



**A M E R I C A N A C A D E M Y *of* A C T U A R I E S**

---

**Clarification of C-3 (Interest Rate Risk) RBC Instructions**

**Presented by the American Academy of Actuaries' Life Capital Adequacy  
Subcommittee to the National Association of Insurance Commissioners' Life Risk-  
Based Capital Working Group**

**Reno, NV – March 2002**

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 Capital Adequacy Subcommittee**

**Alastair G. Longley-Cook, F.S.A., M.A.A.A., Chair**  
**Robert A. Brown, F.S.A., M.A.A.A., Vice-Chair**

Gerald A. Anderson, F.S.A., M.A.A.A.	Stephen M. Batza, F.S.A., M.A.A.A.
Jeffrey M. Brown, F.S.A., M.A.A.A.	Martin R. 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.
David E. Neve, F.S.A., M.A.A.A.	Keith D. Osinski, F.S.A., M.A.A.A.
Jan L. Pollnow, F.S.A., M.A.A.A.	Craig R. Raymond, F.S.A., M.A.A.A.
James F. Reiskytl, F.S.A., M.A.A.A.	Michael S. Smith, F.S.A., M.A.A.A.
James A. Tolliver, F.S.A., M.A.A.A.	George M. Wahle, F.S.A., M.A.A.A.
Bill Wilton, F.S.A., M.A.A.A.	Michael L. Zurcher, F.S.A., M.A.A.A.

The subcommittee members would also like to recognize Mark C. Rowley for his work on this report.

It has been determined that some companies have been confused by the C-3 RBC instructions. The confusion comes from not being able to distinguish between what is meant by cash flow testing for reserve adequacy (which is part of Section 8 opinions) and cash flow scenario testing (which is required for C-3 for companies who are not exempt).

To clear up the confusion we suggest the following wording changes (see Attachment 1 – pages 40-43, 58-62 of the original 2001 Instructions and Attachment 2 – LR023) for the 2002 RBC instructions. We are proposing several changes that we hope will clarify the C-3 RBC instructions. The most significant comments include:

- Change “cash flow scenario testing” to “cash flow testing for C-3 RBC.”
- Use consistent reference to cash flow testing for asset or reserve adequacy. We suggest changing “cash flow testing for reserve adequacy” to “cash flow testing for asset adequacy.”

# **2001 NAIC Life Risk-Based Capital Report**

**Including**

**Overview and Instructions for Companies**



**as of December 31, 2001**

**Confidential  
when Completed**

***NAIC***

**National Association  
of Insurance Commissioners**

© Copyright NAIC 1993, 2001 by National Association of Insurance Commissioners  
Revised edition.  
All rights reserved.

ISBN 0-89382-975-7

National Association of Insurance Commissioners  
Publications Department  
(816) 783-8300  
<http://www.naic.org>

Printed in the United States of America

Executive Headquarters  
2301 McGee Street, Suite 800  
Kansas City, MO 64108-2604  
(816) 842-3600

Securities Valuation Office  
1411 Broadway, 9th Floor  
New York, NY 10018-3402  
(212) 398-9000

Federal and International  
Relations  
Hall of States Bldg.  
444 North Capitol NW, Suite 701  
Washington, DC 20001-1512  
(202) 624-7790

## **PREMIUM STABILIZATION RESERVES**

LR022

### *Basis of Factors*

Premium stabilization reserves are funds held by the company in order to stabilize the premium a group policyholder must pay from year to year. Usually experience rating refunds are accumulated in such a reserve so that they can be drawn upon in the event of poor future experience. This reduces the insurers risk.

For group life and health insurance, 50 percent of premium stabilization reserves held in the Annual Statement as a liability (not as appropriated surplus) are permitted as an offset up to the amount of risk-based capital. The 50 percent factor was chosen to approximate the portion of premium stabilization reserves that would be an appropriate offset if the formula were applied on a contract by contract basis, and the reserve offset was limited to the amount of risk-based capital required for each contract. Life and health coverages are aggregated due to many companies combining these coverages.

