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April 4, 2022

Mr. Philip Barlow
Chair, Life Risk-Based Capital (E) Working Group
National Association of Insurance Commissioners (NAIC)

Via email: Dave Fleming (dfleming@naic.org)

Re: Analyses Requested at the January 20, 2022, Life RBC Meeting and Response to ACLI Comment Letter and Regulator Comments Discussed at the March 10, 2022, Life RBC Meeting

Dear Philip,

On behalf of the C-2 Mortality Work Group of the American Academy of Actuaries,[1] we are providing the analysis requested at the January 20, 2022, Life Risk-Based Capital (E) Working Group meeting. This includes the following and is discussed in the attached report.

1. Impact on C-2 factors of assuming zero expected mortality improvement
2. Sensitivities on the catastrophe component of the C-2 factors
   a. Unknown sustained risk likelihood and severity
   b. Pandemic risk likelihood and severity
3. Support for the five-year risk exposure period for products with pricing flexibility

Overall, the additional analysis related to C-2 factors reinforces the factors and structure recommended by the work group. The C-2 Mortality Work Group maintains its recommended factors made in November 2021 and its structural change options recommended in January 2022.

The report also includes commentary on the ACLI comment letter and regulator comments discussed at the March 10, 2022, Life RBC Working Group meeting. The response addresses the following topics.

1. Tiered charges
2. Clarification of definitions
3. Improved annual statement tie-out
4. Non-participating whole life and default category
5. Group permanent life

Sincerely,

Chris Trost, MAAA, FSA
Chairperson, C-2 Mortality Work Group

Ryan Fleming, MAAA, FSA
Vice Chairperson, C-2 Mortality Work Group

American Academy of Actuaries

Life RBC – C-2 Mortality Risk

Regarding analysis requested at the January 20, 2022, Life Risk-Based Capital (RBC) (E) Working Group meeting and ACLI Comment Letter and Regulator Comments Discussed at the March 10, 2022, Life RBC (E) Working Group Meeting

To: NAIC Life RBC (E) Working Group

From: American Academy of Actuaries C-2 Mortality Work Group

Date: April 4, 2022

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LIFE RBC – C-2 MORTALITY RISK

Zero Expected Mortality Improvement

Assumptions From November 2021 Recommendation

Experience mortality improvement is set equal to the 2017 Society of Actuaries (SOA) mortality improvement scale for use with Actuarial Guideline (AG) 38 and VM-20. The rates vary by age and gender and are converted to lognormal rates for input in the model.

Trend risk is modeled to assess the risk that future mortality improvement is different than assumed. Historically, both mortality improvement (MI) and MI volatility have differed by historical period, gender, and age, among others. While average MI over long periods tends to stabilize, period-to-period MI can be quite different. An improvement distribution that captures these characteristics was developed while balancing the desire for simplicity. Deviation in mortality improvement is modeled across male/female and young/middle/old ages as correlated normally distributed random variables. An MI deviation is generated for each cohort in each year of each scenario. This allows for large differences year-to-year, consistent with historical data.

Sensitivity Test

An Academy C-2 Mortality Work Group sensitivity test was performed to assess the impact of assuming zero expected mortality improvement. The trend risk component remained included in the model and was assessed versus the zero expected mortality improvement. In the absence of the trend risk component, the recommended factors would be lower.

The results of this sensitivity test are shown below for the large size factors for individual life. Zeroing expected mortality improvement led to a slight increase in the factors for the longer projection periods due to the slightly higher risk associated with higher experience mortality rates. Group life factors would not be impacted consistent with the five-year individual life result.

The C-2 Mortality Work Group continues with its suggestions, which include expected mortality improvement based on the SOA 2017 mortality improvement scale and the evaluation of trend risk versus this expectation.

Sensitivity - Impact of Zero Expected Mortality Improvement						
Pre-Tax RBC C-2 Factors - Large Size	Individual & Industrial Life			Change vs Baseline		
Per $1,000 of Inforce NAR	20 Year	10 Year	5 Year	20 Year	10 Year	5 Year
Baseline - 2017 Mortality Improvement Scale	1.10	0.75	0.50			
Zero Expected Mortality Improvement	1.20	0.80	0.50	0.10	0.05	0.00

