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Mr. Philip Barlow
Chair, Life Risk Based Capital Working Group
Deputy Commissioner
Dept of Insurance Securities & Banking
810 First Street NE Suite 701
Washington, DC 20002

Re Comments on NAIC Instructions for proposed C-3 Phase III

Dear Philip:

The American Council of Life Insurers (ACLI) is pleased to provide the following comments regarding the NAIC instructions for proposed C-3 Phase III. The ACLI represents 340 member companies operating in the United States, of which 332 are legal reserve life insurance companies, and eight are fraternal benefit societies. These 340 member companies account for 93 percent of total assets, 93 percent of the life insurance premiums, and 94 percent of annuity considerations in the United States.

Our detailed comments, which are provided in Attachment 1, are intended to serve as a preliminary technical review of the proposed instructions. Our review of Section 5.E. of Appendix 3 is not yet complete, and we plan to submit more detailed comments within the next 30 days. We will also separately provide comments on Appendix 2, which is related to the C-3 Phase II methodology for variable annuities. It is also possible that our ongoing review of this proposal or the ongoing changes at LHATF to VM20 will surface additional issues that merit comment.

We would like to highlight several items:

- We do not believe that the calculations provide an appropriate offset for C-1 risk charges for equities other than public common stocks (i.e. the C-1cs offset) that are modeled stochastically. We believe that this is an oversight and are proposing a correction.
- In our October 2009 letter, we advocated establishing a “safe harbor” minimum number of stochastic scenarios in order to avoid the circularity of needing to run additional scenarios to demonstrate that one has run a sufficient number of scenarios. We continue to believe that such a “safe harbor” is essential and are proposing language to implement this.
- We are proposing re-writes of selected portions of Appendix 3. We have included these proposals as Attachments 2-4.
    - Attachment 2: We have re-written Section 2.I.7 to correct for the C-1 offset issue.

- Attachment 3: We are proposing a new Section 2.O (and moving the existing 2.O to 2.P) in order to clarify the handling of prior period calculations.
- Attachment 4: We are proposing streamlining the description of the Stochastic Exclusion Test scenarios. This section seems to have much more detail than needed and is confusing as a result.

- We are recommending removal of the description of and references to a "principle-based" approach. The proposed calculation is a hybrid of company modeling and factors, and we are not persuaded that the "principle-based" term is necessary within Appendix 3.
- We are recommending that references to proposed reserve standards be eliminated.
- We recommend moving all relevant materials to the NAIC website and eliminating references to the Academy website. In recommending the placement of the scenario generator and similar items on the NAIC website, we are assuming that they will continue to remain freely available to companies.

During the course of our review, we noted one change (the definition of Business Segment) between the document that was included in the December 2009 Life RBC meeting materials and the document that was formally exposed. We request further information about changes that were made and may provide additional comments on the basis of these changes.

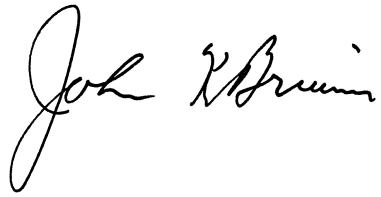
ACLI supports application of the proposed Phase III methodology to a limited product scope comprising fixed interest universal life policies with secondary guarantees, after the following eight tasks are completed:

1. The attached comments need to be addressed and reflected in the instructions, as appropriate.
2. If approved by regulators, changes to the RBC instructions will be needed to reflect the proposed product scope limitation and/or materiality test. ACLI will be pleased to assist in this work.
3. The scenario generator needs to be determined. It is not possible for our member companies to determine the impact of the Phase III proposal on their regulatory capital requirements without a decision on this item.
4. The proposed interest rate calibration criteria need to be evaluated under a variety of different economic environments. Although it is possible that this evaluation has been performed using the Academy's proposed generator, the work cannot be completed until a there is a decision on the generator.
5. Scenario reduction techniques need to be permitted. Such techniques approximately replicate the characteristics of a large number of scenarios with a smaller number of scenarios. This is a critical item for industry from a workload, cost, and execution standpoint.
6. Additional guidance on margins needs to be provided, including the development of measures of appropriate aggregate margins. We understand that the Academy is doing work on margins for principle-based reserves, and it is possible that such work would be useful for this project.
7. A legal review of the proposal needs to occur. Industry legal experts will be performing such a review, and we request a review from NAIC legal staff as well.
8. A "feedback loop" needs to be established whereby a defined process exists for regulators to examine Phase III results and for industry to provide input. ACLI's support for the limited scope of C-3 Phase III is based in part for the need for a "proof of concept": we are not persuaded that the methodology produces meaningful and appropriate results. Accordingly, we believe that a