### *Specific Instructions for Application of the Formula*

There is some variance for reporting liabilities that are appropriately considered premium stabilization reserves. These possible Annual Statement sources are noted.

The sum of these various types of premium stabilization reserves equals the preliminary premium stabilization reserve credit. The final premium stabilization reserve credit is limited to the risk-based capital previously calculated. Since the limitation is applied on an aggregate basis, there is no need to differentiate the premium stabilization reserve between life and health.

## **INTEREST RATE RISK**

LR023

### *Basis of Factors*

The interest rate risk is the risk of losses due to changes in interest rate levels. The factors chosen represent the surplus necessary to provide for a lack of synchronization of asset and liability cash flows.

The impact of interest rate changes will be greatest on those products where the guarantees are most in favor of the policyholder and where the policyholder is most likely to be responsive to changes in interest rates. Therefore, risk categories vary by withdrawal provision. Factors for each risk category were developed based on the assumption of well matched asset and liability durations. A loading of 50 percent was then added on to represent the extra risk of less well matched portfolios. Companies must submit an unqualified Section 8 opinion under the revised Standard Valuation Law to be eligible for a credit of one-third of the RBC otherwise needed.

Consideration is needed for products with credited rates tied to an index as the risk of synchronization of asset and liability cash flows is tied not only to changes in interest rates but also to changes in the underlying index. In particular, equity-indexed products have recently grown in popularity with many new product variations evolving. The same C-3 factors are to be applied for equity-indexed products as for their non-indexed counterparts, i.e., based on guaranteed values ignoring those related to the index.

In addition, ~~any company required to submit a Section 8 opinion may have~~ some companies may be required to calculate part of the RBC on certain annuities and single premium life insurance under a method ~~based using on~~ cash flow ~~scenario~~-testing techniques. Refer to Figure (9) for determination of exemption from this cash flow ~~scenario~~-testing requirement.

Reserves on Certain Annuities and Single Premium Life Insurance that were Cash Flow Tested for ~~ReserveAsset~~ Adequacy – Factor-Based RBC

~~See Appendix 1 of the instructions for more details.~~

The risk categories are:

(a) Low Risk Category

The basic risk-based capital developed for annuities and life insurance in the low risk category was based on an assumed asset/liability duration mismatch of 0.125 (i.e., a well matched portfolio). This durational gap was combined with a possible 4 percent one-year swing in interest rates (the maximum historical interest rate swing 95 percent of the time) to produce a pre-tax factor of 0.0077. In addition to the 50 percent loading discussed above, the risk-based capital pre-tax factor is 0.0115.

(b) Medium and High Risk Category

The factors for the medium and high risk categories were determined by measuring the value of the additional risk from the more discretionary withdrawal provisions based on assumptions of policyholder behavior and 1000 random interest rate scenarios. Supplementary contracts not involving life contingencies (SCNI) and dividend accumulations are included in the medium risk category due to the historical tendency of these policyholders to be relatively insensitive to interest rate changes.

Additional Component for Callable Assets

Identify the amount of callable assets (including IOs and similar investments) supporting reserves classified in this section. The C-3 requirement is 50 percent of the excess, if any, of book/adjusted carrying value above current call price. The calculation is done on an asset by asset basis. NOTE: If a company is required to calculate part of the RBC based on cash flow scenario testing, the callable assets adjustment for any such assets used in that testing is reversed in a later step of the calculation.

Reserves that were not Cash Flow Tested for ~~ReserveAsset~~ Adequacy – Factor-Based RBC

The risk categories are:

(a) Low Risk Category

The basic risk-based capital developed for annuities and life insurance in the low risk category was based on an assumed asset/liability duration mismatch of 0.125 (i.e., a well matched portfolio). This durational gap was combined with a possible 4 percent one-year swing in interest rates (the maximum historical interest rate swing 95 percent of the time) to produce a pre-tax factor of 0.0077. In addition to the 50 percent loading discussed above, the risk-based capital pre-tax factor is 0.0115.