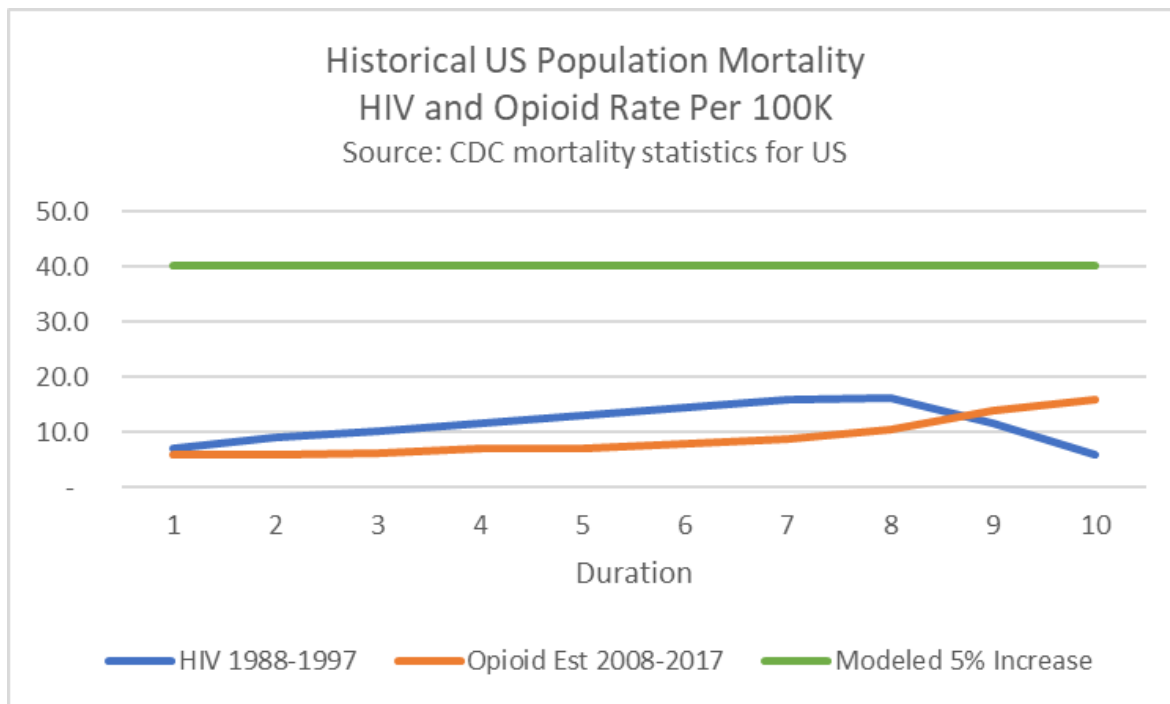## Unknown Sustained Risk Likelihood and Severity

Assumptions From November 2021 Recommendation

The catastrophe risk component of the model assesses the risk of a short-term spike in mortality or a longer-term increase in mortality from a currently unknown health event. This risk includes three components: a pandemic risk distribution, a terrorism risk distribution, and an unknown sustained risk distribution.

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The unknown sustained risk assumes a sustained increase in mortality from an unknown health event. The discrete distribution was calibrated from two historical health events impacting the U.S. population: HIV and opioid abuse. The mortality increase is defined as a 5% increase applied across all ages if triggered. The annual likelihood of the event occurring is 2.5%. If the event is triggered in the scenario, it continues for the lesser of the maximum duration assumption and remainder of the projection period. A 10-year period was selected for the maximum duration based on the historical events and to provide for an event lasting up to a decade. The maximum duration assumption is relevant only when modeling projection periods longer than this assumption. Given the sustained nature of the event, it can only occur once per scenario.

As highlighted in the chart below, the modeled catastrophe provides for deaths in excess of similar historical events due to assuming experience from the worst age band category. The worst age band category was selected to conservatively set the severity as life insurers could have exposure concentrated at certain ages impacted by this type of event.

Historical US Population Mortality
HIV and Opioid Rate Per 100K
Source: CDC mortality statistics for US

HIV 1988-1997 — Opioid Est 2008-2017 — Modeled 5% Increase

Sensitivity Testing

Sensitivity tests were performed to assess the impact of increasing the likelihood and/or severity of an unknown sustained risk event.

The results of these sensitivity tests are shown below for the large size factors. The impact of increased likelihood and/or severity is more significant for the longer risk exposure periods. The impact to group life would be similar to the five-year individual life category. The impact to the small and medium size categories would be comparable on an absolute add-on basis. Increasing the impact of this component would provide for safety beyond the level to identify weakly capitalized companies, which may be misaligned with RBC objectives.

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The C-2 Mortality Work Group maintains its recommendation, which includes conservatively setting both the likelihood and impact of an unknown sustained risk event.

