels of aggregation of data for model cells within a Business Segment in the stochastic calculations?

A: The actuary may wish to consider the similarities between policies and their respective assumptions when grouping policies together. Some actuaries may use model office projections for a subset of Scenarios to determine the impact various groupings may have on the resulting RBC. The actuary may wish to consider Section 3.3.4a of the discussion draft of a proposed ASOP on Principle-Based Reserves that discusses considerations in choosing model cells for principle-based calculations (this is a discussion draft only and not an exposure draft of any ASOP and its contents have not been reviewed or approved by the ASB and is therefore subject to changes by the ASB).

Q3.8: What is the required modeling time step / frequency of projection?

A: While there is no required model time step in the C3 Phase 3 Report, actuaries commonly use monthly, quarterly or annual time steps in the cash flow projections. In choosing a time step, actuaries may wish to consider factors such as product characteristics, the frequency of setting credited interest rates, other Non-Guaranteed Elements or the sensitivity of the projection to the time step, and practical limitations. Some actuaries may have a quarterly time step for a specific Business Segment, while using a monthly time step for business with an equity component or monthly rate setting. For very stable Business Segments with little interest rate sensitivity, an annual time step might be appropriate.

Q3.9: When determining the Stochastic Amount, what level of aggregation is appropriate?

A: Section 6.G.6.b of the C3 Phase 3 Report states that the aggregation of one or more Business Segments in the determination of the Stochastic Amount is up to actuarial judgment. Some actuaries may aggregate all business since risk-based capital is a company-based calculation. Other actuaries may look toward company practices for managing the business.

Some actuaries believe that modification of the level of aggregation solely due to a more favorable outcome is not within the spirit of principle-based calculations and would not be a reasonable justification for making such a change. The rationale for an actuary's decision to aggregate Business Segments, if aggregation is done, is to be documented as part of the Actuarial Report.

Q 3.10: How are positive and negative cash flows at the end of a Projection Interval handled in the calculation of a Scenario Amount?

A: Per the C3 Phase 3 Report, Section 6.C.4, any positive net cash flows are reinvested in a manner that is consistent with the investment strategy used for the Business Segment being projected. Negative cash flows are covered through the disinvestment strategy for the Business Segment.

4. Difference from Cash Flow Testing – Stochastic Amount Calculation

Q 4.1: May the actuary use an asset adequacy testing Cash Flow Model to calculate the Stochastic Amount for the C-3 RBC?

A: It is anticipated that some actuaries will make use of their cash flow testing (CFT) models in calculating the Stochastic Amount. However, the actuary may need to adjust the cash-flow testing model to reflect the different purposes of the calculations. Some of the potential differences between CFT and the C3 Phase 3 calculation are listed below. Note that this list is not intended to be a complete listing of all differences.

- CFT may be based on assumptions that are not Prudent Estimate assumptions; C3 Phase 3 uses Prudent Estimate Assumptions
- There may be some difference in projection periods / timestep / model segments
- Some business may not be cash flow tested
- Treatment of IMR and AVR

Q4.2: May the actuary use different assumptions for C-3 Phase 3 RBC than those used for cash-flow testing?

A: For C-3, Prudent Estimate Assumptions are required under the Report. Sections 5.R. and EE. of the C3 Phase 3 Report state that Prudent Estimate Assumptions are Anticipated Experience assumptions increased by a Margin for estimation error and adverse deviation. Some modifications to cash flow testing assumptions may be required if the cash flow testing assumptions are not the actuary's Prudent Estimate Assumptions.

Q4.3: In calculating the Stochastic Amount, may the actuary use the same interest rate and equity Scenarios as used for asset adequacy analysis projections?

A: The C3 Phase 3 Report in Section 6.D outlines the proposed requirements for interest and equity paths to be used in the stochastic calculations. Some actuaries may wish to use these same Scenarios for both asset adequacy analysis and C3 Phase 3, assuming the scenarios meet the specific requirements.

Q4.4: May the same Projection Period used for cash flow testing be used in the C3 Phase 3 capital calculation as well?

A: Section 6.C.6 of the C3 Phase 3 Report states that the Projection Period shall be sufficiently long that no materially greater Stochastic Amount would result from a longer Projection Period. Some actuaries would review their cash flow testing projection length to ensure that this condition is satisfied.

Q4.5: How will the actuary measure materiality in this context?

A: Actuaries can refer to the Council on Professionalism paper on materiality at www.actuary.org/pdf/prof/materiality_06.pdf. Some actuaries may run multiple projection periods to determine the amount and direction of the change that will inform their decision on materiality. Other actuaries may look at the ending in force amount, cash flows or other measures as well.

Q4.6: Would the actuary generally use the same assets in both the C3 Phase 3 and cash flow testing calculations?

A: The Stochastic Amount calculation requires the assignment of a set of Starting Assets satisfying certain criteria to each Business Segment (see Section 6.E. of the C3 Phase 3 Report). Some actuaries will assign the same assets for both calculations but it is not a requirement.

5. Considerations When Performing Work on Other Than the Valuation Date

Q5.1: Would it be required that the model used to determine C3 Phase 3 start with assets and Policy data as of the Valuation Date?

A: Per Section 6.A.3 of the C3 Phase 3 Report, the calculation can be performed as of a date up to six months prior to the Valuation Date as long as an appropriate method is used to adjust the Reported Amount to the Valuation Date. Section 3.3.5 of the discussion draft of a proposed ASOP on Principle-Based Reserves suggests the use of a Deterministic Update, but warns of conditions that could require adjustment such as condition changes that affect guarantees (this is a discussion draft only and not an exposure draft of any ASOP and its contents have not been reviewed or approved by the ASB and is therefore subject to changes by the ASB).

Although the calculation may use prior data, some actuaries would take into account relevant experience up to the Valuation Date in their determination of Anticipated Experience and Prudent Estimate Assumptions used in the calculations.

Q5.2: Will actuaries take into account experience after the Valuation Date but prior to the date the calculations are performed in the determination of C3 Phase 3 RBC?

It is not clear whether practice will lead to modifications of assumptions for information learned after the Valuation Date but prior to the date the calculations are performed. Some actuaries may modify calculation assumptions if such new information would lead to material changes in assumptions that would materially affect the Reported Amount.

Q5.3: Does the Report require the use of year-end data?

A: Yes. Section 6.G.7 of the C3 Phase 3 Report states that to the extent that the Stochastic Amount is based on data prior to the Valuation Date and the Total Adjusted Capital is less than 110 percent of the Company Action Level amount, it will be necessary to re-determine the Stochastic Amount subsequent to filing, using actual year-end data. Also, if the actual RBC value exceeds that estimated earlier in the blanks filing by more than 5 percent, or if the actual value triggers regulatory action, a revised filing with the NAIC and the state of domicile is required by June 15; otherwise re-filing is permitted but not required.

Q5.4: Should changes in economic conditions from the Projection Start Date also be incorporated in the adjustment of the RBC?

A: Some actuaries performing the calculations would modify the C3 Phase 3 calculations to take into account the economic conditions as of the Valuation Date if the Valuation Start Date is different than the Projection Start Date. This adjustment would take into consideration both the impact on the liability cash flows and the net asset earned rate.

For products whose liability cash flows are dependent on changes in the economic environment like current assumption universal life products, some actuaries would reflect the economic conditions on the Valuation Date (if there have been material changes) and adjust the liability cash flows accordingly. This may require a re-computation of the capital amounts or could include high-level adjustments reflecting expected changes to the liability cash flows. Some actuaries would apply adjustments that were based on sample calculations or prior sensitivity testing.

For products whose future expected liability cash flows are not sensitive to changes in market conditions, it is expected that some actuaries would not make modifications to the liability calculation. It is likely that these actuaries would disclose their rationale in the documentation of the calculation. An example would be no or very low Cash Surrender Value term policies with fixed premiums. The liability cash flows would not be dependent on a change in the economic environment so no adjustments would generally be made.

Some actuaries believe that actuarial judgment should be used to determine if adjustments to the reinvestment assumptions and the projected net asset earned rate used in the calculation are needed. Those actuaries may modify the asset projection based on updated economic conditions as of year-end if the changes would lead to materially different capital levels.

It is anticipated that some actuaries would include specific description and discussion of how the asset and liability cash flows were adjusted in the documentation supporting the calculation per the requirements in Section 11 of the C3 Phase 3 Report.

Q5.5: Will actuaries adjust the calculation for new business and lapses if company in force data from prior to the Valuation Date is used?

A: If Policy in force data from a date prior to the Valuation Date is used, it is expected that some actuaries would not make adjustments to the models to take into account policies that are no longer in force as of the Valuation Date and those newly issued since the date of the in force data but prior to the Valuation Date. If large volumes of new business have been issued, some actuaries would estimate the additional Reported Amount from the new issues. Others would include these policies in the Non-modeled Amount. It is also expected that some actuaries would have a lapse and new business assumption to reflect / project changes between the Projection Start Date and the Valuation Date.

Some actuaries would analyze whether including policies no longer in force in the stochastic reserve modeling would materially affect the Reported Amount. If there were a material difference in actual to expected terminations, some actuaries would make modifications to the models to take into account the changes. Some actuaries would include specific description and discussion of how the in force was modified to take into account changes up to the Valuation Date in the documentation supporting the calculation and why it was determined to be material or immaterial.

Q5.6: Does the calculation need to be adjusted for Policyholder actions such as additional premium payments, taking or repayment of a Policy loan, partial withdrawals, face amount adjustments and other Policy changes that have occurred since the date of the in force data but prior to the Valuation Date?

A: It is expected that some actuaries would not make adjustments to the RBC for policyholder actions between the Projection Start Date and the Valuation Date. However, if there have been policyholder actions that would materially affect the Reported Amount, some actuaries would make modifications.

Q5.7: Are there other types of changes occurring between the Projection Start Date and the Valuation Date that could lead to adjustments in the calculations?

A: In addition to those items addressed above, some actuaries would consider the impact of changes to the business's risk profile such as, but not limited to:

- Significant changes in asset allocation or mix of assets (by quality, duration, or other characteristics);
- New, terminated or recaptured reinsurance; and
- Changes in counterparty risk.