(b) Medium and High Risk Category

The factors for the medium and high risk categories were determined by measuring the value of the additional risk from the more discretionary withdrawal provisions based on assumptions of policyholder behavior and 1000 random interest rate scenarios. Supplementary contracts not involving life contingencies (SCNI) and dividend accumulations are included in the medium risk category due to the historical tendency of these policyholders to be relatively insensitive to interest rate changes.

Additional Component for Callable Assets

Identify the amount of callable assets (including IOs and similar investments) not reported above. This includes callable assets supporting other reserves and capital and surplus. The C-3 requirement is 50 percent of the excess, if any, of book/adjusted carrying value above current call price. The calculation is done on an asset by asset basis.

Cash Flow ~~Scenario~~-Testing for C-3 RBC

Based on the results of the C-3 RBC Cash Flow ~~Scenario~~-Testing Exemption Worksheet (Figure 9), a company may be required to perform RBC cash flow ~~scenario~~-testing to determine their C-3 RBC requirement.

Because of the widespread use of increasingly well disciplined scenario testing for Section 8 Actuarial Opinion Asset Adequacy Analysis involving cash flow testing (CFT), it was determined that a practical method of measuring the degree of asset/liability mismatch existed. It involves further cash flow ~~scenario~~-testing. See "Appendix 1 ~~C-3 RBC for Certain Business Subject to Asset Adequacy~~ "Cash Flow Testing" ~~for C-3 RBC~~" for details.



### *Specific Instructions for Application of the Formula*

#### Lines (2) through (16)

These lines deal with products for which reserves were cash flow tested for ~~reserve~~asset adequacy. The fixed portion of equity-based variable products should be included in Lines (18) through (31).

#### Line (17)

Should equal the sum of Lines (6) + (11) + (14) + (15). Line (16) is not included in the Line (17) total. Instead, it is included in the Line (32) total.

#### Lines (18) through (31)

These lines cover:

- (a) The remaining company business that was not cash flow tested for ~~reserve~~asset adequacy (see Appendix 1 for details), and
- (b) Business in companies that did not cash flow test for ~~reserve~~asset adequacy.

The calculation for risk-based capital should not include unitized separate accounts without guarantees even though they may be included in Item 25 of the Notes to Financial Statements. Separate accounts with guarantees should be included, except for certain guaranteed separate accounts as defined below. Synthetic GICs net of certain credits should be included in this section. The provisions for these credits to C-3 requirements is provided in the Separate Accounts section of the risk-based capital instructions. Experience rated pension contracts defined below should be excluded from “annuity reserves with fair value adjustment” and “annuity reserves not withdrawable.” All amounts should be reported net of reinsurance, net of policy loans and adjusted for assumed and ceded modified coinsurance.

Experience rated group and individual pension business that meets all of the following four conditions is excluded from C–3 factor-based risk:

- (a) General account funded;
- (b) Reserve interest rate is carried at no greater than 4 percent and/or fund long-term interest guarantee (in excess of a year) does not exceed 4 percent;
- (c) Experience rating mechanism is immediate participation, retroactive credits, or other technique other than participating dividends; and
- (d) Either is not subject to discretionary withdrawal or is subject to fair value adjustment, but only if the contractually defined lump sum fair value adjustment reflects portfolio experience as well as current interest rates and is expected to pass both credit risk and rate risk to the policyholder at withdrawal. (A lump sum settlement based only on changes in prevailing rates does not meet this test. Book value cash out options meet this test as long as the present value of payments using U.S. Treasury spot rates is less than or equal to the lump sum fair value on the valuation date and the policyholder does not have an option to change the payment period once payments begin).

For companies not exempt from cash flow ~~scenario~~ testing for C-3 RBC, such testing is to include those experience rated products exempted from the formula factors, but for which cash flow testing is done as a part of the asset adequacy testing.