process and timetable for regulators to evaluate the methodology and results—with input from industry—should be established before the proposal is adopted.

Finally, on a longer-term basis, we think that it may be worth re-thinking how taxes are handled within the RBC blank. For example, the proposed methodology requires after-tax calculations, but the results are converted to a pre-tax basis for inclusion in LR025, only to be converted back to an after-tax basis in LR028 for calculation and reporting purposes in LR029. Perhaps it might be possible to construct a more straightforward approach.

We thank you for your consideration of our comments and look forward to continuing to work with you on this project.



cc Dan Swanson, NAIC

Attachment 1

ACLI Technical Review of Proposed C-3 Phase III Instructions

#	Document	Page(s)	Section(s)	Question, Comment, or Recommendation
1	LR025	9-10		The instructions include detailed language regarding the amounts included on lines (35) and (37) for life insurance, but not for variable annuities. We recommend a consistent approach.
2	App. 3	1	Intro	The introduction describes the methodology as a "principle-based approach" to the determination of C-3, but this description has several problems. First, C-3 is a single risk, but then a principle-based approach is defined as capturing multiple "identifiable, quantifiable, and material risks." Second, under the proposed methodology, the risk charge is a function of statutory reserves, which are typically calculated on a prescribed, formulaic, net premium basis. Third, there is a reference to PBA minimum statutory reserves, which is not a currently existing standard. Finally, it is unclear why this description applies to life insurance and not to fixed (C3P1) or variable (C3P2) annuities. For all of these reasons, we suggest that the description of a "principle-based approach" be eliminated. We suggest that the description of Appendix 3 be changed to: "the calculation of the C-3a and C-3c risk charges for certain life insurance products."
3	App. 3	1	Intro	The "C-3 RBC amount" is based not only on a "prospective valuation method that appropriately captures all material C-3 risks," but also on statutory reserves. This should be clarified.
4	App. 3	1; 8	Intro; 2.B.1.a	References to reserve standards should be eliminated.
5	App. 3	2	Intro	The wording "…inconsistent with these principles" should be changed to "…inconsistent with these requirements."
6	App. 3	2	Intro	It should be clarified that the Accumulated Deficiency can be negative. We suggest adding: "The Accumulated Deficiency can be positive or negative" to the end of item (2).
7	App. 3	2; 28	Intro; 3.A	"Accumulated Deficiency" is a defined term and should be capitalized throughout the document.
8	App. 3	4; 5; 6; 7; 8; 31; 44	1.C; 1.X; 1.EE; 1.GG; 1.HH; 1.NN; 2.A.3; 2.B.3.c; footnote 9; 7.C	The references should be to "this appendix," not "this report."
9	App. 3	4	1.F	The definition of "Business Segment" appears to have been modified in converting the language to an Appendix:

				• Prior definition: "A group of assets associated with a group of policies that are modeled together to project future Accumulated Deficiencies. This grouping will generally follow the company's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes." • Current definition: "A group of assets associated with a group of policies that are modeled together to project future Accumulated Deficiencies." It is unclear why this definition was changed. We believe that the prior, more expansive definition is necessary to appropriately limit optionality for our proposed limited optional application of C3P3.
10	App. 3	5	1.U	The net revenue sharing reference should be to section 4.B, 3.B.
11	App. 3	5	1.Y	The definition refers to "this Act." It should be changed to "this appendix."
12	App. 3	6	1.GG	The definition of Reported Amount should indicate what is being measured. It also should not refer to a minimum. We suggest: "The measured amount of C3a and C3c risk as of the Valuation Date…"
13	App. 3	6	1.GG; 1.NN	The references to "a principle-based approach" should be eliminated: the proposal allows for C-3 requirements to be determined by other methods under certain circumstances.
14	App. 3	6	1.GG	"Valuation Date" should be consistently capitalized.
15	App. 3	6-7	1.JJ; 2.A	The formatting of references to other sections is inconsistent. We prefer the "2.I.6" format.
16	App. 3	7	2.A.1	The language regarding the preference of stochastic methods is not needed. We suggest removing this sentence and eliminating the "However" from the start of the next sentence.
17	App. 3	7	2.A.3	It is noted that calculations may be done prior to the Valuation Date "as long as an appropriate method is used to adjust the amounts so determined to the Valuation Date." In context, this seems to be a reference to the Stochastic Amount. We suggest: "The actuary may elect to perform the Stochastic Amount calculations on a date other than the Valuation date, but in no event earlier than six months before the Valuation Date, as long as an appropriate method is used to adjust the Stochastic Amount so determined to the Valuation Date."
18	App. 3	8	2.B.1.c	This requirement seems more relevant to future RBC calculations than to current calculations, and it is furthermore unclear what sort of assumptions one should use if such a "documented process" does not exist. We recommend eliminating this item.
19	App. 3	8	2.C.1	This section should clarify that it is referring to both the Stochastic Amount and the Stochastic Exclusion Test, i.e. "The Stochastic Amount and Stochastic Exclusion Test calculations require…"
20	App. 3	9	2.C.3	The reference to 2.E.1 should be 2.G.1.
21	App. 3	10	2.C.3.a.1	"Demonstrating" that grouping of assets "does not result in a materially lower Scenario

				Amount" than would have been obtained using a seriatim approach would seem to require running the model using both a grouped and seriatim approach. Moreover, this difference would vary by economic scenario. We suggest borrowing the language for liabilities from section 2.I.5: "Grouping shall not be done in a manner that intentionally understates the resulting Reported Amount."
22	App. 3	10	2.C.3.b.3	This language also applies to the Stochastic Exclusion Test. We suggest: "The projected S&P 500 return for each Scenario shall be modeled stochastically as described in Section 2.D or as required for the Stochastic Exclusion Test.
23	App. 3	11	2.C.8	"…Actuarial Standards of Practices" should be "…Actuarial Standards of Practice"
24	App. 3	11-12; 49	2.D.2; 2.D.3; 2.E.1; 6.F	References to the Academy website should be removed and all relevant scenario generators, etc. should be on the NAIC website. If the generator that is ultimately adopted is the generator recommended by the Academy, it would probably still be appropriate to refer to it as the "Academy generator." In recommending the placement of the scenario generator and similar items on the NAIC website, we are assuming that they will continue to remain freely available to companies.
25	App. 3	12	2.D.4	Consistent with our October 2009 letter, we advocate establishing a "safe harbor" minimum number of stochastic scenarios. We suggest 200 scenarios. Without such a safe harbor or other clearly defined means to assess materiality, companies will need to run additional scenarios in order to demonstrate that they have run enough scenarios. We suggest replacing this section with the following language: "The number of stochastic scenarios shall be considered to be sufficient if Scenario Amounts for at least 200 unreduced scenarios are determined."
26	App. 3	12	2.E.1	"Spread" is not defined.
27	App. 3	12	2.E.1.b.2	Should the description of the Right Tail refer to "high spread" instead of "high interest rates"? This appears to be incorrect.
28	App. 3	13-14	2.F.2	This section is more in the nature of education and is not needed in a regulation. We recommend that the entire section be removed.
29	App. 3	14	2.F.3	The second and third paragraphs are more in the nature of education and are not needed in a regulation. We recommend removal of these paragraphs.
30	App. 3	14-15	2.F.4	The paragraphs after the first paragraph are more in the nature of education and are not needed in a regulation. We suggest removal of these paragraphs.
31	App. 3	15	2.G.1	In the description of the Starting Asset Amount, starting assets are based on the "statutory value of the reserve and other liabilities." What are the "other liabilities"?
32	App. 3	15	Footnotes 6, 7, 8	The formatting is inconsistent.
33	App. 3	16	2.G.4	The language says that IMR "may be included," which implies that it may also be excluded. We