6. Detail on Starting Assets and Asset Modeling

Q6.1: What is the level of Starting Assets required in the calculation?

A: Section 6.E.1. of the C3 Phase 3 Report requires the value of Starting Assets, using valuation methods consistent will their Annual Statement values, to be no less than 98% of the statutory reserve plus other liabilities on the policies being valued at the Projection Start Date. If assets used to support policies are held in Separate Accounts, the value of the Starting Assets shall be at least equal to the amount of those assets in the Separate Accounts. The Report requires that there be some normal association between the Starting Assets and the group of policies being modeled. Starting Assets need to be in the company's asset portfolio at the Projection Start Date in order to be used in the projection.

Section 6.C.3. of the Report requires assets at the beginning of the projection to be selected from the company's actual assets backing the policies associated with each Business Segment. The assets chosen to be Starting Assets are generally derived from the asset segmentation process used by the company. In cases where asset segmentation is used, the Starting Assets will generally be well-defined subsets of the overall company asset portfolio, and be routinely monitored for the purposes of tracking investment strategies and allocation of investment income to the policies they support.

Q6.2: What methods should be used when policies are supported by a combination of General Account and Separate Accounts assets?

A: For some product types, Separate Account assets will be a main source of Starting Assets, but be complemented by a set of General Account assets. These General Account assets may, for example, support fixed components of the Policy, or be held as hedges against fluctuations in the value of the Separate Account assets. In these cases, Section 6.E.1.c. of the Report states that the sum of the assets from the Separate Account and the assets from the General Account should be at least equal to 98% of the reserve and other liabilities on the policies being valued.

Q6.3: How should the actuary choose which assets to include in the calculation?

A: The C3 Phase 3 Report states that the assets used in the calculation must be associated with the group of policies that are modeled together to project the future Accumulated Deficiencies. Policy loans and deferred premium assets are examples of assets that are associated with specific policies. Some actuaries would look to the company's asset segmentation plan, investment strategies or approach used to allocate investment income for statutory purposes in deciding which assets are appropriate for the C3 Phase 3 calculation.

Q6.4: How will the actuary choose assets to include in the model if there are more assets associated with the Business Segment than are needed as Starting Assets?

A: Some actuaries would choose a pro-rata portion of a segmented portfolio or other grouping of assets comprising the Business Segment. Some actuaries might choose specific assets based on modeling constraints. However, the same asset would not be included in the Starting Assets of different Business Segments where the total amount of such asset is more than what the company owns.

Q6.5: What types of grouping of assets might be used in the projection?

A: Some assets may be similar enough in nature that the actuary might reasonably expect their cash flows and valuations to react in similar fashions as economic conditions change and therefore be grouped together for modeling purposes. For grouping of fixed income investments, some actuaries would ensure that parameters such as credit quality, time to maturity, duration and interest and principal patterns are similar before considering grouping of individual securities.

Q6.6: Should the assets backing the IMR be included in the Starting Assets for the C3 Phase 3 calculation?

A: Per Section 6.E.4 of the Report, assets supporting the IMR allocable to the Business Segment may be included. The intent is to permit the inclusion of all invested assets in the projection that are normally associated with supporting the corresponding liabilities in the Business Segment being modeled. Any positive IMR balance allocable to the business being valued may be included. Any negative IMR balance allocable to the business being valued, to the extent it offsets positive IMR balances elsewhere in the entity, may also be included.

Q6.7: Should the assets backing the dividend liability be included in the Starting Assets?

A: In the C3 Phase 3 Report, Section 6.M.5, this liability may be included or not included in the Cash Flow Model at the company's option. If the dividends that give rise to the dividend liability are included in the Cash Flow Model, then the dividend liability may be included in the liabilities that are deducted at the end of the calculation from the Total Asset Requirement in calculating the Reported Amount for C3.

Q6.8: Does the deferred premium asset have to be used as a Starting Asset?

A: The deferred premium asset represents the offset to the statutory reserve for policies with non-annual premium modes. If the cash flow model takes into account the actual expected timing of the future modal premiums, then actuaries may wish to consider if including the deferred premium asset in the projection is also necessary or if it will be addressed in some other way. Some actuaries may consider the deferred premium asset as being included in the Starting Assets as it is a contra-liability and the Starting Assets per Section 6.E.1.c. of the Report includes "other liabilities" as well as the reserve. Some actuaries who decide to include the deferred premium asset may net the liabilities in the determination of the level of Starting Assets. Other actuaries may include it as an explicit asset.

Q6.9: To the extent that Starting Assets have unstable market values, what Starting Asset values would be used and how would the asset cash flows be modeled?

A: Per Section 6.E.1 of the C3 Phase 3 Report, Starting Assets are valued in a manner consistent with their annual statement values and the future value of projected Starting Assets should be done in a manner consistent with their statement values at the start of the projection. If the market is volatile, then some actuaries would take this into account in establishing the prudent estimate assumption for the future cash flows. For example, future defaults might be expected to be larger during times of very unstable market values than when market values are more stable.

Some actuaries would project the volatile conditions to last for a number of Projection Years but not necessarily for the lifetime of the projection. Some would use judgment based on the reason why the

market is unstable, historical duration of similar times of uncertainty and their expectation of future events (including appropriate Margins) in determining the number of future Projection Years the instability is assumed to continue. Some actuaries would grade to their longer-term Prudent Estimate Assumptions when the markets are projected to become stable again.

Q6.10: How are the Starting Assets determined where a regulatory Closed Block asset amount is less than the total liabilities (i.e., closed blocks funded with a deficit)?

A: Some Closed Blocks are notionally funded with an amount of assets whose statutory value is less than the total statutory liabilities. In reality, it is likely that the company's statutory balance sheet does include enough assets to cover 100% of the statutory liabilities. In determining the C3 Phase 3 amount for these policies, the actuary may consider using surplus assets of a value equal to the difference between the closed block asset total and at least 98% of the statutory liabilities on the Valuation Date.

Q6.11: If the company has letters of credit as admitted assets, can the letter of credit be used in the Starting Assets?

A: Some actuaries may include these assets by projecting their cash flows, including the cost of the letters of credit, under each Scenario using Prudent Estimate Assumptions.

Q6.12: How will the actuary model negative assets when they arise in the projections?

A: There are several alternative ways to handle negative assets or "borrowing." Some actuaries may assume that the borrowing takes place using their assumed reinvestment strategy (particularly if a Business Segment is going to be aggregated with other Business Segments). Other actuaries may assume that the negative assets will come from the surplus portfolio or that the company will borrow and consider the company's ability to secure external or internal financing during situations that are representative of stressful economic "tail" Scenarios.

7. Details on Scenarios / Scenario Generators / Economic Assumptions

Q7.1: What economic assumptions are stochastically generated?

A: The C3 Phase 3 Report in Section 6.D.1 states that the assumption for future U.S. Treasury yield curves and future S&P 500 and other future fund performance for separate account asset returns should be stochastically generated for use in the calculations.

Q7.2: How would actuaries generate the Scenarios for the C-3 Phase 3 calculations?

A: Actuaries may wish to use the following Scenarios, according to Section 6.D of the C-3 Phase 3 Report:

- Stochastic generators and model parameters prescribed by the NAIC;
- Pre-packaged Scenarios generated from the stochastic generators and model parameters prescribed by the NAIC;
- Stochastic models developed by the company (called Proprietary Scenario Sets), if mandated calibration criteria established by the NAIC are met. Returns for equity performance and groupings of variable funds shall be determined on a stochastic basis such that the resulting distribution of the Gross Wealth Ratios of the Scenarios meets the Scenario calibration criteria established by the NAIC.

If the company chooses to use a fully integrated interest rate/equity return Model, the equity return Scenarios must satisfy the equity return calibration criteria adopted by the NAIC and the interest rate Scenarios must satisfy the interest rate calibration criteria adopted by the NAIC.

Returns on other asset classes for a Scenario must be consistent with the projected total return on the S&P 500. It would be generally be inappropriate for an asset class to consistently outperform the S&P 500 return, such as having a consistently lower risk and higher expected return. (see Section 6.C.3.b.2. of the C3 Phase 3 Report).

Q7.3: How many Scenarios should be run to determine the C-3 Phase 3 RBC?

A: According to Section 6.D.2 of the C-3 Phase 3 Report, the number of Scenarios for which Scenario Amounts are computed shall be considered to be sufficient if any resulting understatement in Reported Amount, as compared with that resulting from running a broader/more robust range of additional Scenarios, is not material. The number of Scenarios needed to meet the criteria may dramatically differ depending on the sensitivity of the liability to the stochastically generated path. Some products may be very sensitive to the absolute level of paths or large relative changes in the paths over short periods of time. Some actuaries would periodically test how sensitive the Reported Amount is to the number of Scenarios used to determine how many Scenarios to run.

Section 6.D.1.c of the C3 Phase 3 Report states that Proprietary Scenario Sets may be used and may consist of a small number of paths that are not necessarily a representative sample of a larger set of stochastic paths, but a conservative sample developed by the company for the purpose of calculating the Stochastic Amount for policies within the scope of the Report. If this approach is used, it may limit the number of paths needed for the projections.

Q7.4: What are Proprietary Scenario Sets and how are they created?

A: Per Section 6.D.1.c of the C3 Phase 3 Report, Proprietary Scenario Sets are groups of Scenarios developed by the company that will be constructed from a universe of Scenarios in a manner that produces a result that is reasonably similar to, but not less than, the prescribed CTE amount. This is intended to provide companies an alternative to modeling a large sample from an interest rate generator, or a large number of prepackaged Scenarios.

Some actuaries who desire to use Proprietary Scenarios Sets may develop the set of Scenarios based on significant testing using previously completed stochastic analysis.

Q7.5: What factors should be considered in order to appropriately calibrate Proprietary Scenario Sets?

A: For equity Scenarios, the NAIC may publish documents that show the Scenario statistics that will be required to be met in order for a company-developed model to be used.

Q 7.6: How are separate account funds mapped into specific equity index Scenarios?

A: As this is not specifically addressed in the C3 Phase 3 Report, some actuaries may find the information in the C3 Phase 2 practice note about mapping account values to specific modeled equity indices useful.

Q7.7 How might a simplified discounting process be implemented to determine a Scenario Amount?