Separate account business with guarantees that satisfy both conditions (b) and (d) above is excluded from C–3 factor-based risk.

#### Line (33)

Enter in Column (3) the interest rate risk results of ~~scenario~~ cash flow testing per the Appendix 1a methodology. Line (33) should only be completed if the answer to Line (13) or Line (22) of the ~~C-3~~ Cash Flow ~~Scenario~~ Testing for C-3 RBC Exemption Worksheet (Figure 9) is “Yes”.

#### Line (34)

If Line (33) is equal to zero, then Line (34) should equal Line (32). Otherwise, Line (34) should equal Line (32) plus Line (33) less Line (16) less Line (17) subject to a maximum of 2 times Line (32) and a minimum of 0.5 times Line (32).

Unitized separate account business with guarantees provided via guaranteed living benefits is handled as follows:

- (a) The factor is applied to the sum of reserves for the base separate account plan plus any additional reserves for guaranteed living benefits (“base amounts”). The calculation is done net of reinsurance. For purposes of the calculation, the gross reserve for the base separate account plan is reduced proportionally to the extent the guaranteed living benefits are reinsured on a proportional basis.
- (b) The policy is assigned to the medium risk category if the following two conditions are both met:
  - 1. The actuary submits an unqualified reserve adequacy opinion for the company, and
  - 2. On a seriatim basis, the fund balance for a particular policy is no less than the “effective floor,” where the “effective floor” is determined as the floor benefit accrued as of the annual statement date. For guaranteed minimum income benefits, the floor is further adjusted by multiplying by a factor of 80 percent (to account for margins to the insurer from policyholder requirement to annuitize).

Include the “base amounts” in Line (23) Column (2) of LR023 Interest Rate Risk if the two conditions above are met.

- (c) If the above two conditions are not met, the policy is assigned to the high-risk category. Include the “base amounts” in Line (28) Column (2) of LR023 Interest Rate Risk.

Structured settlements are reported in the medium risk category and consist of either immediate or deferred payout annuities that are purchased from damages received on account of personal injuries or sickness. The payments under these contracts should be excludable from the annuitants’ gross income for tax purposes under Sec 104(a)(2) of the Internal Revenue Code.

The total of all Annual Statement reserves representing exposure to C–3 risk on Line (34) should equal the following:

- Exhibit 8, Column 2, Line 0199999
- Page 2, Column 3, Line 5
- + Exhibit 8, Column 2, Line 0299999
- + Exhibit 8, Column 2, Line 0399999
- + Exhibit 10, Column 1, Line 19
- + Separate Accounts Page 3, Column 1, Line 1 through Line 5 (funds in unitized separate accounts with no underlying guaranteed minimum return and no unreinsured guaranteed living benefits should be deducted from this amount. In addition, deduct any non-cash flow tested separate accounts with guarantees less than 4 percent, and non-cash-flow-tested experience rated pension reserves/liabilities).
- Non policyholder reserves reported on Exhibit 10
- + Exhibit 8, Column 2, Line 0799996
- + Schedule S, Part 1, Section 1, Column 11
- Schedule S, Part 3, Section 1, Column 13

(Figure 9)