				suggest leaving this to a practice note.
34	App. 3	16	2.G.5	The language could be clearer. We suggest the following: Valuation of Projected Assets. ~~The~~ Projected values of ~~projected~~ Starting Assets shall be determined in a manner consistent with their values at the start of the projection, i.e. their values should be determined in the same way that they are determined for the statutory annual statement. For reinvestment assets, the values shall be determined in a manner consistent with the values of assets at the start of the projection that have similar investment characteristics.
35	App. 3	17	2.G.9	The requirements for a Clearly Defined Hedging Strategy should be expanded to encompass hedging of interest rate guarantees.
36	App. 3	18	2.H.1	It is not clear what a "risk-based calculation" is (2nd paragraph after b.). Is this intended to be a reference to the Scenario Amount?
37	App. 3	20	2.I.2	"Material Tail Risk" is a defined term and should be capitalized.
38	App. 3	20	2.I.5	The language refers only to projections performed "for each policy in force on the date of valuation," but elsewhere there is language allowing for projections prior to the Valuation Date. Grouping should be permitted in these circumstances as well. We suggest: "Projections may be performed for each policy or by grouping policies…"
39	App. 3	21	2.I.6.a.3	The reference in this section should be to step 6.a.2 above, not 2.a.(2)
40	App. 3	22-24	2.I.7	Why is the Stochastic Amount reduced for RBC risk charges related to recoverability of expense allowances but not for other RBC charges (e.g. C-2 or C-4)? We would appreciate a better understanding of this technical point.
41	App. 3	22-24	2.I.7	This section adjusts for the double-counting of C-1 risk in C-3 modeling, but only for public common stock. Similar adjustments should be made for all equities, such as real estate, if their volatility is modeled in the C-3 calculation. See Attachment 2 for our proposed correction. Please note that our proposed correction currently omits the source references for the adjustments. We do not oppose including these references but they would need to be significantly expanded.
42	App. 3	22	2.I.7	The considerations regarding adjustments of prior period results would seemingly apply not only to the Stochastic Amount, but also to the Alternative Amount. We recommend adding a new section titled "Adjustments of Prior Period Results" that would include both the updating of various "amounts" and the circumstances under which model re-runs would be necessary. See Attachments 2 and 3 for our proposed re-formatting.
43	App. 3	23	2.I.7	The paragraph addressing the reduction in the Stochastic Amount for RBC related to expense allowances incorrectly refers to the factor-based C-1cs component (third sentence). See

				Attachment 2 for our proposed correction.
44	App. 3	24	2.I.7	Does "re-determined RBC value" refer to the TAR, the C-3a and C-3c risk charges, the CAL RBC the RBC ratio, or something else? Similarly, what does the 5 percent mean? (Parallel language on page 39 makes it seem like it should refer to the CAL RBC.) See Attachment 3 for our proposed clarification.
45	App. 3	24; 39	2.J.4; 6.C	It is unclear why there is an inconsistency between these two sections. Section 2.J.4 requires that the policies to which the Alternative Amount is applied to have been subject to asset adequacy testing. Section 6.C appears to require that policy reserves be adequate on a standalone basis. We would appreciate an understanding of what these requirements are intended to accomplish and why a difference exists. We may have additional comments once we receive this clarification.
46	App. 3	24	2.J.4	The reference to "generally accepted actuarial standards of practice" should be clarified to refer to Actuarial Standards of Practice as promulgated by the Actuarial Standards Board. We suggest: "The actuary should use professional judgment in choosing an appropriate testing method among those currently considered in applicable Actuarial Standards of Practice as promulgated by the Actuarial Standards Board."
47	App. 3	24-25	2.J.5	The note seems unnecessary. While we do not necessarily support the indefinite application of arbitrary floors, we believe that the entire C3P3 methodology and process will merit evaluation, not just the floor on the Alternative Amount.
48	App. 3	24; 25	2.J.5; 2.K.2	We would appreciate an explanation of why the Factor-based Amount does not have a floor of 0.75% if the company lacks an unqualified actuarial opinion, similar to the Alternative Amount. (This may be related to comment #45 above.) We may have additional comments once we receive this explanation.
49	App. 3	26	2.N.1	The language describing the Reported Amount as a "minimum amount" seems to be a reserve concept. We recommend that the entire sentence be deleted.
50	App. 3	26	2.N.2.b; 2.N.2.c	The terms "covariance effect" "covariance impact" are confusing because, in theory, the effects of risk diversification can increase or decrease. We suggest simply removing the lengthy description of considerations following the second sentence under point b.: if the risk is immaterial, the effect on RBC should be immaterial. Under point c., we suggest changing "component with the least covariance effect" to "component that maximizes Company Action Level RBC." In addition to revising the language, we suggest including an illustrative example.
51	App. 3	28	3.A	The reference to Section 2.G should more precisely be Section 2.G.9.
52	App. 3	29	3.B	The reference to variable annuities (2nd paragraph) should be eliminated.