Sensitivity - Impact of Alternative Unknown Sustained Risk Assumptions						
Pre-Tax RBC C-2 Factors - Large Size	Individual & Industrial Life			Change vs Baseline		
Per $1,000 of Inforce NAR	20 Year	10 Year	5 Year	20 Year	10 Year	5 Year
Baseline - 2.5% Annual Probability, 5% Increase	1.10	0.75	0.50			
5% Annual Probability, 5% Increase	1.25	0.85	0.55	0.15	0.10	0.05
2.5% Annual Probability, 10% Increase	1.40	1.05	0.60	0.30	0.30	0.10
5% Annual Probability, 10% Increase	1.65	1.25	0.75	0.55	0.50	0.25

Pandemic Risk Likelihood and Severity

Assumptions From November 2021 Recommendation

The pandemic risk component assesses the risk of a one-year increase in mortality from a new pandemic, such a new flu strain. The distribution is discrete and was calibrated from historical observations and multiple sources: current RBC, Swiss Re's model, Solvency II, U.S. Centers for Disease Control and Prevention (CDC)/Department of Health and Human Services Pandemic Severity Assessment Framework (PSAF). Rates are expressed as deaths per 1,000 lives and are applied as an add-on across all ages if triggered. Multiple pandemics may occur in a given scenario. The table of annual likelihood and severity is shown below. The excess mortality from a pandemic may occur over multiple years. For modeling pandemics, the cumulative excess mortality is assumed to occur in a one-year period, which is a more conservative assumption than assuming that the same cumulative excess mortality occurs over multiple years.

Annual Probability	Excess Deaths Per 1K
0.50%	1.5
0.50%	0.7
0.50%	0.55
0.50%	0.35
0.50%	0.2
0.50%	0.1
0.50%	0.05
96.50%	0

While the pandemic distribution was developed prior to the COVID-19 pandemic, the emerging experience from COVID-19 for group and individual life insurers has been assessed. *Early indications are that the COVID-19 experience for the life insurance industry falls within the distribution of pandemic severities above.* The SOA is conducting ongoing research for both individual and group life insurers. The links to the latest reports are shown below.

Individual Life: https://www.soa.org/globalassets/assets/files/resources/research-report/2022/us-ind-life-covid-19-reported-claims.pdf

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Group Life: https://www.soa.org/globalassets/assets/files/resources/research-report/2022/group-life-covid-19-mortality.pdf

For individual life, the average reported excess mortality by amount (adjusted for trend) from the second quarter of 2020 through the third quarter of 2021 was 10% for the 1.5-year period. Assuming the pandemic lasts from two to three years at that average rate, the estimated cumulative excess mortality ranges from 20%-30%. Based on modeled mortality rates, this translates to estimated excess deaths of 0.5-0.7 per thousand.

For group life, the average reported excess mortality by amount from the second quarter of 2020 through the third quarter of 2021 was 29% for the 1.5-year period. Assuming the pandemic lasts from two to three years at that average rate, the estimated cumulative excess mortality ranges from 60% to 90%. Based on modeled mortality rates, this translates to estimated excess deaths of 0.8-1.2 per thousand.

Note, these are industry-wide estimates to assess reported COVID-19 experience versus the RBC pandemic distribution. Estimates could change based on the course of the COVID-19 pandemic and further research on mortality experience during this period. Insurer experience may vary greatly by company.

Sensitivity Testing

Sensitivity tests were performed to assess the impact of increasing the likelihood and/or severity of a pandemic.

The results of these sensitivity tests are shown below for the large size factors. The impact to group life and to the small and medium size categories would be similar. Increasing the impact of this component would provide for safety beyond the level to identify weakly capitalized companies, which may be misaligned with RBC objectives. The likelihood of future pandemics, given the COVID-19 pandemic, is uncertain, and there is the possibility of overreacting to current events. If future research provides new expert judgment on pandemic outcomes that are significantly different than the distribution assumed in the recommended factors, this would be justification for a new review of the C-2 factors.

The C-2 Mortality Work Group maintains its suggestions, which includes a distribution of potential outcomes providing for excess mortality at least as severe as the COVID-19 pandemic.