~~C-3 CASH FLOW SCENARIO TESTING~~ EXEMPTION WORKSHEET: CASH FLOW TESTING FOR C-3 RBC

<u>C-3 Significance Test</u>	<u>Source</u>	<u>(1)</u> <u>Amount</u>
(1) C-0 Asset Risk - Affiliated Amounts	LR027 Calculation of Total Authorized Control Level Capital Column (1) Line (8.2)	_____
(2) C-1cs Asset Risk - Unaffiliated Common Stock	LR027 Calculation of Total Authorized Control Level Capital Column (1) Line (16)	_____
(3) C-1o Asset Risk - All Other	LR027 Calculation of Total Authorized Control Level Capital Column (1) Line (38)	_____
(4) C-2 Insurance Risk	LR027 Calculation of Total Authorized Control Level Risk-Based Capital Column (1) Line (45)	_____
(5) C-3a Factor-Based Interest Rate Risk Single Premium and Annuity Reserves	LR023 Interest Rate Risk Column (3) Lines (16) + (17)	_____
(6) C-3a Factor-Based Interest Rate Risk All Other Reserves	LR023 Interest Rate Risk Column (3) Lines (22) + (27) + (29) + (30) + (31)	_____
(7) C-3b Health Credit Risk	LR027 Calculation of Total Authorized Control Level Risk-Based Capital Column (1) Line (51)	_____
(8) C-4a Business Risk Premium and Liability Components	LR027 Calculation of Total Authorized Control Level Risk-Based Capital Column (1) Line (56)	_____
(9) C-4b Business Risk Health Administrative Risk	LR027 Calculation of Total Authorized Control Level Risk-Based Capital Column (1) Line (59)	_____
(10) Total	Sum of Lines (1) through (9)	=====
(11) C-3a Factor-Based Interest Rate Risk	Line (5) + Line (6)	_____
(12) C-3a Percentage	Line (11) divided by Line (10)	=====
(13) Is Line (12) is greater than 40 percent? (Complete cash flow scenario testing on Page LR023 Interest Rate Risk Column (3) Line (33) if "Yes".)	"Yes" or "No" in Column (1)	=====
<u>C-3 Stress Test</u>		
(14) Total Adjusted Capital	LR029 Calculation of Total Adjusted Capital Column (2) Line (10)	_____
(15) C-3a Factor-Based Interest Rate Risk Single Premium and Annuity Reserves	LR023 Interest Rate Risk Column (3) Line (16) + (17)	_____
(16) 6.5 Times C-3a Factor-Based Interest Rate Risk Single Premium and Annuity Reserves	LR023 Interest Rate Risk Column (3) Line (17) x 6.5	_____
(17) C-3a Factor-Based Interest Rate Risk All Other Reserves	LR023 Interest Rate Risk Column (3) Lines (22) + (27) + (29) + (30) + (31)	_____
(18) Adjusted C-3a Factor-Based Interest Rate Risk	Line (15) + Line (16) + Line (17)	_____
(19) Assumed Correlation Between C-1cs and (C-1o + C-3a)	LR027 Calculation of Total Authorized Control Level  Risk-Based Capital Column (1) Line (60)	_____
		0.0000

(20) RBC After Covariance with Line (18) in C-3a Formula	Line (1)+Line (8)+Square Root of [(Line (3)+Line (18) ) <sup>2</sup> +2*Line (19)* (Line (3)+Line (18))*Line (2)+Line (2) <sup>2</sup> +Line(4) <sup>2</sup> +Line (7) <sup>2</sup> +Line (9) <sup>2</sup> ]	_____
(21) Total	Line (14) / Line (20)	=====
(22) Is Line (21) less than 100 percent and not equal to zero?	“Yes” or “No” in Column (1)	=====
(Complete cash flow scenario testing on Page LR023 Interest Rate Risk Column (3) Line (33) if “Yes”.)		

## ~~C-3 CASH FLOW SCENARIO TESTING~~

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

This appendix is applicable only for ~~calculating RBC when using cash flow scenario testing~~ companies that are not exempt from Cash Flow Testing for C-3 RBC (see Figure (9)).

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 95<sup>th</sup> percentile C-3 risk.

The revised C-3 component is to be calculated as the sum of ~~three~~four 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 C-3 RBC factors, not the results of ~~scenario testing~~ cash flow 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 C-3 RBC 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 book/adjusted carrying 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~~ for C-3 RBC 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 of the cash flow testing for C-3 RBC~~ 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 the cash flow testing for C-3 RBC~~ is done by a different actuary.
- The ~~scenario cash flow~~ testing used for this purpose will use 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 consistent with those used for cash flow testing ~~for asset adequacy purposes~~ (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 for asset adequacy purposes~~.) The other differences are the interest scenarios assumptions and how the results are used.