53	App. 3	34; 35	5.A.2; 5.A.4; 5.B.3; 5.D.2; 5.D.4;	We think "Reported Amount" should be "Stochastic Amount." Reinsurance is not necessarily modeled explicitly in other components of the Reported Amount.
54	App. 3	35; 36	5.D.3; 5.D.8.c	The formatting of section references should be made consistent with the rest of the document.
55	App. 3	36	5.D.9; 5.D.10; 5.D.11	Use of the term "margin" is confusing because "Margin" is a formally defined term and is related to Prudent Estimate Assumptions. We suggest the term "provision" (or "provision for counterparty default") to provide clarity.
56	App.3	36	5.E	In general, we think the wording in the section is inappropriate for a methodology that is intended to capture only mismatch risk. We will be supplying proposed language within the next 30 days.
57	App. 3	38	6.A.2	Verb corrections: "If the range of results is beyond the specified tolerance for variability then the block of policies is ~~are~~ considered to have material tail risk and does ~~do~~ not pass the test."
58	App. 3	38	6.B.3	It is not clear which, if any, reserves are currently determined under a "principle-based approach." We recommend truncating the sentence after "Test Scenario Amount."
59	App. 3	39	6.C.1	It is unclear why the "statutory value" is being certified, and not the statutory reserve.
60	App. 3	39	6.C.1	Verb correction: "statutory value…is adequate," not "are adequate."
61	App. 3	39	6.C.2	The phrase "adequacy of a given block of policies" should be clarified to be: "adequacy of the reserves for a given block of policies."
62	App. 3	39-42	6.F	This section seems to have much more detail than needed and is confusing as a result. Our proposed simplified wording is provided in Attachment 4. We do not intend to modify the requirements by this proposal.
63	App. 3	42	7.A.1.c	It seems unnecessary to require "a paragraph identifying whether" a material subsequent event has occurred relative to the Stochastic Exclusion Test, because the SET cannot be relied upon under such circumstances. It may, however, be appropriate to certify that no material subsequent has occurred if the SET has been relied upon.
64	App. 3	42	7.A.1.c	Extra word: "…in the context of ~~the~~ performing the Stochastic Exclusion…"
65	App. 3	42	7.A.1.e	The certification should not reference all required capital; it should be limited to the C-3a and C-3c risk charges for in-scope life insurance policies.
66	App. 3	42	7.A.1.e	We recommend changing "principles and requirements" to simply "requirements." The principles in the introduction of Appendix 3 should be removed (see comment #2), and it is otherwise unclear what other principles in the RBC instructions might apply.
67	App. 3	43	7.B.2.e	Mortality is not listed as one of the assumptions to include in the documentation.
68	App. 3	45	7.E.2	We recommend changing this to: "Be familiar with all applicable Actuarial Standards of Practice."

69	App. 3	45	7.E.3.d	We recommend changing “generally acceptable actuarial standards” to “Actuarial Standards of Practice as promulgated by the Actuarial Standards Board.”

Attachment 2

ACLI Proposed Revision of Section 2.I.7

7. The Stochastic Amount

   a. The Stochastic Amount is determined as the sum of applying steps 1. and 2. below to each segment or set of segments for which a Scenario Amount has been calculated.

      1. Rank the Scenario Amounts from lowest to highest; and
      2. Take the average of the highest 10% of the Scenario Amounts.