A Per the example in the C3 Phase 3 Report, Section 6.F.1.b, actuaries may use a 90 CTE approach on a set of scenario generated discounts factors to arrive at a string of discount rates, with one discount rate per year of the projection. A smaller set of discount rates, including potentially one discount rate over the entire period, can additionally be created by demonstrating that the Reported Amount would not be materially lower due to this simplification. To demonstrate this simplification, some actuaries would review the interest sensitivity of the assumptions and cash flows in the Business Segment being projected and choose a discount rate that would ensure compliance.

8. Setting Anticipated Experience Assumptions

Q8.1: How will actuaries set Anticipated Experience assumptions?

A: Per Section 6.B.2 of the C3 Phase 3 Report, the actuary shall use company experience, if relevant and credible, to establish the Anticipated Experience assumption for any Risk Factor. To the extent the company experience is not available or credible, the actuary may use industry experience or other data to establish the Anticipated Experience assumption, making modifications as needed to reflect the actuary's expectation of the risk.

Some actuaries may develop Anticipated Experience assumptions based on the assumptions used for pricing and development of the product. Those actuaries would work closely with the product development actuary to understand the basis for assumptions and review the studies performed prior to using them in the C3 Phase 3 calculations to assure they meet the criteria set in Section 6.B.2 of the Report.

Q8.2: When would the actuary update the Anticipated Experience assumptions?

A: Assumptions are updated as experience data emerges and the actuary's expectation of future experience changes. Therefore, assumptions are not locked in at issue.

Q8.3: What data sources may be used to set Anticipated Experience assumptions?

A: Some actuaries would first look to company specific data, if relevant and credible, to set Anticipated Experience assumptions. However, in instances where company specific data is not available or credible, actuaries would look to alternative sources as discussed in Section 6.B.2 of the Report.

A non-exhaustive list of possible data sources for developing Anticipated Experience assumptions are listed below:

- Company data on the same products
- Company data on similar products
- Industry or reinsurer data on the same products
- Industry or reinsurer data on similar products
- General population data
- Predictive models or algorithms

Q8.4: What other issues should the actuary take into account when setting Anticipated Experience assumptions?

A: The actuary may wish to consider whether Anticipated Experience assumptions developed from the data should be modified as needed to reflect the circumstances of the company. For example, if the data from alternative sources includes mortality experience based on three underwriting classes, and the company has just two underwriting classes, then adjustments to the assumptions may be needed to make them appropriate for the company's underwriting classes.

The actuary may wish to consider adjusting assumptions based on historical experience to consider those guarantees that are available in the contracts that were not materially prevalent in the experience base. The actuary may also wish to consider the possibility of anti-selection affecting assumptions. For

example, anti-selection may involve a combination of lapses, persistency, mortality, and the level of guarantees.

The actuary may also wish to consider reviewing guarantees related to cash inflows and outflows to determine to what degree these future cash flows may be incorporated in the model. The actuary may wish to consider the probability of events occurring that may materially impact future assumptions. Examples of these events include increased expected volatility of markets affecting the distribution of future returns or changes in inflation expectations affecting future expenses.

Q8.5: How should trends in data affect the anticipated experience assumption?

A: Some actuaries would use the smallest breakdown of data that is available and credible over time for comparison to experience of other exposure periods. However, judgment is needed here as the actuary has to balance precision against credibility considering the practical ability to do the necessary studies. An example would be in analyzing mortality data to compare mortality rates for preferred underwritten, non-smoker, female age ranges 40-44 over calendar years 1990-1994 to the same grouping over calendar years 1995-1999.

Some actuaries would project trends that in their judgment are likely to be sustained in the future in the Anticipated Experience assumption, subject to any applicable restrictions. Some actuaries would make a judgment on the uncertainly surrounding the projection of the trend and increase Margins as uncertainty increases, such as in later durations.

Q8.6: How is it determined if company experience data is credible?

A: To make a determination on the level of credibility that a set of company experience may have, some actuaries will use concepts from classical credibility theory. In this sense, the actuary may determine that full credibility will be established when enough observations of an event occur so that the actual result of its frequency will be within a defined percentage of the expected results with a specified probability. Additional adjustments to the definition of full credibility may be used in cases where the actual observed events can range in their magnitude of severity. The actuary may wish to review the Credibility Practice Note.

If the number of observations is fewer than the amount needed for full credibility, partial credibility of the data may be established. This can be done by using information such as the expected number of observations and the number of observations needed for full credibility.

Some actuaries will base credibility on actuarial judgment. They would use the available and relevant data that in their judgment is credible or combine partially credible data with other industry experience to determine their Anticipated Experience assumptions.

Q8.7: Should the actuary perform sensitivity testing to set Anticipated Experience assumptions?

A: Some actuaries would perform some sensitivity testing to understand which assumptions have a larger impact on the Reported Amount. Some actuaries may look to asset adequacy sensitivity testing for this purpose.

Some actuaries would develop more detailed justification for assumptions that produce greater sensitivity on the Reported Amount.

Q8.8: Which Risk Factors do not require an Anticipated Experience assumption?

A: Some Risk Factors that affect the cash flows of the product and the Reported Amount will be set using stochastic methods. These Risk Factors do not require an Anticipated Experience assumption. Examples of Risk Factors that are set using stochastic methods are paths of U.S. Treasury yield curves and S&P 500 returns as described in Section 6.D.1. of the C3 Phase 3 Report.

The C3 Phase 3 Report, Section 6.C.7., states that simplified approaches may be acceptable if they can be shown to produce amounts that are not materially different than those produced by a more robust Cash Flow Model. Some actuaries might not develop an Anticipated Experience assumption for Risk factors that do not materially affect the cash flows of the product or the Reported Amount.

9. Prudent Estimate Assumptions and Setting Margins

Q9.1: How are Prudent Estimate Assumptions determined?

A: Section 5.R and 5.EE of the C3 Phase 3 Report defines Margins and Prudent Estimate Assumptions where Prudent Estimate assumptions equal Anticipated Experience assumptions plus a Margin (the Margin may increase or decrease the assumption as appropriate) to cover adverse deviations and estimation error, to produce a larger Reported Amount than would otherwise result without it. There is no requirement in C3 Phase 3 in the Report to add a Margin to assumptions that are stochastically modeled because the applicable CTE measure provides a Margin.

Q9.2: What references are available when determining appropriate Margins?

A: In the C3 Phase 3 Report, Section 6.B is titled "Prudent Estimate Assumptions," within which Sections 6.B.3 and 6.B.4 provide guidance relating to the setting of amounts of Margins.

Other than the C3 Phase 3 Report itself, some actuaries may look to the following:

- AG XLIII
- The proposed VM-20 Section 8.B.3., in particular
- The proposed VM-31
- Various Canadian VTPs (Valuation Technique Papers) and educational notes

Q9.3: What specific guidance is available when determining appropriate Margins?

A: Section 4 of the C3 Phase 3 Report states that assumptions that are neither stochastically determined nor prescribed should incorporate appropriate Margins for uncertainty. These Margins should be consistent with those that would be appropriate for reserves.

Sections 6.B.3. and 6.B.4. of the C3 Phase 3 Report provide additional guidance on setting Margins. In particular, Section 6.B.4 states that in setting the Margin for a Risk Factor, the actuary must consider the magnitude of fluctuations in historical experience of the company for that Risk Factor, as measured by the standard deviation around the mean or other standard statistical measure (if meaningful historical experience data are available for the Risk Factor).

Some actuaries would look to the proposed VM-20, which states that higher Margins should be used when:

- The experience data are either not relevant or not credible;
- The experience data are of lower quality, such as incomplete, internally inconsistent, or not current;
- There is doubt about the reliability of the Anticipated Experience assumption, such as, but not limited to recent changes in circumstances or changes in company policies; or
- There are constraints in the modeling that limit an effective reflection of the Risk Factor

Other proposed requirements are discussed below in this section.

Q9.4: How often should Margins be updated?

A: Some actuaries would use consistent Margins or the same Margins from one reporting date to the next unless there is a particular reason the actuary believes the credibility, quality or reliability of the assumption has changed.

Q9.5: Are there any differences in how an actuary would set Margins for C3 Phase 3 if the policies are subject to principle-based reserve requirements versus policies that are still under formula-based reserve requirements?

A: Regardless of the underlying reserve methodology, if the level of uncertainty in the anticipated experience assumption is generally the same across both groups of policies, some actuaries would use the same Margins. However, if the level of uncertainty in the anticipated experience assumption is different between the two groups of policies, then some actuaries would use Margins that reflect this difference in uncertainty. For example, if the degree of uncertainty in the anticipated experience mortality assumption for a mature block of polices (that are subject to formula-based reserves) is lower than a block of more recently issued policies (that are subject to principle-based reserves), some actuaries would use a lower mortality Margin for the former in the C3 Phase 3 calculation.

Q9.6: What general method should be used in setting Margins for the C3 Phase 3 calculation?

A: Some actuaries believe that a practical approach to Margins is to focus on the key assumptions for the underlying product first and then analyze how those Margins affect other assumptions. For example, for an annually renewable term product, the actuary may initially focus on setting the mortality Anticipated Experience and Margin assumptions (since it is a principal risk) and then set other assumptions such as lapse rates and expenses such that these assumptions are internally consistent with the mortality assumption.

One advantage of concentrating on the key assumptions is avoiding the situation where the application of a Margin to one assumption affects the direction of the appropriate Margin to apply to another assumption (e.g., a high mortality Margin may cause lower rather than higher lapses to be conservative). Some actuaries would develop the approach, in a manner consistent with the underlying principle of reflecting the underlying risk characteristics of the product.

Q9.7: How would the actuary set Margins for an expense assumption?

A: A process that some actuaries might use would be to review the historical experience data (for example, unit costs for the last five years) for the line of business or relevant block. Assuming the actuary is comfortable that the level of expenses will not significantly increase or decrease in the future the actuary would then determine what type of modification to this assumption would increase the Total Asset Requirement (likely an increase to expenses). Then, taking into account the criteria above for determining Margins including the uncertainty, credibility, quality of experience data and the level of the Anticipated Experience assumption relative to the historical values, the actuary would develop a range of potential outcomes of future expenses. This range could vary by duration with a tighter range expected in the next few Projection Years and a wider range further out in the projection. The Margin would be set so that in the actuary's judgment, the range of the Prudent Estimate Assumption includes the potential deviations from the Anticipated Experience in a manner consistently conservative as the CTE requirement for the entire Total Asset Requirement.