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

- The actuary must also assure that the cash flow testing methodology 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-1o requirement. To that degree, these margins should be removed from the reserve used for C-3 RBC cash flow testing.

## Appendix 1a – Cash Flow ~~Scenario~~ Testing for C-3 RBC 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 -----

Scenario Rank:	17	16	15	14	13	12	11	10	9	8	7	6	5
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 for C-3 RBC

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/1products/finance/lrbc3/index.htm>). It is also available on diskette from the American Academy of Actuaries.

2. The results ~~of the scenario testing~~ may ~~be~~ include 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 fair 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 assumptions consistent with those used for Asset Adequacy Analysis testing be used for C-3 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.

**INTEREST RATE RISK**

#REF!

(1.1) Unqualified Section 8 Actuarial Opinion?	["Yes" or "No" in Column (1)]	(1)
(1.2) <b>C-3 RBC Cash Flow Testing on Annuities or Single Premium Life?</b>	["Yes" or "No" in Column (1)]	
(1.3) If Line (1.2) is "Yes", is the Appointed Actuary C-3 Assumption Statement Attached?	["Yes" or "No" in Column (1)]	

RESERVES ON CERTAIN ANNUITIES AND SINGLE PREMIUM LIFE INSURANCE THAT WERE CASH FLOW TESTED FOR **ASSET** ADEQUACY

	<u>Annual Statement Source</u>	(2) Statement Value	Factor	(3) RBC Requirement
<u>Low Risk Category that were Cash Flow Tested for Asset Adequacy</u>				
(2) Annuity Reserve with Market Value Adjustment (excluding unitized separate accounts)*	Notes to Financial Statements Item <b>25</b> Line <b>A1</b> , in part‡		X 0.0115 or 0.0077† =	
(3) Annuity Reserve not Withdrawable (excluding structured settlements)*	Notes to Financial Statements Item <b>25</b> Line <b>B</b> , in part‡		X 0.0115 or 0.0077† =	
(4) Guaranteed Investment Contract (GIC) Reserve within 1 Year of Maturity£	Notes to Financial Statements Item <b>25</b> Various Lines, in part‡		X 0.0115 or 0.0077† =	
(5.1) Single Premium Life Insurance Reserves Net of Reinsurance	Exhibit 8 Column 2 Line 0199999, in part			
(5.2) Less Single Premium Life Insurance Reserves Policy Loans	Page 2 Line 5, in part			
(5.3) Plus Modified Coinsurance Assumed Single Premium Life Reserves net of Modified Coinsurance Assumed Policy Loans	Schedule S Part 1 Section 1 Column 11, in part‡			
(5.4) Less Modified Coinsurance Ceded Single Premium Life Reserves net of Modified Coinsurance Ceded Policy Loans	Schedule S Part 3 Section 1 Column 13, in part‡			
(5.5) Single Premium Life Insurance Reserves	Line (5.1) - (5.2) + (5.3) - (5.4)		X 0.0115 or 0.0077† =	
(6) Total Low Risk	Lines (2) + (3) + (4) + (5.5)			
<u>Medium Risk Category that were Cash Flow Tested for Asset Adequacy</u>				
(7) Annuity Reserve at Book Value Less Surrender Charge of 5 Percent or More*	Notes to Financial Statements Item <b>25</b> Line <b>A2</b> , in part‡		X 0.0231 or 0.0154† =	
(8) Exhibit 10 Reserve not Included <b>Elsewhere</b> §	Exhibit 10 Line <b>14</b> amounts not included elsewhere in Interest Rate Risk (C-3)‡		X 0.0231 or 0.0154† =	
(9) Structured Settlements	Notes to Financial Statements Item <b>25</b> Line <b>B</b> , in part‡		X 0.0231 or 0.0154† =	
(10) Additional Actuarial Reserves for Annuities and Single Premium Life - Asset/Liability Analysis	Exhibit 8 Column 2 Line <b>0799996</b> , in part		X 0.0231 or 0.0154† =	
(11) Total Medium Risk	Sum of Lines (7) through (10)			

† The factors are decreased by one-third if the company submits an unqualified actuarial opinion under Section 8 of the revised Standard Valuation Law. The diskette automatically recalculates the factor, depending on the answer to Line (1.1).