Sensitivity - Impact of Alternative Pandemic Assumptions						
Pre-Tax RBC C-2 Factors - Large Size	Individual & Industrial Life			Change vs Baseline		
Per $1,000 of Inforce NAR	20 Year	10 Year	5 Year	20 Year	10 Year	5 Year
Baseline - 3.5% Aggregate Annual Probability, 0.05 - 1.50 Deaths / 1000	1.10	0.75	0.50			
Double Probability	1.30	1.00	0.75	0.20	0.25	0.25
Double Impact	1.50	1.10	0.90	0.40	0.35	0.40
Double Probability, Double Impact	2.00	1.75	1.55	0.90	1.00	1.05

Support for the Five-Year Risk Exposure Period for Products With Pricing Flexibility

Assumptions From November 2021 Recommendation

The five-year risk exposure period in the modeling is intended to represent inforce blocks where pricing may be adjusted following adverse mortality experience due to the presence of non-guaranteed elements,

which are not yet being charged at maximum levels. The five-year period represents a conservatively appropriate period where experience emerges, is subsequently studied, and implemented into inforce pricing through adjusting non-guaranteed elements. Examples of products with this flexibility are universal life products without secondary guarantees and participating whole life products.

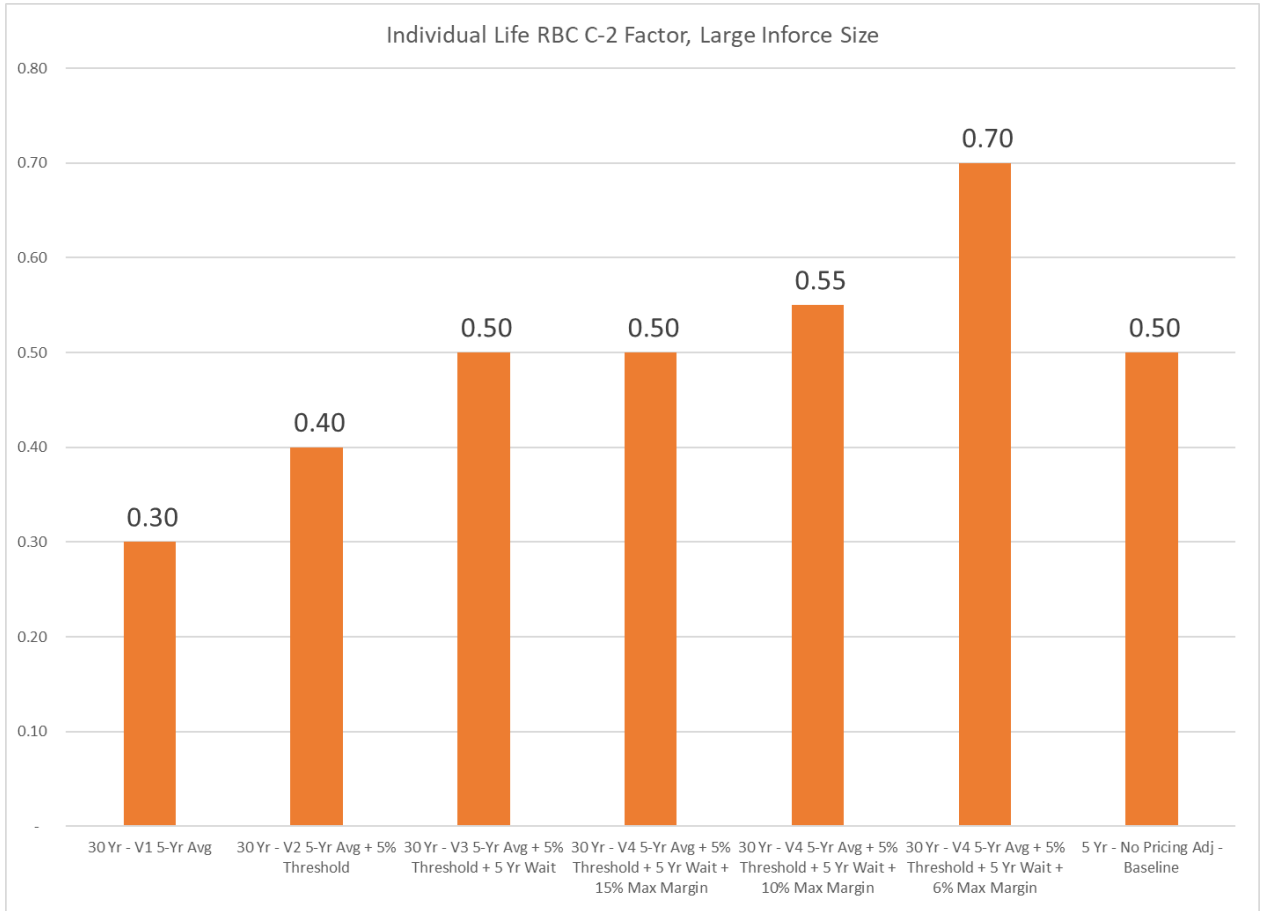Additional Support for the Five-Year Risk Exposure Period

The C-2 Mortality Work Group developed alternative versions of the model to directly simulate pricing flexibility to respond to emerging mortality experience. These versions of the model were run for 30 years, over which nearly 100% of the inforce business has run-off. Four versions of the model were developed as described below.