Q9.8: Can the actuary use Canadian prescribed margins?

A: Some actuaries may use Canadian prescribed margins but it is not a "safe harbor" just because the prescribed margins are appropriate for use in Canada. The actuary still needs to make a determination of their appropriateness for use in the C3 Phase 3 calculation as set forth in the Report and as adopted by the NAIC and adopted by the states.

Q9.9: To what extent should the size of the company affect the size of the Margins used?

A: Some actuaries would not modify the size of the Margins based solely on the size of the company. For example, larger Margins should generally coincide with a reduction in uncertainty that might be due to a large number of observations, but is not necessarily dependent on company size since a large number of observations could be generated over time from a smaller company.

Q9.10: Does the level of reserves matter when setting Margins in the C3 Phase 3 calculation?

A: Not pursuant to the Report. The Margins should be set depending on the characteristics of the business as discussed above.

Q9.11: Does the sensitivity in an assumption affect how the Margin is set?

A: Some actuaries would use sensitivity testing as a tool to identify the material assumptions that need to be scrutinized. Section 6.B.4.c. of the Report states that the actuary must consider the magnitude of fluctuation in the historical experience of the company for the Risk Factor, as measured by the standard deviation around the mean or other standard statistical measure (if meaningful historical experience data are available for the Risk Factor).

Some actuaries would use the sensitivity to review both the rigor used in determining the Anticipated Experience assumption and the Margin for the assumptions that are part of the sensitivity testing.

Q9.12: Are there additional considerations in setting Margins on assumptions of policyholder behavior?

A: The C3 Phase 3 Report, Section 6.B.4.a, states that "in setting the Margin for a Risk Factor, the actuary must consider ... that larger Margins may be required to reflect contingencies related to Policyholder behavior in situations where a given Policyholder action results in the surrender or exercise of a valuable option." Given the level of uncertainty in the estimation of policyholder behavior, especially when there are valuable options, this would tend to increase Margins compared to those risk factors which the company may have more control. Some actuaries would look to the credibility of experience data in setting the Margins around this assumption using the considerations summarized above.

Q9.13: Should the actuary determine the Margins in aggregate or for each individual assumption?

A: Some actuaries will not determine Margins in aggregate unless simplified methods are used to determine Margins. If it is possible to determine reasonable levels of Margins jointly, some actuaries would still examine the Margin levels and behavior separately, since the interaction of risks may change as the mix of business changes.

While it is believed that multiple methods will be employed in practice, one possible method would be for the actuary to strive for a pattern of aggregate Margins that in the actuary's judgment start at a reasonable level at the beginning of the projection. At later projected durations as the level of uncertainty of assumptions generally increases, some actuaries would include higher aggregate Margins to reflect the additional uncertainty of projecting the results in the future.

Q9.14: Are there examples of when, for practical reasons, one might use simplified methods to calculate Margins?

A: When the assumption does not have a material impact on the reserve, Margins may not be required. Simplified methods may be used in cases where it can be demonstrated that the simplification provides a reasonable result relative to a more complicated methodology. In some cases, Margins could be implemented by not recognizing a potential future positive cash flow stream in the calculation.

For example, for a term product with a level premium payment period followed by a sharply increasing premium, some actuaries may incorporate a portion of the Margin required by assuming 100% lapse after the level premium period as their Prudent Estimate Assumption. In this case, a Margin would be essentially the impact of the truncation of the Anticipated Experience cash flows expected to occur after the level premium period. When using this simplification, some actuaries would demonstrate that the omission of the cash flows after the level premium period is enough to constitute a reasonable Margin for the calculation.

Q9.15: What are appropriate methods to test the level of uncertainty around a particular assumption? Are Monte Carlo methods useful? Are other methods appropriate?

A: Some actuaries may use a direct method such as a Monte Carlo simulation method as an approach that can add useful insight. It directly measures process risk, and can indirectly give a feel for parameter estimation risk. However, other methodologies likely will be used such as identifying a likely range of expected outcomes and setting Margins based on the range or setting Margins based on discrete sensitivity testing. There is no one "correct" method and it is expected that actuaries will use various methods to set Margins.

Q9.16: Are there any practical approaches or benchmarks to determining when the cumulative impact of the individual Margins may be considered excessive?

A: The work group that developed this practice note is not aware of any at this time. It is expected, however, that benchmarks may arise as practice matures. However, Margin setting is highly dependent on the business being valued and the company experience so some actuaries would likely apply professional judgment in setting appropriate Margins and not rely on practice only.

This is also addressed in the AG 43 / C3 Phase II Practice Note as follows:

"As is further stated in Methodology Note C3-03 of the C-3 Phase II Report:
The interdependence of assumptions (particularly those governing customer behaviors) makes this task [setting Margins] difficult and by definition requires professional judgment, but it is important that the model risk factors and assumptions:

- Remain logical and internally consistent across the scenarios tested;
- Represent plausible outcomes; and

- Lead to appropriate, but not excessive, asset requirements.

In Appendix 9, section A9.2 of the AG 43 report, it is recognized from the practical standpoint that it may not always be possible to determine the level of Margin in aggregate for all behavior assumptions. Therefore the Actuary may determine prudent best estimate or prudent assumption independently for each policyholder behavior."

Q9.17: Is it important that Margins be identified with particular policies or groups of business? Or is it just important that the balance sheet of the company as a whole reflect the appropriate degree of conservatism?

A: Some actuaries would attribute Margins for capital specifically to groups of business as appropriate. The proposed Valuation Manual Section 31 discusses disclosure of Margins. For example, some actuaries would assess whether the calculation was appropriate by product as well as whether the Margins are adequate over a broad set of policies. This would be particularly useful for products with uncertain risks or particularly unique characteristics. It is expected that aggregate methods will be used by some actuaries, particularly where Policy characteristics are similar or have homogeneous risks.

Q9.18: Should Conditional Tail Variance (CTV) be considered in addition to CTE?

A: Some actuaries may calculate a CTV value or other measures like CTV but it is not required by C3 Phase 3 under the Report. Some actuaries may feel that such a measure may be useful in giving extra weight to very low frequency, very high severity events.

Q9.19: How should Margins be set when the impact of assumption movements changes over the duration of the business?

A. For some products, the impact of increasing or decreasing an assumption may vary according to the duration of the business. Since Margins are intended to add conservatism, one interpretation would require positive Margins for some durations, and negative Margins for others. However, some actuaries would not introduce arbitrary duration breakpoints when setting Margins.

Where there is a clear change in the Policy, such as a dramatic change in premiums or surrender charges, some actuaries will develop assumptions and Margins that differ before and after this point.

Q9.20: How are Margins set on dynamic assumptions?

A: Where an assumption is interest rate or equity return dependent, and a dynamic formula is included in the modeling, some actuaries may not add an additional Margin to the calculation, on the basis that conservatism is provided by the conservatism inherent in the tail measure (i.e., CTE).

However, some other actuaries may add additional conservatism, as they might feel that the use of the tail measure will only inject conservatism regarding the interest rate or equity risk, but not necessarily the dynamically related risk, which they may see as a distinct risk. Some of these actuaries might add conservatism by making the dynamic formula slightly more or less dynamic (depending on what would be more conservative) than anticipated.

10. Setting Mortality Assumptions

Q10.1: Would the actuary have to follow any specific mortality assumption setting procedure, e.g., the one discussed in the proposed VM-20 to establish the Anticipated Experience assumption listed in proposed VM-20, in calculating C3 Phase 3?

A: There is no requirement under the Report in C3 Phase 3 to follow any specific mortality assumption setting procedure listed in proposed VM-20. The C3 Phase 3 Report Section 6.B requires the actuary to use company experience, if relevant and credible, to establish Anticipated Experience for any Risk Factor. To the extent that company experience is not available or credible, the actuary may use industry experience or other data to establish Anticipated Experience, making modifications as necessary to reflect the actuary's expectation of the risk.

It is expected that some actuaries will follow the procedure listed in proposed VM-20 to be able to use consistent assumptions in both the C3 Phase 3 calculations and principle-based reserves when the reserve methods are adopted.

Q10.2: If the proposed VM-20 method is used, what criteria should be used in assigning policies to credibility segments and mortality segments?

A: The actuary may wish to consider the current draft of proposed VM-20 which provides two procedures for setting Prudent Estimate Assumptions for mortality. A simplified procedure is provided for situations where the credibility of experience data is limited; a more complex procedure is provided for situations where experience data has greater than a minimum level of credibility. To determine which procedure to use, the actuary assigns policies to "credibility segments" and applies a "credibility criterion" to each such segment. A credibility segment is made up of policies with similar underwriting and mortality experience characteristics. The credibility segment may contain policies having different plans of insurance as long as the underwriting and mortality experience characteristics are similar. A drafting note in VM-20 indicates that the credibility criterion may be based on numbers of deaths within each credibility segment. The process has yet to be defined, but some actuaries may determine credibility based on the methods described in this drafting note.

Since the characteristics of the underwriting applicable to policies in the credibility segment are to be similar, some actuaries would set up separate credibility segments for policies subject to preferred underwriting and another for policies subject only to traditional standard/substandard classifications. Similarly, policies subject to medical underwriting would usually be in a different segment from policies issued on a non-medical basis. Some actuaries would also assign permanent and term policies to separate credibility segments; however, sometimes in practice, actuaries would group permanent policies that have been designed to provide term-like coverage with term policies. Other actuaries would assign all term and permanent policies subject to the same underwriting rules to the same credibility segment, especially if conversion of term policies to permanent policies is common.

Mortality segments are sub-sets of the policies within a credibility segment. All the policies within a mortality segment would use the same Anticipated Experience and Prudent Estimate Assumptions for mortality. Thus, policies assigned to the same credibility segment but belonging to different preferred classes would fall in different mortality segments (unless the different preferred classes are to have the same Prudent Estimate Assumptions for mortality). Some actuaries would also create separate mortality segments for groups of policies within a mortality segment for which use of the same mortality assumptions was, in their judgment, inappropriate.