‡ Net of reinsurance, less policy loans, plus modified coinsurance assumed reserves, less modified coinsurance ceded reserves.

§ Excluding any non-policyholder reserves (e.g., reserves that are not related to specific policies).

\* Excluding GICs within 1 year of maturity.

£ Includes GICs within 1 year of maturity subtracted elsewhere.

Denotes items that must be manually entered on the filing software.

#REF!

**INTEREST RATE RISK (Continued)**

	<u>Annual Statement Source</u>	(2) Statement Value	Factor	(3) RBC Requirement
<u>High Risk Category that were Cash Flow Tested for Asset Adequacy</u>				
(12) Annuity Reserve at Book Value Without Adjustment (minimal or no charge or adjustment)*	Notes to Financial Statements Item <b>25</b> Line <b>A5</b> , in part‡	[REDACTED]	X <b>0.0462</b> or <b>0.0308</b> † =	[REDACTED]
(13) Debt with GIC-like Characteristics (see Appendix 1 & 1b instructions)	Company records	[REDACTED]		[REDACTED]
(14) Total High Risk	Line (12) + (13)	[REDACTED]		[REDACTED]
<u>Synthetic GIC's</u>				
(15) Synthetic GIC's C-3 Requirement	Company records	[REDACTED]		[REDACTED]
<u>Callable Assets</u>				
(16) Callable Assets Assigned to Products Categorized Above	Company records	[REDACTED]		[REDACTED]
(17) Subtotal of Factor Based RBC For Products Categorized Above	Lines (6) + (11) + (14) + (15)	[REDACTED]		[REDACTED]

ALL OTHER RESERVES (exclude statement amounts included in Lines (2) to (17) above)

<u>Low Risk Category</u>				
(18) Annuity Reserve with Market Value Adjustment (excluding unitized separate accounts and eligible experience rated pension and separate accounts with guarantees)*	Notes to Financial Statements Item <b>25</b> Line <b>A1</b> , in part‡	[REDACTED]	X <b>0.0115</b> or <b>0.0077</b> † =	[REDACTED]
(19) Annuity Reserve not Withdrawable (excluding structured settlements and eligible experience rated pension and separate accounts with guarantees)*	Notes to Financial Statements Item <b>25</b> Line <b>B</b> , in part‡	[REDACTED]	X <b>0.0115</b> or <b>0.0077</b> † =	[REDACTED]
(20) Guaranteed Investment Contract (GIC) Reserve within 1 Year of Maturity£	Notes to Financial Statements Item <b>25</b> Various Lines, in part‡	[REDACTED]	X <b>0.0115</b> or <b>0.0077</b> † =	[REDACTED]
(21.1) Life Insurance Reserves Net of Reinsurance	Exhibit 8 Column 2 Line 0199999, in part	[REDACTED]		[REDACTED]
(21.2) Less Life Insurance Reserves Policy Loans	Page 2 Line 5, in part	[REDACTED]		[REDACTED]
(21.3) Plus Modified Coinsurance Assumed Reserves net of Modified Coinsurance Assumed Policy Loans	Schedule S Part 1 Section 1 Column 11, in part‡	[REDACTED]		[REDACTED]
(21.4) Less Modified Coinsurance Ceded Reserves net of Modified Coinsurance Ceded Policy Loans	Schedule S Part 3 Section 1 Column 13, in part‡	[REDACTED]		[REDACTED]
(21.5) Life Insurance Reserves	Line (21.1) - (21.2) + (21.3) - (21.4)	[REDACTED]	X <b>0.0115</b> or <b>0.0077</b> † =	[REDACTED]
(22) Total Low Risk	Lines (18) + (19) + (20) + (21.5)	[REDACTED]		[REDACTED]

† The factors are decreased by one-third if the company submits an unqualified actuarial opinion under Section 8 of the revised Standard Valuation Law. The diskette automatically recalculates the factor, depending on the answer to Line (1.1).

