



AMERICAN ACADEMY *of* ACTUARIES

Changes to Proposed LRBC Instructions for C-3 (Interest Rate Risk) by the American Academy of Actuaries Life-Risk Based Capital Committee

Presented to the National Association of Insurance Commissioners Life Risk-Based Capital Working Group

June 2001 – New Orleans, Louisiana

The American Academy of Actuaries is the public policy organization for actuaries practicing in all specialties within the United States. A major purpose of the Academy is to act as the public information organization for the profession. The Academy is non-partisan and assists the public policy process through the presentation of clear and objective actuarial analysis. The Academy regularly prepares testimony for Congress, provides information to federal elected officials, comments on proposed federal regulations, and works closely with state officials on issues related to insurance. The Academy also develops and upholds actuarial standards of conduct, qualification and practice and the Code of Professional Conduct for all actuaries practicing in the United States.

Life Risk-Based Capital Committee
Michael L. Zurcher, F.S.A., M.A.A.A., Chair

Gerald A. Anderson, F.S.A., M.A.A.A.
Robert A. Brown, F.S.A., M.A.A.A.
Errol Cramer, F.S.A., M.A.A.A.
Larry Gorski, F.S.A., M.A.A.A.
Norman E. Hill, F.S.A., M.A.A.A.
Jan L. Pollnow, F.S.A., M.A.A.A.
James F. Reiskytl, F.S.A., M.A.A.A.
Harold Summer, F.S.A., M.A.A.A.
Bill Wilton, F.S.A., M.A.A.A.

Stephen M. Batza, F.S.A., M.A.A.A.
Martin Claire, F.S.A., M.A.A.A.
Joseph L. Dunn, F.S.A., M.A.A.A.
Arnold N. Greenspoon, F.S.A., M.A.A.A.
Alastair G. Longley-Cook, F.S.A., M.A.A.A.
Craig R. Raymond, F.S.A., M.A.A.A.
Mark C. Rowley, F.S.A., M.A.A.A.
James A. Tolliver, F.S.A., M.A.A.A.
Miles B. Yakre, F.S.A., M.A.A.A.

Note: The changes recommended by the Academy’s LRBC Committee are underlined and deleted material is shown by a strike-through.

Appendix 1 – C-3 RBC for Certain Business Subject to Asset Adequacy Cash Flow Testing

This appendix is applicable only for calculating RBC when using cash flow scenario testing.

The method of developing the C-3 component is building on the work of the asset adequacy modeling, but using interest scenarios designed to help approximate the 95th percentile C-3 risk.

The revised C-3 component is to be calculated as the sum of three amounts, but subject to a minimum and maximum. The calculation is:

- (a) For Annuities or Single Premium Life Insurance products other than equity-indexed products, whether written directly or assumed through reinsurance, that the company tests for Asset Adequacy Analysis using cash flow testing, an actuary should calculate the C-3 requirement based on the same cash flow models and assumptions used and same “as-of” date as for Asset Adequacy, but with a different set of interest scenarios, and a different measurement of results. A weighted average of a subset of the scenario specific results is used to determine the C-3 requirement.

If the “as-of” date of this testing is not 12/31, the ratio of the C-3 requirement to reserves on the “as-of” date is applied to the year end reserves, similarly grouped, to determine the year-end C-3 requirement for this category.

- (b) Equity-indexed products are to use the existing factors, not the results of scenario testing.
- (c) For all other products (either non-cash-flow-tested or those outside the product scope defined above) the C-3 requirements are calculated using current existing factors and instructions.
- (d) For callable assets (including IOs and similar investments other than those used for testing in component a) above, the C-3 requirement is 50 percent of the excess, if any, of statement value above current call price. The calculation is to be done on an asset by asset basis.

The total C-3 component is the sum of a, b, c and d, but not less than half nor more than double the C-3 component based on current factors and instructions.

- For this C-3 calculation, “annuities” means products with the characteristics of deferred and immediate annuities, structured settlements, guaranteed separate accounts, and GICs (including synthetic GICs, and funding agreements). Debt incurred for funding an investment account is included if cash flow testing of the arrangement is required by the insurer’s state of domicile for Asset Adequacy Analysis. The equity-based portions of variable products are not to be included, but guaranteed fixed options within such products are. See Appendix 1b for further discussion.