Q10.3: Would the actuary need to use a specific credibility method, such as the one in the proposed VM-20, to determine the credibility of the mortality experience used to develop the mortality assumption?

A: The Report does not require the use of the proposed VM-20 credibility method in the capital calculation for mortality. However, some actuaries would follow a statistical approach to determine credibility of mortality experience. Methods such as what is described in the proposed VM-20 or other statistical approaches such as the Panjer method are also commonly used. Another resource on credibility methods is the Credibility Practice Note.

Q10.4: If the credibility criterion for a credibility segment falls below the minimum credibility level listed in the proposed VM-20, would the actuary be permitted to use its mortality experience in setting the Prudent Estimate Assumption for mortality for the segment?

A: The C3 Phase 3 Report does not require the use of any specific credibility method such as the one discussed in the proposed VM-20 to determine the mortality assumption. If the experience is credible, some actuaries may use the criterion in the proposed VM-20 or another reasonable method to incorporate credibility.

Q10.5: If there is limited information regarding the underwriting requirements that were used in issuing the policies (for example bulk reinsurance or acquired blocks), what are some ways for the mortality assumption to be established?

A. Some actuaries would start with the pricing assumptions underlying the acquisition or current premium rating of the policies. This would be followed by an analysis or validation of the actual experience. If the policies have credible experience, some actuaries would use the same credibility methodology used for other blocks.

Q10.6: What are some ways to adjust mortality assumptions for impaired lives?

A: Some actuaries would determine a mortality assumption for substandard business separately (i.e., develop a Prudent Estimate Assumption for mortality specifically for substandard policies). Another potential way would be to include the substandard business with standard policies and adjust the base mortality assumption for the entire block.

Where there is a significant amount of substandard business, the first option is more likely to be used as it will capture the proportional change of substandard business over time. Some actuaries may compare mortality experience on the impaired lives to the mortality experience of the standard lives and express the differences as a percentage or flat addition to standard mortality experience. Where there is sufficient credibility of experience, the actuary would not be precluded from a more complex adjustment that changed the shape of the mortality curve.

Some actuaries may also increase the Margin on the substandard mortality assumption (in addition to the higher base assumption) as there likely is less data available on impaired lives.

Q10.7: Should the actuary take Policyholder behavior into account in setting the mortality assumption?

A: This is addressed in the Policyholder Behavior section of this practice note as well. Actuaries may wish to consider making adjustments for Policyholder behavior when the product design leads to potential anti-selection from Policyholder behavior. An example of this would be a term product with dramatic increases in tail premiums and the assumption of less than 100% lapse after the premium increase.

Adjustments may also be made where there is a guaranteed purchase option, guaranteed renewability or similar features where the mortality expectation of those electing the option would be different than the base assumption.

Q10.8: Does the actuary need to grade the experience mortality rates into industry rates, such as discussed in Section 9.C.4.f of proposed VM-20?

A: Section 6.B.2 of the C3 Phase 3 Report states the actuary should use company experience, if relevant and credible, to establish Anticipated Experience for any Risk Factor. To the extent that company experience is not available or credible, the actuary may use industry experience or other data to establish Anticipated Experience, making modifications as needed to reflect the actuary's expectation of the risk. If the company's mortality experience is credible for some of the Policy years within a segment and not others, for example, then some actuaries would grade the company's experience into an industry table using grading methods that are reasonable and consistent with accepted actuarial practice. For example, if the company's experience were credible for the first five years of a product, but not beyond, then some actuaries would use 100% of the company experience during those first five years, and grade smoothly over the next N years into 100% of an industry mortality table that reflects the company's mortality expectation for the product or block.

Q10.9: What considerations should be taken into account in setting Margins for the mortality assumption?

A: Section 4 of C3 Phase 3 Report states that Margins should be consistent with those that would be appropriate for reserves. With that in mind, actuaries might consider looking to the proposed VM-20, where Margins for mortality assumptions are discussed. Margins are increased where there is greater uncertainty in the particular assumption.

The proposed VM-20 lists the following situations in which a relatively larger Margin is required:

(a) The reliability of the company's experience studies is low due to imprecise methodology, long length of time since the data was updated or other reasons.

(b) The underwriting or risk selection risk criteria have changed since the experience on which the experience rates are based was collected.

(c) The data underlying the experience rates lack homogeneity.

(d) Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.

(e) The company's marketing or administrative practices or market forces (for example, the secondary market for life insurance policies) expose the policies to the risk of anti-selection.

In addition, larger Margins may be needed under the following circumstances:

(1) For term plans with low initial premiums followed by substantially higher premiums, there would be anti-selection and much uncertainty after the initial period.

(2) Insureds that chose extended term as the nonforfeiture option may anti-select against the company.

(3) Insureds that chose term conversion at the expiry or very close to expiry of the term coverage period may anti-select against the company.

(4) Insureds that exercise the guaranteed purchase option may anti-select against the company, especially if regular underwriting can give them better rates.

(5) Products that offer composite rates may be subject to anti-selection (i.e., same rate for male/female, various issue/attained ages, underwriting classes, etc.).

11. Setting Premium Assumptions

Q11.1: How should the distribution by modal premium be taken into account in the Cash Flow Model for fixed premium policies?

A: Some actuaries would model the cash flows reflecting the actual modal premium distribution using average factors in aggregate.

Q11.2: For dividend paying business, how would the modeling account for dividends used to reduce premium?

A: It is expected that some actuaries will model based on how policies are actually utilizing dividends to pay premiums by including both the dividend and the implicit premium amount. However, it is also likely that some actuaries would model based on a net basis (fixed premium minus dividend used to pay premium) since the cash flow impact is similar. In that circumstance, general practice would be to make other adjustments where necessary so that other projected items that are based on premiums (e.g., premium taxes) or dividends are captured correctly. Actuaries may wish to consider how dividends that are used to reduce premiums would impact lapses and other policyholder behavior assumptions.

Q11.3: Flexible premium products often have minimum required premium payments, excess premium payments, cessation of premium payments and irregular premium payments. How does one capture this flexibility in the Cash Flow Model if the underlying experience is not fully credible?

A: Some actuaries would determine the premium assumption on flexible premium policies taking into account how the product was marketed and sold. If such information is available, that information could be used as a starting point to set the premium assumption. However, as there is flexibility in payment of premiums, historical payment patterns may also be taken into account. Policy features that would impact premium payments in the future may also be reviewed as they have the ability to impact expected future premiums. For example, if a Policy has a guarantee that would expire if a specific premium is not paid in a period, then some actuaries would look at historical or expected experience for similar policies in setting the expected future premium payments.

Additionally, some actuaries model flexible premium products based on how the products are expected to be used by the policyholders. For example, one could have separate assumptions for policies expected to be used for accumulation compared to those expected to be used for protection. For simplicity, some actuaries may want to determine which method paying premiums produces the most conservative amount of reserves and capital and use that method.

12. Setting Policyholder Behavior Assumptions Other than Premiums

Q12.1: What Policyholder behaviors (other than premiums) might be considered in the capital calculations for life insurance?

A: According to Section 5.Y. of the C3 Phase 3 Report, policyholder behavior includes but is not limited to lapse, withdrawal, transfer, deposit, premium payment, loan, annuitization, or benefit elections prescribed by the policy or contract. Policyholder behavior assumptions might vary by product. Some actuaries would consider the election of dividend, conversion, guaranteed purchase and non-forfeiture options. In addition, some actuaries might consider policy loan utilization, especially in situations where the policyholder can select against the company.

Q12.2: Would actuaries take into account expected future policyholder behavior as well as historical policyholder behavior in setting Anticipated Experience assumptions?

A: Some actuaries would take into account the expected future policyholder behavior to the extent that differences in policyholder behavior would materially impact the results. Examples include, but are not limited to: lapses on universal life policies that increase as the available market rate increases over the credited interest rate; lapses may decrease when there is a Policy option that is in the money; or anti-selection when policyholders continue coverage after the level premium period of a term Policy.

Q12.3: How should policyholder options such as term conversion options and guaranteed purchase options be treated in determining capital?

A: Some actuaries will take into account potential exercise of policyholder options. However, some actuaries would use a simplified model for companies where the impact of term conversions and exercise of the guaranteed purchase options are not significant. Section 6.C.7. of the C-3 Phase 3 Report permits simplified approaches when it can be demonstrated that the results are not materially different from those of a more robust cash flow model.

For companies where term conversions are significant, some actuaries would include additional decrements in the term line to take into account policies converting to whole life policies. The impact (i.e., additional cash flows from the conversion or purchase) would be included in the cash flow projection to take into account the impact of the policies converting. Some actuaries would reflect this impact using a “cost of conversion or purchase” charge or credit from studies on the cost of term conversions.

The cost / credit of conversion or purchase could be determined by projecting some typical post-conversion or purchased policies using appropriate prudent estimate assumptions and including this cost / credit at the point of conversion or purchase. Some actuaries may consider reflecting the potential of mortality anti-selection and other option specific behavior.

Some actuaries may consider the impact from more than one possible post-conversion product type. Term policies converting to newer products such as a universal life with secondary guarantees could theoretically generate a significantly different cost of conversion or purchase than those converting to a traditional whole life product.

Some actuaries might include projected new policies arising from term conversions with their own respective cash flow projections in the RBC calculations. Other actuaries might include the present

value of the cost / credit of conversion in conjunction with the election rate in the term projection to affect the cash flows at the time of the expected election of an option.

Q12.4: Could the existence of a guaranteed purchase option lead to a reduction in C3 Phase 3 capital?

A: Yes, this is possible. A guaranteed purchase option is simply a charge being made for a potential future exercise of the purchase of additional insurance. Prior to the exercise of any remaining future options, the impact to RBC would be negative if the actuary projects (using Prudent Estimate Assumptions reflecting any applicable anti-selection) that the present value of expected profits from future exercised policies plus the present value of guaranteed purchase option premiums less guaranteed purchase option commissions and guaranteed purchase option expenses is greater than zero.

Q12.5: How might policies that have already converted be treated?