‡ Net of reinsurance, less policy loans, plus modified coinsurance assumed reserves, less modified coinsurance ceded reserves.

§ Excluding any non-policyholder reserves (e.g., reserves that are not related to specific policies).

\* Excluding GICs within 1 year of maturity.

£ Includes GICs within 1 year of maturity subtracted elsewhere.

[REDACTED] Denotes items that must be manually entered on the filing software.

#REF!

**INTEREST RATE RISK (Continued)**

#REF!

	<u>Annual Statement Source</u>	(2) Statement Value	Factor	(3) RBC Requirement
<u>Medium Risk Category</u>				
(23) Annuity Reserve at Book Value Less Surrender Charge of 5 Percent or More*	Notes to Financial Statements Item <b>25</b> Line <b>A2</b> , in part‡	[ ] X	<b>0.0231</b> or <b>0.0154</b> † =	[ ]
(24) Exhibit 10 Reserve not Included <b>Elsewhere</b> §	Exhibit 10 Line <b>14</b> amounts not included elsewhere in Interest Rate Risk (C-3)‡	[ ] X	<b>0.0231</b> or <b>0.0154</b> † =	[ ]
(25) Structured Settlements	Notes to Financial Statements Item <b>25</b> Line <b>B</b> , in part‡	[ ] X	<b>0.0231</b> or <b>0.0154</b> † =	[ ]
(26) Additional Actuarial Reserves - Asset/Liability Analysis	Exhibit 8 Column 2 Line <b>0799996</b> , in part	[ ] X	<b>0.0231</b> or <b>0.0154</b> † =	[ ]
(27) Total Medium Risk	Sum of Lines (23) through (26)			[ ]
<u>High Risk Category</u>				
(28) Annuity Reserve at Book Value Without Adjustment (minimal or no charge or adjustment)*	Notes to Financial Statements Item <b>25</b> Line <b>A5</b> , in part‡	[ ] X	<b>0.0462</b> or <b>0.0308</b> † =	[ ]
(29) Total High Risk	Line (28)			[ ]
<u>Synthetic GIC's</u>				
(30) Synthetic GIC's C-3 Requirement	Company records		RBC x 1.000 (less "haircut")	[ ]
<u>Callable Assets</u>				
(31) Callable Assets Not Allocated to Line (16). Include Callable Assets Allocated to Surplus	Company records			[ ]
(32) Interest Rate Risk Based Completely on Factors	Lines (16) + (17) + (22) + (27) + (29) + (30) + (31)			[ ]
(33) <b>C-3 RBC Cash Flow Testing Interest Rate Risk (If C-3 RBC Cash Flow Testing Exemption Worksheet Line (13) = "Yes" or Line (22) = "Yes" then calculate the interest rate risk for annuities and single premium life products that were cash flow tested for C-3 RBC)</b>	Company records		[ ]	[ ]
(34) Total Interest Rate Risk	If Line (33) = 0, then Line (34) = Line (32). Otherwise, Line (34) = Line (32) + (33) - (16) - (17), subject to a maximum 2 times Line (32) and a minimum of 0.5 times Line (32)			[ ]

† The factors are decreased by one-third if the company submits an unqualified actuarial opinion under Section 8 of the revised Standard Valuation Law. The diskette automatically recalculates the factor, depending on the answer to Line (1.1).

‡ Net of reinsurance, less policy loans, plus modified coinsurance assumed reserves, less modified coinsurance ceded reserves.

§ Excluding any non-policyholder reserves (e.g., reserves that are not related to specific policies).

\* Excluding GICs within 1 year of maturity.

£ Includes GICs within 1 year of maturity subtracted elsewhere.

[ ] Denotes items that must be manually entered on the filing software.

#REF!