1. An actual-to-expected ratio is calculated for each projection year on a statutory loss/net amount at risk basis (death benefits minus reserves released). Pricing is adjusted on a five-year rolling average basis with a one-year lag for both positive and negative experience. Years prior to the projection start date have an actual-to-expected ratio of 100%.

2. Same as version 1 plus pricing adjustments don't occur unless outside of +/- 5% deviations on a rolling average basis. The 5% deviation aligns with the margin assumed in reserves to cover moderately adverse experience of 1 standard deviation.

3. Same as version 2 plus there are no pricing adjustments for the first five projection years.

4. Same as version 3 plus a 15% limit for the maximum margin available consistent with typical mortality loads applied in the loaded 2017 CSO table. Sensitivities with lower margins of 10% and 6% were also tested.

The results for a large inforce size are shown in the chart below. Versions 1 and 2 result in a capital factor lower than the recommendation for the five-year category. This is because pricing adjustments occur sooner than after five years. Versions 3 and 4 result in a capital factor consistent with the recommendation as the exposure periods are aligned at five years. These versions assume that there is sufficient margin available to offset changes in mortality experience beyond the five-year risk exposure period. With version 4 of the model, sensitivities performed at lower margins of 10% and 6% demonstrate that the capital factor increases to the extent margins are more limited.

The C-2 Mortality Work Group maintains its suggestions to assign products with inforce pricing flexibility to the five-year risk exposure period category.

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Individual Life RBC C-2 Factor, Large Inforce Size

Category	Value
30 Yr - V1 5-Yr Avg	0.30
30 Yr - V2 5-Yr Avg + 5% Threshold	0.40
30 Yr - V3 5-Yr Avg + 5% Threshold + 5 Yr Wait	0.50
30 Yr - V4 5-Yr Avg + 5% Threshold + 5 Yr Wait + 15% Max Margin	0.50
30 Yr - V4 5-Yr Avg + 5% Threshold + 5 Yr Wait + 10% Max Margin	0.55
30 Yr - V4 5-Yr Avg + 5% Threshold + 5 Yr Wait + 6% Max Margin	0.70
5 Yr - No Pricing Adj - Baseline	0.50

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Response to ACLI Comment Letter and Regulator Comments Discussed at the March 10, 2022, Meeting

<u>Tiered Charges</u>

The C-2 Mortality Work Group is supportive of tiering the factors applied to the net amount at risk based on the aggregate amounts for individual life and for group life. Either of the approaches suggested by the ACLI are acceptable solutions. The pro rata approach to the work group appears to be the logical approach because it spreads the tiering proportionately among the categories. The larger factors associated with smaller sizes are due to the volatility and level risk components. It makes sense that the aggregate volatility and level risks for a company are spread proportionately among the categories. The approach similar to the disability income factors would result in slightly more conservative capital amounts because the highest factor products are assigned first.

<u>Clarification of Definitions</u>

The categories in the recommended C-2 factors were developed broadly. The length of the risk exposure period was the distinguishing variable to differentiate risk through the factors. The practical implementation of the factors was to select product categories based on the existing annual statement reporting structure. Universal life with secondary guarantee products have the longest mortality guarantees on average. Term products fall in the middle on average. The all other life category represents products that have the ability to adjust current mortality rates for emerging experience. The C-2 Mortality Work Group recognizes that the categorization is not perfect in all instances but is intended to recognize differences in risk broadly based on the existing annual statement reporting structure. The categories are also intended to apply to all inforce business regardless of whether the reserving is pre- or post-principles-based reserving.

<u>Improved Annual Statement Tie-Out</u>

The C-2 Mortality Work Group is supportive of efforts to report net amounts at risk directly in the annual statement. This practice would simplify the necessary/required data sources to be retrieved for the RBC C-2 Life calculation. Reporting the net amount at risk for each company and by product line may also provide meaningful information to financial statement users.