A: Actuaries generally model policies based on the status of the Policy on the Valuation Date. However, some actuaries would take into account expected future experience that may be based on a Policy coming into its current status from another Policy type. One key potential impact is any expected mortality anti-selection arising from converted term policies. This may be modeled explicitly for these Policies, could be modeled in aggregate or could be part of a Non-modeled Amount.

Q12.6: What policyholder behavior sensitivity testing should be performed?

A: It is expected that some actuaries would identify key assumptions and run additional projections under alternative assumptions to understand the effect changing those assumptions would have on the capital values. Some actuaries may run Scenarios towards the outer bound of plausible to understand how capital would be affected.

Q12.7: When should dynamic policyholder behavior assumptions be used?

A: Some actuaries would use dynamic policyholder behavior assumptions in instances where an external environment or actions of the company affects policyholder behavior.

Some examples include:

(a) If a company raises nonguaranteed premiums or cost of insurance rates, more Policyholders would surrender/lapse/convert (especially the healthy lives) which could worsen the overall mortality of the remaining lives;

(b) Under decreasing / low interest Scenarios, the guarantees may become attractive leading to lower lapses or additional premium payments or exercise of guaranteed settlement options.

(c) Reductions to interest crediting rates or dividend scales may lead to additional lapses or premiums for certain specific Policy forms such as those with premium expectations based on higher illustrated interest rate or dividend levels.

(d) Situations where the company offers / increases conversion credit or agents' incentives might lead to additional term conversions.

(e) For interest sensitive products, under increasing interest Scenarios, the assumption of how credited rates are set (i.e., how fast they increase) might be assumed to affect the lapse assumption which may affect other assumptions such as mortality and premiums.

Q12.8: Would dynamic assumptions used in cash flow testing be acceptable in C3 Phase 3 projections?

A: Some actuaries would use the methodology they developed for cash flow testing as a starting point for the C3 Phase 3 projections, and modify it as necessary.

Q12.9: How would the actuary reflect non-forfeiture options in the cash flow projections?

A: If the values (based on Prudent Estimate Assumptions) of the various nonforfeiture options are equivalent, then it may be appropriate to assume that all nonforfeiture benefits are cash surrenders. If these values are not equivalent, then some actuaries might use the greatest of the values of the non-forfeiture options similar to the approach under the Commissioner's Annuity Reserve Valuation Methodology or CARVM.

Another approach is to project the cash flows under the various non-forfeiture paths with expected election rates that vary by path.

Q12.10: How are dividend options considered in performing the C3 Phase 3 calculations?

A: Some actuaries may model dividend options separately in the cash flow projections, especially if the election of particular dividend options is integral to how a policy was sold. This would include dividends used to pay premiums (discussed in Section 11 above) and the purchase of paid up additions or one year term. Alternatively, when the C3 Phase 3 calculation is not materially affected by the choice of dividend options, some actuaries may adopt a more simplified approach.

13. Setting Expense Assumptions

Q13.1: What types of expenses should be included in the models for determining risk based capital?

A: The C3 Phase 3 Report provides that all types of expenses, including, but not limited to commissions, general expenses, overhead, premium taxes, investment expenses, and federal income taxes be reflected in the modeling. Some actuaries may consider proposed VM-20 as well as relevant ASOPs when determining the expenses included in the projections where it is not specifically addressed in the C3 Phase 3 Report. Specific guidance is provided in Section 8.B of the C3 Phase 3 Report for reflecting investment expenses and expenses (and expense reimbursements) related to Revenue Sharing Agreements.

Q13.2: Must acquisition expenses be included?

A: The C3 Phase 3 Report covers in force business, and expenses do not normally include acquisition expenses. However, it is possible that business still in its first year of issue may have acquisition expenses associated with it. There may also be business that has trail commissions or commissions on future flexible premiums or even acquisition expenses on future premiums, etc. In these instances, some actuaries would include these future acquisition expenses.

Q13.3: How should overhead be reflected in the calculation?

A: Per the C3 Phase 3 Report, Section 6.C.d, overhead expenses should be included along with other expenses consistent with the block of policies being modeled and the company's practices of expense allocation among lines of business. Some actuaries may not develop an allocation specifically for C-3 modeling. Some actuaries will exclude overhead expenses associated with the acquisition of new business.

Q13.4: How should inflation be reflected?

A: Some actuaries would make an assumption for inflation that is related to the Scenarios being modeled. A common way to do this is to base the rate of inflation on the interest rate scenario being projected, such as assuming a base real rate of return with some portion of the additional amount assumed to be inflation. Some actuaries may model inflation separately.

Q13.5: What future improvements in expenses may be included?

A: The C3 Phase 3 Report does not address this directly. Actuarial judgment would be used to determine which projected expense improvements (if any) are consistent with the purposes of the calculation. Some actuaries might assume no improvement in expenses. Other actuaries might review the company's expense control strategies to develop the anticipated experience assumption and add an appropriate Margin to establish the prudent estimate assumption. According to the proposed VM-20 guidelines, future improvements in expenses are not allowed.

Q13.6 How should federal income taxes be reflected in the calculation?

A: Since Scenario Amounts need to be determined on an after-tax basis, federal income tax expenses need to be modeled. Some actuaries would generally include in their projections items such as tax reserves and other items affecting the calculation of taxable income for a Business Segment. The taxable income then would have an overall company tax rate applied to estimate federal income taxes. Per the C3 Phase 3 Report, Section 6.G.6.a.5, adjustments to the Scenario Amount should be considered if there are differences between the modeled and actual tax reserves at the beginning of the projection. The report describes acceptable ways to make such adjustments to the Scenario Amount.

14. Setting Non-Guaranteed Element Assumptions

Q14.1: What are Non-Guaranteed Elements ("NGEs") and how should they be included in the models?

A: As defined in Section 5.V of the C3 Phase 3 Report, NGEs are debits or credits to a policyholder's account value, benefit, premiums, or consideration that may be adjusted at the discretion of an insurance company. NGEs include, for example, policyholder dividends for participating policies and participation rates and asset fee charges for equity-indexed universal life policies. Section 6.M of the Report provides guidance on how NGEs should be modeled. In addition Section 9.D of the Report provides that certain actions under reinsurance treaties be considered NGEs.

Q14.2: Can the actuary modify (up or down) the assumed NGEs scale or spread in response to the experience unfolding in the Scenario?

A: Yes. The guidance provided in the C3 Phase 3 Report Section 6.M (and Section 6.C.2, "General description of cash flow projections") states that changes in NGEs should be reflected by the actuary when considering changes in the market environment in each scenario if the NGE is determined by the company based on experience.

Q14.3: When determining the NGEs assumption for each Scenario, what considerations might the actuary take into account when modifying the current NGEs scale or spread?

A: Examples of considerations are:

(a) Existence of contract guarantees;

(b) The company's ability to modify its non-guaranteed dividend scale and/or non-guaranteed spreads on items such as credited rates, expense charges, COI's, etc.;

(c) Effect on contract holder behavior by maintaining the current non-guaranteed dividend scale and/or non-guaranteed spreads under the Scenario;

(d) Effect of the NGEs assumption on the competitive position of the product under the Scenario;

(e) The extent to which a change in experience is recognized in the non-guaranteed dividend scale;

(f) The timing lag from when a change in experience occurs to when it is recognized in the non-guaranteed dividend scale; and

(g) Management philosophy; for example, the actuary may expect – perhaps based on recent company history or stated management policy – that management would not likely raise charges beyond a certain level, even if emerging experience and competitor reaction may support such increases. Therefore, the actuary's judgment is critical.

Q14.4: What adjustments to the model can be made to take into account lags in the changing of NGEs?

A: Some actuaries may find it difficult to model lags in changing NGEs in these calculations. One technique that some actuaries use is to assume that NGEs are determined based on last year's values or the last period if quarterly or monthly time steps are being used in the projection. As the model cannot

assume foreknowledge of changes in the market conditions, the actuaries will need to make sure that the model is not anticipating exact timing of changes to NGEs and thus understating the impact of the changes in market conditions on the projections.

Q14.5: Can the actuary just review the NGE impact for the tail scenarios since those scenarios are the only ones that go into the Stochastic Amount?

A: Some actuaries would pay particular attention to how the model assumes NGEs are modified as the market conditions change within the entire model. This would include scenarios outside of the bottom 10% tail scenarios where NGEs play a significant part in the risk mitigation since an error or misstatement in one of those scenarios could lead to that scenario (that was not previously in the bottom 10%) becoming part of the bottom 10%. This is particularly true for blocks where changes to NGEs will likely have a significant impact on the calculation of the required capital.

Q14.6: Does the model need to start with dividends that are consistent with the current dividend scale?

A: According to Section 6.M.6 of the C3 Phase 3 Report, NGEs that represent the payment of retained surplus other than divisible surplus under participating contracts may be excluded from the calculations. Therefore, the starting dividend scale in the model may be different than the current dividend scale due to this reason.

15. Life Capital – Stochastic Exclusion Test

Q15.1: What is the Stochastic Exclusion Test?

A. As described in the C-3 Phase 3 Report, Section 10, the Stochastic Exclusion Test can be used to identify those blocks of policies not having Material Tail Risk arising from interest rate movements or equity performance, i.e., not having significant variation in financial results depending upon future economic conditions. For blocks of policies that both pass the Stochastic Exclusion Test and meet the reserve adequacy certification requirements of Section 10.C of the Report, the C3 requirement may be determined as the Factor-based Amount as defined in Section 10.D of the Report (see Q15.4 for more detail). The specific scenarios are listed in Section 10.F of the C3 Phase 3 Report.

Q15.2: What products might be good candidates for the Stochastic Exclusion Test?

A: Examples include participating products where changes in investment experience can be passed onto Policyholders, or term insurance or products where little prefunding of future liability cash flows occurs. However, even liabilities that have little sensitivity to changes in the economic environment may not pass the Stochastic Exclusion Test if the associated assets backing the reserves are sensitive to market conditions.

Some actuaries will be able to identify potential candidate blocks for the Stochastic Exclusion Test based on deterministic sensitivity tests or simply running the required Stochastic Exclusion Test Scenarios and analyzing the change in the Stochastic Exclusion Test Ratio.