- The company may use either a standard 50 scenario set of interest rates or an alternative, but more conservative, 12 scenario set (for part a, above). It may use the smaller set for some products and the larger one for others. Details of the cash flow scenario testing methodology are contained in Appendix 1a.
- In order to allow time for the additional work effort, an estimated value is permitted for the year end annual statement. For the RBC electronic filing though, the actual C-3 results based on the scenario testing will be required. 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.
- The risk-based capital submission is to be accompanied by a statement from the Appointed Actuary certifying that in his or her opinion the assumptions used for these calculations are not unreasonable for the products, scenarios, and purpose being tested. This "C-3 Assumption Statement" is required from the Appointed Actuary even if the C-3 Risk scenario testing is done by a different actuary.
- The scenario testing used for this purpose will use the same assumptions as to cash flows, assets associated with tested liabilities, future investment strategy, rate spreads, "as-of" date and how negative cash flow is reflected ~~as are~~ consistent with those used for cash flow testing (except that if negative cash flow is modeled by borrowing, the actuary needs to make sure that the amount and cost of borrowing are reasonable for that particular scenario of the C-3 testing). The other differences are the interest scenario assumptions and how the results are used.

It is important that assumptions be reviewed for reasonableness under the severe scenarios used for C-3 testing. The assumptions used for cash flow testing may need to be modified so as to produce reasonable results in extreme scenarios.

- The actuary must also assure that the cash flow testing used for the 50 or 12 scenarios does not double count cash flow offsets to the interest rate risks. That is, that the calculations do not reduce C-3 and another RBC component for the same margins. For example, certain reserve margins on some guaranteed separate account products serve an AVR role and are credited against the C-1 requirement. To that degree, these margins should be removed from the reserve used for C-3 testing.

Appendix 1a – Cash Flow Scenario Testing Methodology

General Approach

1. The underlying asset and liability model(s) are those used for year-end Asset Adequacy Analysis cash flow testing, or a consistent model.
2. Run the scenarios (12 or 50) produced from the interest-rate scenario generator.
3. The statutory capital and surplus position, S(t), should be captured for every scenario for each calendar year-end of the testing horizon. The capital and surplus position is equal to statutory assets less statutory liabilities for the portfolio.
4. For each scenario, the C-3 measure is the most negative of the series of present values S(t)*pv(t), where pv(t) is the accumulated discount factor for t years using 105 percent of the after-tax one-year Treasury rates for that scenario. In other words:

$$pv(t) = \prod_1^t 1/(1+i_t)$$

5. Rank the scenario-specific C-3 measures in descending order, with scenario number 1's measure being the positive capital amount needed to equal the very worst present value measure.
6. Taking the weighted average of a subset of the scenario specific C-3 scores derives the final C-3 factor.
 - (a) For the 50 scenario set, the C-3 scores are multiplied by the following series of weights:

----- Weighting Table -----

	17	16	15	14	13	12	11	10	9	8	7	6	5
Rank:													
Weight:	0.02	0.04	0.06	0.08	0.10	0.12	0.16	0.12	0.10	0.08	0.06	0.04	0.02

The sum of these products is the C-3 charge for the product.

- (b) For the 12 scenario set, the charge is calculated as the average of the C-3 scores ranked 2 and 3, but cannot be less than half the worst scenario score.

7. If multiple asset/liability portfolios are tested and aggregated, an aggregate C-3 charge can be derived by first summing the S(t)'s from all the portfolios (by scenario) and then following steps 2. through 6. above. An alternative method is to calculate the C-3 score by scenario for each product, sum them by scenario, then order them by rank and apply the above weights.

