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November 3, 2014

Mark Birdsall  
Chair, NAIC Life Risk Based Capital (E) Working Group  
National Association of Insurance Commissioners

Dear Mark:

The instructions below indicate how to use a new spreadsheet to calculate the CTE 90 RBC measure as part of the 2014 C-3 Phase 1 RBC field test for large companies. This new spreadsheet constitutes the update mentioned at the bottom of page 3 of the American Academy of Actuaries (AAA) C-3 Work Group [report](#) of June 2014, “Recommended Approach for Updating Regulatory Risk-Based Capital Requirements for Interest Rate Risk for Fixed Annuities and Single Premium Life Insurance (C-3 Phase I).”

The current RBC C-3 Phase 1 factor is a weighted average factor centered at the 95<sup>th</sup> percentile, with declining weights assigned to percentiles moving up from the 95<sup>th</sup> percentile to the 98<sup>th</sup> percentile, and down from the 95<sup>th</sup> percentile to the 92<sup>nd</sup> percentile. The change to a Conditional Tail Expectation (CTE) 90 measure will align the C-3 Phase 1 factor with the measure in use for C-3 Phase 2, and proposed for C-3 Phase 3.

Note: The Academy June 2014 report indicates that the Economic Scenario Generator (ESG) to use is the American Academy of Actuaries (Academy) generator Version 7.1.201405. The planned May 2014 release of the ESG was delayed until June, so the ESG to use is called Version 7.1.201406.

Sincerely,

Link Richardson, MAAA, FSA, CERA  
Chairperson  
C3 Work Group  
American Academy of Actuaries

## Instructions for the 2014 C-3 Phase 1 Field Test RBC and CTE 90 Factors Calculation Spreadsheet

### Getting Started

Open the file “C3 Phase 1 CTE 90 Measure 2014-10-28 version.xlsm” in Excel. It may ask you if you wish to disable the macros; if it does, you should enable the macros so that the programs will work. Please note that in order to use the spreadsheet, Microsoft Excel 2007 or later is required.

### Input

#### 1. General Information

General Information needed for this spreadsheet includes Projection Date, Beginning Statutory Reserve Level, Tax Rate (use 35%), Discount Loading (use 105%) and Projection Basis (Calendar Year or Projection Year). Those inputs can be edited in Range G2 to G6 in Sheet “C3Factor.” In this spreadsheet, all input areas have been highlighted light blue.

#### 2. Projected 1 Year Treasury Rates

These rates are from the Academy’s Interest Rate Generator (AIRG)(Version 7.1.201406) and are used for discounting purposes and should be copied to Sheet “1 Yr Rate,” starting at range B2. Each row is a single scenario path and there are 200 C-3 Phase 1 field test scenario paths. For each path, the user can load up to 51 years of projected 1 year Treasury rates with monthly time steps.

#### 3. Projected Statutory Surplus

The Surplus matrix should be copied to Sheet “C3Factor,” starting at range E28. Similarly to the 1 year rate scenario matrix, each row is a Surplus projection for one scenario, and there are 200 rows. The user can report up to 50 years of projected Surplus. Please note that the time step is yearly.

### C-3 Factors Calculation

1. After updating all the inputs needed (light blue highlighted cells), click “Calculate RBC C-3 Phase 1 Factor” button at the very top of Sheet “C3Factor.” The Macro will loop through the 200 scenarios and output calculated C-3 Factors in Column C, with assigned weights in Column D, both from Row 28 to Row 227. Note that the Macro button will remain depressed until it has finished running. **This step needs to be repeated to refresh the calculation after any update to the inputs listed above.**
2. Based upon computed C-3 factors for each scenario, three statistical measures (“Max C-3 Factor,” “CTE 90 C- 3 Factor” and “RBC C-3 Phase I Factor (95% weighted Avg)”) are

reported in Range N4 to N7. Additional statistical measures are shown in Range B10 to V13.

The “CTE 90 C-3 Factor” is to be used in determining the 2014 CTE 90 disclosure amount. The other statistical measures are for informational purposes. The “RBC C-3 Phase I Factor (95% Weighted Avg)” is shown so that companies can compare results using this current measure and the new scenarios, to corresponding results using both the current measure and the current scenarios. The difference between these two results is the effect of the change in scenarios. The effect of the change in the measure can then be looked at separately.

The following provides additional information on the items shown in Range B10 to V13:

- The chosen percentiles used in determining the “CTE 90 C-3 Factor” and the “RBC C-3 Phase 1 Factor (95% weighted Avg)” are illustrated in Row 10.
  - Row 11 Column F to Column R contains the weights that are used in determining the “RBC C-3 Phase I Factor (95% weighted Avg).” These weights are also shown for the corresponding scenarios in Column D, Row 28 to Row 227.
  - The scenario numbers corresponding to the chosen percentiles are reported in Row 12.
  - The C-3 factors for chosen percentile are reported in Row 13. Note that the average of the 20 results shown in Row 13, Column C to Column V equals the “CTE 90 C-3 Factor.” And that the weighted average of Range F13 to R13 and Range F11 to R11 equals the “RBC C-3 Phase I Factor (95% Weighted Avg).”
3. Range D17 to BB22 illustrates a sample calculation of C-3 factor for scenario 1.

### Validation

1. A validation tab (“Validation”) is provided to facilitate user understanding and verification of the calculated results.
2. There are two parts of validations
  - Part 1 illustrates the computation of discount factor from scenario 1 – this is the same scenario as illustrated in the sample calculation.
  - Part 2 is for Ranking and CTE validation. User can change the Cell U1 (number of scenario tested) if the CTE measure is based upon a scenario set that has other than 200 scenario paths – doing so will produce a warning message.