Q15.3: Is it necessary to perform the Stochastic Exclusion Test on all blocks of life insurance?

A: The Stochastic Exclusion Test is entirely optional. The test may be applied to the entire in force life insurance business, to selected blocks of business, or not be performed at all.

Q15.4: What should the actuary do if a block of business passes the test?

A: For C-3 Phase 3, passing the Stochastic Exclusion Test allows a company to forgo stochastic testing for that group of policies and instead report a Factor-based Amount equal to 0.5% of the statutory reserve at the Valuation Date relating to such policies (See the C-3 Phase 3 Report, Section 6.I). Note that the reserve adequacy requirements on a stand alone basis must also be met in order to report a Factor-based Amount, as this amount is a function of statutory reserves.

Some actuaries will decide to hold the Factor-based Amount for blocks that pass the test.

Q15.5: What happens if a block fails the test?

A: For C-3 Phase 3, if the test is failed, the block is either subject to stochastic testing to determine the Stochastic Amount or another calculation methodology such as the Alternative Amount (see Section 16 of this practice note).

Q15.6: If a specific block of policies passes the test, how often does the actuary need to repeat the test on that same block?

A. The Stochastic Exclusion Test for C-3 Phase 3 must be repeated annually to continue to qualify for the Stochastic Exclusion (See the C-3 Phase 3 Report, Section10.E.1).

Some actuaries will make a specific determination of what blocks will use the Stochastic Exclusion Test each year. There is no requirement that the actuary use the Stochastic Exclusion Test on the same blocks each year.

Q15.7: Does the Stochastic Exclusion Test need to be performed with year-end valuation data?

A. Per the C3 Phase 3 Report, Section 10.E.1, the Stochastic Exclusion Test is required to be done within the 12 month period prior to the Valuation Date. Per Section 10. E.1 of the Report, it is expected that the timing of the test would be consistent from year-to-year and that the actuary would document both the current and prior year timing of the exclusion testing as well as rationale for any change in timing.

Per the C3 Phase 3 Report, it is necessary to subsequently re-perform the testing if a material subsequent event has occurred between the date of current year testing and the actual year-end. A material subsequent event is defined as one or more circumstances which, if reflected in the exclusion testing, would be anticipated to result in a failure of the Stochastic Exclusion Test.

Q15.8: Is the Stochastic Exclusion Test performed gross or net of reinsurance?

A. There is nothing in Section 10 of the C3 Phase 3 Report that specifically excludes reinsurance from the cash flows used in the Stochastic Exclusion Test calculations.

Q15.9: Is the Working Reserve incorporated in to the calculation of the Test Scenario Amounts for the Stochastic Exclusion Test?

A: Per the C3 Phase 3 Report, Section 10.B.2, since the calculations of the Test Scenario Amount use a Gross Premium Valuation methodology using the present value of net cash flows, the concept of the Working Reserve is not incorporated in the determination of the Test Scenario Amount. In contrast, in the C3 Phase 3 Report, Section 6.G.6.2, the Working Reserve is needed in the calculation of Scenario Amounts as part of the calculation of the overall Stochastic Amount. In these Scenario Amount calculations, the methodology incorporates the greatest present value of Accumulated Deficiencies, with the Accumulated Deficiency at any point in time equal to the excess of the Working Reserve over the net accumulated asset amount.

16. Life Capital – Alternative Amount Calculation

Q16.1: What is the Alternative Amount?

A: Per the C3 Phase 3 Report, the Alternative Amount provides for all material C3 risks of a group of policies, including Material Tail Risk arising from sensitivities to changing economic conditions. It equals the amount determined by the actuary, using methods and assumptions deemed appropriate by the actuary, subject to the amount meeting the minimum requirements specified in the Report.

Q16.2: When would actuaries use the Alternative Amount instead of performing a stochastic analysis?

A: Some actuaries will not use the Alternative Amount at all. Some actuaries may decide that a stochastic analysis for certain blocks is not required due to lack of sensitivity to changes in interest rates and equity returns. This may be the case when it is not practical to perform a stochastic projection or the projections required for the Stochastic Exclusion Test for a particular block.

Q16.3: Does the actuary need to pass the Stochastic Exclusion Test to be able to hold the Alternative Amount?

A: There is no requirement to pass the Stochastic Exclusion Test in the C3 Phase 3 Report if the Alternative Amount is used by the actuary.

Q16.4: Is there a requirement for the Alternative Amount to be of a certain size?

A: Yes, Section 6.H.5 of the C3 Phase 3 Report states that the Alternative Amount must be at least equal to 100.5% of the statutory reserve of the policies as of the valuation date.

Actuaries should note that Section 6.H.4 of the C3 Phase 3 Report states that the Alternative Amount may be determined for a set of policies if and only if such policies have been subjected to asset adequacy testing at the Valuation Date.

Q16.5: What products might be good candidates for the Alternative Amount calculation?

A: Some actuaries will perform the stochastic testing or the Stochastic Exclusion Test for most of their policies. Some actuaries will use the Alternative Amount for Business Segments that might be particularly difficult or time consuming to model. Examples of this might be very old Business Segments without substantial market-based guarantees. These blocks may not already be modeled and some actuaries may make the determination that the effort is not worth the benefit for these blocks. Also, some actuaries may use the Alternative Amount calculation for very small blocks that either have very immaterial capital requirements or will be difficult or time consuming to model.

Some actuaries may use the Stochastic Exclusion Test to validate the factor based capital amount for products that have little or no market risk instead of the Alternative Amount. Actuaries may do this because these policies have already been modeled and the actuary decides to use the Stochastic Exclusion Test to support the use of the factor based approach.

Q16.6: What are some ways that an actuary might use to develop an Alternative Amount without performing stochastic analyses?

A: Many possible methods could be used to develop an Alternative Amount approach, depending on the risks and circumstances of the policies being evaluated.

Some actuaries may develop the Alternative Amount by performing a deterministic calculation with insight derived from cash flow testing. For example, if the worst financial results in cash flow testing occur under down interest rate Scenarios, then the actuary could prepare a deterministic down Scenario to develop the Alternative Amount. The
deterministic Scenario could be specifically taken from the cash flow testing exercise, or some actuaries would pick a down interest rate Scenarios from the Academy supplied generator, choosing a Scenario representing what the actuary believes is a conservatively determined Scenario (e.g., the 86th percentile scenario). The capital amount determined from this deterministic run, as long as it is conforms to minimum required amounts, would be the Alternative Amount.

Some actuaries would also set a fixed value for the RBC amount using a simplified analysis of the risk of the policies. For example, consider a small block of older life policies with no future policyholder options that has a total face amount of $10,000,000 and a current cash surrender value of $8,000,000. If there would be no useful benefit to modeling the block, the actuary may decide to hold a simply determined additional amount of RBC. One option would be to hold an additional $2,000,000 which would equal the amount at risk, and clearly be sufficient. The actuary should be able to demonstrate an appropriate rationale for any RBC amount determined and ensure it meets the minimum required amounts.

Q16.7: The floor on the Alternative Amount is the after-tax equivalent of the formulaic RBC instructions. Is it enough to say that a block is insensitive to interest rate changes and simply apply the floor?

A: Section 6.H.2 of the C3 Phase 3 Report states that the actuary must be able to demonstrate how he/she came to the conclusion that the Alternative Amount considers the dynamics of the liability and supporting asset cash flows in response to changes in interest rates and market movements. Therefore, it would not be enough to simply state that a block is insensitive; it would be appropriate to provide a demonstration of why the actuary has concluded that the blocks of policies are insensitive to interest rate changes and why the factor based amount (or amount being held) is appropriate.

17. Treatment of Reinsurance

Q17.1: Is the TAR calculated gross or net of reinsurance?

A: Per Sections 9.B.1 and 9.C.1 of the C3 Phase 3 Report, the TAR is calculated net of reinsurance for both assumed and ceded reinsurance "if the reinsurance agreements are appropriate to the business and not merely constructed to exploit foreknowledge of the components of the required methodology."

Q17.2: Do the assumptions used by both the assumed and ceded company have to be the same for a specific block part of a reinsurance treaty?

A: No. Per Section 9.A.2 of the C3 Phase 3 Report, "The assumptions that are used by a ceding company to determine the Reported Amount for policies that are ceded to a reinsurer shall be appropriate for the ceding company and need not be the same as the assumptions used by the assuming company to determine the Reported Amount for these policies."

Q17.3: Can the actuary rely on calculations performed by the other party in the reinsurance transaction?

A: Yes, if the adjustments are made per Section 9.A.3 of the C3 Phase 3 Report.

Q17.4: If a reinsurance treaty is not in force as of the valuation date, when should the actuary include it in the calculation?

A: Per Section 9.A.4 of the C3 Phase 3 Report, if "the company has determined after review of the relevant facts and circumstances that it is likely to have legal obligations under the agreement or amendment and including the agreement or amendment would result in a higher Reported Amount," then the treaty should be considered in force and the projected cash flows included in the determination of the Reported Amount.

Q17.5: What does the C3 Phase 3 Report mean by treating counterparties to a reinsurance treaty as "knowledgeable counterparties"?

A: Section 9.D.1 of the C3 Phase 3 Report addresses knowledgeable counterparties in the following way:

"Assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and thus likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. Items that should be considered as Non-guaranteed Elements in reinsurance cash flows shall include but not be limited to:
(i). Any limits placed upon either party's ability to exercise contractual changes in the treaty terms;
(ii). The usual and customary practices associated with such agreements;
(iii). Past practices by the parties concerning the changing of terms;
(iv). The ability of the direct-writing company to modify the terms of its policies in response to changes in terms from its reinsurers; and
(v). Actions that might be taken by a party if the counterparty is in financial difficulty."

Q17.6: Will actuaries assume 100% selection against the company by knowledgeable counterparties in all instances?

A: Some actuaries will set assumptions for Non-guaranteed Elements in reinsurance treaties taking into account expected experience based on their actuarial judgment informed by historical experience.

Some actuaries will likely assume less than 100% selection against the company but the actuary would be well advised to take into account the financial impacts to the counterparty when setting these assumptions including, for example:

- The estimated level of profit being earned (or losses experienced) on the reinsurance treaty in the year of the setting of the Non-guaranteed Element,
- The dollar amount of cumulative losses assumed not to be passed on through increased reinsurance costs; and
- Expected future profitability on the treaty with a higher likelihood of changes in the Non-guaranteed Elements by the counterparty if the future profitability is low or negative.