Single Scenario C-3 Measurement Considerations

1. GENERAL METHOD - this approach incorporates interim values, consistent with the approach used for bond, mortgage and mortality RBC factor quantification. The approach establishes the risk measure in terms of an absolute level of risk (e.g., solvency) rather than volatility around an expected level of risk. It also recognizes reserve conservatism, to the degree that such conservatism hasn't been used elsewhere.
2. INITIAL ASSETS = RESERVES - consistent with Appointed Actuary practice, the cash flow models are run with initial assets equal to reserves; that is, no surplus assets are used.
3. AVR - existing AVR-related assets should not be included in the initial assets used in the C-3 modeling. These assets are available for future credit loss deviations over and above expected credit losses. In cash flow modeling, expected credit losses are typically modeled without deviations. These deviations are covered by C-1 risk capital. Similarly, future AVR contributions should not be modeled.
4. IMR - IMR assets should be used for C-3 modeling. (Also see #9 – Disinvestment Strategy)
5. INTERIM MEASURE - retained statutory surplus (i.e., statutory assets less statutory liabilities) is used as the year-to-year interim measure.
6. TESTING HORIZONS - surplus adequacy should be tested over a period that extends to a point at which contributions to surplus on a closed block are immaterial in relationship to the analysis. If some products are being cash flow tested for Asset Adequacy Analysis over a longer period than the 30 years generated by the interest rate scenario generator, the scenario rates should be held constant at the year 30 level for all future years. A consistent testing horizon is important for all lines if the C-3 results from different lines of business are aggregated.
7. TAX TREATMENT - the tax treatment should be consistent with that used in Asset Adequacy Analysis. Appropriate disclosure of tax assumptions may be required.
8. REINVESTMENT STRATEGY - the reinvestment strategy should be that used in Asset Adequacy Analysis modeling.
9. DISINVESTMENT STRATEGY – In general, negative cash flows should be handled just as they are in the Asset Adequacy Analysis. The one caveat is that, since the RBC scenarios are more severe, models that depend on borrowing need to be reviewed to be confident that loans in the

necessary volume are likely to be available under these circumstances at a rate consistent with the model's assumptions. If not, adjustments need to be made.

If negative cash flows are handled by selling assets, then appropriate modeling of contributions and withdrawals to the IMR need to be reflected in the modeling.

10. **STATUTORY PROFITS RETAINED** - the measure is based on a profits retained model, anticipating that statutory net income earned one period is retained to support capital requirements in future periods. In other words, no stockholder dividends are withdrawn, but policyholder dividends, excess interest, declared rates, etc. are modeled realistically and assumed, paid or credited.
11. **LIABILITY and ASSET ASSUMPTIONS** - the liability and asset assumptions should be those used in Asset Adequacy Analysis modeling. Disclosure of these assumptions may be required.
12. **SENSITIVITY TESTING** – Key assumptions shall be stress tested (e.g. lapses increased by 50 percent) to evaluate sensitivity of the resulting C-3 requirement to the various assumptions made by the actuary. Disclosure of these results may be required.

Appendix 1b - Frequently Asked Questions for Cash Flow Scenario Testing

1. Where can the scenario generator be found? What is needed to run it?

The scenario generator is a Microsoft Excel spreadsheet. By entering the Treasury yield curve at the date for which the testing is done, it will generate the sets of 50 or 12 scenarios. It requires Windows 95 or higher. This spreadsheet and the instructions are available on the NAIC web site at (http://www.naic.org/finance/interest_rate_risk_project_c3.htm). It is also available on diskette from the American Academy of Actuaries.

2. The results of the scenario testing may be sensitive information in some instances. How can it be kept confidential?

As provided for in Section 8 of the Risk-Based Capital (RBC) For Insurers Model Act, all information in support of and provided in the RBC Reports (to the extent the information therein is not required to be set forth in a publicly available annual statement schedule), with respect to any domestic or foreign insurer, which is filed with the commissioner constitute information that might be damaging to the insurer if made available to its competitors, and therefore shall be kept confidential by the commissioner. This information shall not be made public or be subject to subpoena, other than by the commissioner and then only for the purpose of enforcement actions taken by the commissioner under the RBC For Insurers Model Act or any other provision of the insurance laws of the state.

3. The definition of the annuities category talks about “debt incurred for funding an investment account...”. Could you give a specific description of what is intended?

One example is a situation where an insurer is borrowing under an advance agreement with a federal home loan bank, under which agreement collateral, on a current market value basis, is required to be maintained with the bank. This arrangement has many of the characteristics of a GIC, but is classified as debt.

4. The instructions specify that ~~the same~~ assumptions ~~are to be used as~~ consistent with those used for Asset Adequacy Analysis testing be used for RBC, but my company cash flow tests a combination of Universal Life and annuities for that analysis and using the same assumptions will produce incorrect results. What was intended in this situation?

Where this situation exists, assumptions should be used for the Risk-Based Capital work which are consistent with those used for the Asset Adequacy Cash Flow Testing. In other words, the assumptions used should be appropriate to the annuity component being evaluated for RBC and consistent with the overall assumption set used for Asset Adequacy Analysis.