Option 1—Annual Statement Updates

The information needed to calculate the net amount at risk by product would fit well in the Analysis of Increase in Reserves During the Year pages. The following lines could be added as a new section called Net Amount at Risk. All amounts would be as of December 31 of the current year and on a net of reinsurance basis.

- Line 18*: Amount of Insurance In Force*. This line should be equivalent to amounts reported on Line 23 of the Exhibit of Life Insurance.

- Line 19: *Aggregate Reserves*. This would simply be set equal to Line 15.

- Line 20: *Separate Accounts Reserves*. These amounts would be on the same basis as the Separate Accounts Exhibit 3.

- Line 21*: Modified Coinsurance Reserves*. These amounts would be on the same basis as Schedule S.

- Line 22: *Net Amount at Risk*. This would be calculated as Line 18 – Line 19 – Line 20 – Line 21

Furthermore, the Whole Life column 3 could be expanded into two lines of business to distinguish between participating and non-participating contracts.

Option 2—Annual Statement Updates

The information needed to calculate the net amount at risk for the three categories (Life Policies with Pricing Flexibility, Term Life Policies without Pricing Flexibility, and Permanent Life Policies without Pricing Flexibility) could be addressed through a table in a new note, line, or item within Notes to Financial Statements. The following lines would be included in the table with four columns for the three RBC categories and a total column. All amounts would be as of December 31 of the current year and on a net of reinsurance basis.

- Line 1: *Amount of Insurance In Force*. This line should be equivalent to amounts reported on Line 23 of the Exhibit of Life Insurance.

- Line 2: *Aggregate Reserves*. This would set equal to Line 15 of the Analysis of Increase in Reserves During the Year.

- Line 3: *Separate Accounts Reserves*. These amounts would be on the same basis as the Separate Accounts Exhibit 3.

- Line 4: Modified Coinsurance Reserves. These amounts would be on the same basis as Schedule S.

- Line 5: *Net Amount at Risk*. This would be calculated as Line 1 – Line 2 – Line 3 – Line 4

In order to populate the RBC categories, a principle-based assessment would need to be completed by each company. Pricing flexibility for life insurance is determined as the ability to materially adjust rates on in force contracts through changing premiums and/or non-guaranteed elements as of the valuation date and within the next 5 policy years. A material rate adjustment is defined as the ability to recover, on a present value basis, the difference in mortality provided for in the factors for contracts with and without pricing flexibility.

Group Life Annual Statement Updates Under Option 1 or Option 2

The information needed to calculate the net amount at risk for the two categories (Group & Credit Life with Remaining Rate Terms 36 Months and Under, Group & Credit Life with Remaining Rate Terms Over 36 Months) could be addressed through a table in a new note, line or item within Notes to Financial Statements. The following lines would be included in the table with three columns for the two RBC categories and a total column. All amounts would be as of December 31 of the current year and on a net of reinsurance basis.

- Line 1: *Amount of Insurance In Force*. This line should be equivalent to amounts reported on Line 23 of the Exhibit of Life Insurance.

- Line 2: *Aggregate Reserves*. This would set equal to Line 15 of the Analysis of Increase in Reserves During the Year.

- Line 3: *Separate Accounts Reserves*. These amounts would be on the same basis as the Separate Accounts Exhibit 3.

- Line 4: *Modified Coinsurance Reserves*. These amounts would be on the same basis as Schedule S.

- Line 5: *Net Amount at Risk*. This would be calculated as Line 1 – Line 2 – Line 3 – Line 4

Non-Participating Whole Life and Default Category

New York (NY) and Minnesota (MN) regulators have expressed a determination to prefer to classify non-participating (or fully guaranteed) whole life with the highest individual life factor category along with universal life with secondary guarantees. There is also a preference under Option 1 of the structural updates that any products not assigned to one of the categories should conservatively default to the highest factor category. The C-2 Mortality Work Group is supportive of these updates to refine the product classifications as long as products that have pricing flexibility continue to be assigned to the lowest factor category.

Group Permanent Life

A regulator comment was made at the March 10, 2022, meeting suggesting that group permanent life should be categorized with the individual life factors. The C-2 Mortality Work Group is supportive of this update, as the individual life factors would be more appropriate for these types of products. The group factors were developed assuming a term life product, as the vast majority of industry exposure is group term life. Furthermore, the C-2 Mortality Work Group suggests assigning group credit life to the group category, and individual credit life to the individual life category. If this update is made, then the category names will need to be updated to make it clear that group permanent life business is being categorized along with individual life products.