Some actuaries are expected to assume significantly higher likelihood of selection against the company if the financial impact to the counterparty is significant.

Q17.7: How will aggregate reinsurance (e.g., stop loss or limits on benefits receivable) be handled?

A: Some actuaries would generally include aggregate reinsurance cash flows in the projections directly where possible. If the aggregate reinsurance includes lines of business that are in separate models then some actuaries would aggregate the results outside of the model and allocate the aggregate reinsurance benefits to the covered business in a reasonable manner. These reinsurance cash flows may then be used to determine the Reported Amount.

Some actuaries would base the reinsurance cash flows on the specific assumptions used in each Scenario as if those assumptions actually occurred. Therefore, in Scenarios where the aggregate reinsurance threshold is not met, no projected payoff would be included.

Q17.8: How should the actuary reflect the credit worthiness of a reinsurer?

A: Section 9.D.3, the C3 Phase 3 Report states “If a reinsurer is known to have a financial impairment, the company shall determine a Margin for default by the reinsurer. In cases without a known financial impairment, no Margin for default is required.”

Q17.9: How should credit worthiness of a reinsurer be modeled if on assumed business the company may terminate the reinsurance upon non-payment by the ceding company?

A: The C3 Phase 3 Report states that the Margin for default risk may be reduced or eliminated in this circumstance.

Q17.10: Will there be a difference in the modeling or reporting of authorized versus unauthorized reinsurers?

A: Some actuaries would develop their assumptions concerning the probability of payment from reinsurers taking into account the characteristics of the reinsurer. If a reinsurer is less likely to pay, possibly due to being unauthorized or not highly rated, a greater Margin might be added to the reinsurance assumption. Some actuaries would review the likelihood of payment and adjust Margins accordingly as the financial condition of the reinsurer changes. If an unauthorized reinsurer puts collateral in a trust or some other protective vehicle, that would also be taken into account in the projection of the expected reinsurer cash flows.

18. Treatment of Hedging / Derivative Programs

Q18.1: Are there limitations on including the impact of hedging or derivative programs in the C3 Phase 3 calculation?

A: Yes, per Section 6.E.8. and 9. and Section 7 of the C3 Phase 3 Report, the hedging or derivative programs that are currently held by the Company in support of the policies in scope for this calculation should be included in the calculation of the Stochastic Amount if the program qualifies as a Clearly Defined Hedging Strategy ("CDHS").

Some actuaries would include the costs of any hedging or derivative program that is held in support of the policies in scope if it would increase the requirements even if it does not qualify as a CDHS because of the principle in Section 2.B.1. of the Report that a principle-based approach "captures the benefits and guarantees associated with the contracts and their identifiable, quantifiable and material risks, including the risks represented in the tails of the distribution and the funding of the risks." Also see Section 6.E.8. of the C3 Phase 3 Report for the requirements around modeling non-hedging Derivative Programs.

Q18.2: If the hedging or derivative program is going to be revised or changed in the future, should this change be included in the calculation?

A: If there is going to be a revision or change in the program, the future assumptions would be modified in accordance with the definitions in Section 5 of the Report of Anticipated and Prudent Estimate Assumptions.

Q18.3: What is a Clearly Defined Hedging Strategy?

A: Per Section 6.E.9. of the C3 Phase 3 Report, in order to qualify as a Clearly Defined Hedging Strategy, the strategy shall, at a minimum, identify:

a. The specific risks being hedged (e.g., delta, rho, vega, etc.);
b. The hedge objectives;
c. The financial instruments that will be used to hedge the risks;
d. The hedge trading rules including the permitted tolerances from hedging objectives; and
e. The criteria, metrics and frequency for measuring hedging effectiveness.

The hedge strategy may be dynamic, static, or a combination thereof.

Q18.4: How will actuaries determine the expected future hedge cash flows?

A: Per Section 6.E.8. of the C3 Phase 3 Report, the financial effect of both costs and benefits should impact the calculation of the C3 requirement. The actuary should consider in modeling the costs and benefits that the C3 requirement is a tail risk measure.

Some actuaries will use models of hedging cash flows developed in a consistent manner with the scenarios used in the calculation of the Stochastic Amount modified for expected costs and timing mismatch. Actuaries will base the expected costs on items such as historical experience, economic conditions in the scenarios that make up the Stochastic Amount and other information where available. The actuary may wish to consider whether hedge effectiveness will vary under extremely adverse or favorable scenarios.

Q18.5: Do the limitations of projected hedge effectiveness in other reserve and capital calculations such as AG 43 (VACARVM) and C3 Phase 2 apply to the C3 Phase 3 calculation?

A: There are no listed limits to hedge effectiveness in the C3 Phase 3 Report. Since AG 43 and C3 Phase 2 require an effectiveness factor to be used, some actuaries will use methodologies consistent with those standards in determining their expected effectiveness of the hedging and derivative programs, particularly for programs that are performed together or in a similar manner.

Q18.6: How do actuaries quantify the hedge cost in the projections?

A: There are two general methods that are described in the C3 Phase 3 Report in Section 7.B. The fundamental characteristic of the first method is that all hedging positions, both the currently held positions and those expected-to-be held in the future, are included in the Cash Flow Model used to determine the Reported Amount

The fundamental characteristic of the second method is that the effectiveness of the current Derivative Program (including currently held hedge positions) on future cash flows is evaluated, in part or in whole, outside of the Cash Flow Model. In this case, the reduction to the Reported Amount otherwise calculated should be commensurate with the degree of effectiveness of the Derivative Program in reducing Accumulated Deficiencies otherwise calculated.

Q18.7: Are there other things that the actuary should take into account when modeling the hedging program?

A: The modeling of the hedge program should aim to capture the real world limitations of hedging – frequency of rebalancing, transaction costs, Margin costs, basis risk, gap risk, pricing risk, parameter estimation, assumption limitations and trading limits. Some actuaries would determine these other costs and limitations in the framework of the tail scenarios that end up determining the Stochastic Amount.

Q18.8: Is there a certification needed if a derivative program is included in the calculation?

A: Yes, per Section 7.D of the C3 Phase 3 Report, the actuary and a financial officer of the company are required to provide certifications about the hedging program.

Q18.9: What other requirements are there around how the derivative cash flows are modeled?

A: Section 7.C of the C3 Phase 3 Report contains other considerations for modeling derivative programs. It states that the parameterization of any model used to measure effectiveness should consider the historical performance of the hedge strategy being implemented.

Some actuaries would review the derivative cash flows for situations where the cash flows show considerable gains in many or most scenarios but not a reasonable amount of losses in others. This may reflect the fact that the strategy takes advantage or has foreknowledge of the characteristics of the Scenario generator. The actuary would use judgment to make sure the modeling complies with the requirements and modify accordingly if not in compliance with the requirements of the C3 Phase 3 Report, particularly Section 7.C.

19. Details on Certification & Required Documentation

Q19.1: What are the qualification standards applicable to the certifying actuary?

A: The Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States determine the standards required for providing the Certification with respect to C3 Phase 3. This includes satisfying basic education, experience and continuing education requirements. The standards can be found at http://www.actuary.org/qualstandards/qual.pdf.

Q19.2: Does the appointed actuary provide the Certification for C3 Phase 3?

A: The appointed actuary does not need to be the Qualified Actuary providing the certification for C3 Phase 3. Any qualified actuary meeting the applicable qualification standards as outlined in Section 11.E of the C3 Phase 3 Report can provide the certification. Some companies have considered having their Board of Directors formally appoint the Qualified Actuary for purposes of providing the required certification for C3 Phase 3.

Q19.3: What is a suggested format of the required Certification (i.e., sample wording)?

A: There is no suggested format. However, there are required components of the Certification, as outlined in Section 11.A of the C-3 Phase 3 Report.

Q19.4: Are there any distinctions in the Certification required from a direct writer versus what would be required from a reinsurance company?

A: There are no required distinctions between the Certifications required from a direct writer and a reinsurance company. However, some actuaries believe additional clarification in the scope may be beneficial and there may be implicit differences in the reliance statements provided.

Q19.5: What additional certification is required if hedging is reflected?

A: If hedging is reflected, Section 7.D. of the C3 Phase 3 Report states that "the actuary must provide a certification that the assumptions used in determining the impact of Derivative Programs on the calculations were reasonable for the purpose of determining the Reported Amount.

The actuary must provide a certification as to whether the Clearly Defined Hedging Strategy is fully incorporated into the cash flow model and any supplementary analysis of the impact of the Derivative Program on the Reported Amount. The actuary must document the extent to which elements of the Derivative Program (e.g., time between portfolio rebalancing) are not fully incorporated into the cash flow model and any supplementary analysis to determine the impact, if any. In addition, the actuary must provide a certification and maintain documentation to support the certification that the Derivative Program designated as the Clearly Defined Hedging Strategy meets the requirements of a Clearly Defined Hedging Strategy. This includes certification that the implementation of the Derivative Program in the stochastic cash flow model and any supplementary analysis does not include knowledge of events that occur after any action dictated by the hedging strategy (i.e., the model cannot use information about the future that would not be known in actual practice).

A financial officer of the company (e.g., Chief Financial Officer, Treasurer or Chief Investment Officer) or a person designated by them who has direct or indirect supervisory authority over the actual trading

of assets and derivatives must certify that the Derivative Program modeled is the Derivative Program being used by the company in its actual day-to-day risk mitigation efforts."

Q19.6: What are the certification requirements if the hedging has actually been outsourced to a third party, or is conducted by another company within the reporting company's group?

A: The certification requirements do not change if hedging has been outsourced to a third party or is conducted by another company. The Qualified Actuary is still responsible for the Certification. To the extent the actuary relies on others, (including those providing hedging calculations and processes for the company) the actuary is usually well advised to reflect such reliance in the reliance statements included in the certification and to make any appropriate further reliance disclosures in the supporting memoranda. The actuary may wish to consider provisions on reliance in the applicable Actuarial Standards of Practices, including those referenced in Q2.3.