      If necessary, add an amount to item 2 to capture any material risk included in the scope of these requirements but not already reflected in the Stochastic Amount.

   b. The Stochastic Amount may be reduced, but not to less than zero, by the factor-based RBC covering market volatility risk of equity assets used in the determination of the Stochastic Amount if that volatility is modeled in the calculation. The amount of such adjustment and its derivation is to be documented in the Actuarial Report. The adjustment reverses the factor-based C1cs relating to existing equity assets that are included in the determination of the market risk component for Life Insurance Products.

      The actuary who certifies the RBC amount must be reasonably certain that the risks that the factor-based RBC are attempting to measure are captured in the Stochastic Amount and that the amount of assets included in determination of the adjustment is not greater than the statutory value of such assets included in the models underlying the Stochastic Amount.

   c. The Stochastic Amount may be reduced, but not to less than zero, by the factor-based RBC covering recoverability of expense allowances at the valuation date relating to liabilities being modeled. The amount of such adjustment and its derivation is to be documented in the Actuarial Report. The adjustment reverses the factor-based C-1 risk charges that provide for the non-recovery of the expense allowance. This risk is included in the determination of the Stochastic Amount.

      The actuary who certifies the RBC amount must be reasonably certain that the risks that the factor-based RBC are attempting to measure are captured in the Stochastic Amount and that the amount of expense allowances included in determination of the adjustment is not greater than the statutory value of such allowances relating to the liabilities included in the models underlying the Stochastic Amount.

Attachment 3

ACLI Proposed New Section 2.O

O. Adjustments of prior period amounts

1. The actuary may elect to base the Stochastic Amount projections on asset and policy inforce data that have an "as of" date prior to the Valuation Date, but in no event earlier than six months before the Valuation Date, provided that the Stochastic Amount so calculated is adjusted to the Valuation Date in a manner that is, in the actuary's judgment, appropriate.

2. If the Alternative Amount is determined on a date that precedes the Valuation Date, then it shall be adjusted to the Valuation Date if deemed necessary by the actuary.

3. The actuary should disclose and discuss in the supporting memorandum any use of prior period data and the reasoning leading to the conclusion that the Stochastic and Alternative Amounts are appropriate. Disclosure of the results of such adjustment and the methodology used to determine the adjustment(s) is required.

4. Adjustments of the Stochastic Amount or Alternative Amount would generally consider:

    a. Changes in economic conditions between the prior period date and the valuation date;
    b. The recognition of estimated cash flows from new business during that period;
    c. Material transactions such as reinsurance (either ceded or assumed) of a block of business;
    d. Material changes in asset profile;
    e. Material changes in liability profile;
    f. Material change in matching position of assets and liabilities;
    g. Change in the effectiveness of Derivative Programs; changes to existing or addition of new Derivative Programs; and
    h. Changes to existing or addition of new reinsurance arrangements.

5. To the extent the Stochastic Amount and Alternative Amount are based on data prior to the Valuation date and 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. If the re-determined RBC value (using the revised Reported Amount) 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.

Attachment 4

ACLI Proposed Revision of Section 6.F

Section 6.F

F. Stochastic Exclusion Test Scenarios

The Stochastic Exclusion Test is based on the sixteen test scenarios described in this subsection. The specific interest rate and equity return rate paths representing each test scenario may be downloaded from the [TBD] .

The test scenarios are defined in terms of 90 percentile random shocks in various directions over various periods of time. The test scenarios are as follows:

1. Test Scenario 1 – Pop up, high equity – Interest rate shocks that maintain the cumulative shock at the 90% level; equity returns that maintain the cumulative equity return at the 90% level.

2. Test Scenario 2 – Pop up, low equity – Interest rate shocks that maintain the cumulative shock at the 90% level; equity returns that maintain the cumulative equity return at the 10% level.

3. Test Scenario 3 – Pop down, high equity – Interest rate shocks that maintain the cumulative shock at the 10% level; equity returns that maintain the cumulative equity return at the 90% level.

4. Test Scenario 4 – Pop down, low equity – Interest rate shocks that maintain the cumulative shock at the 10% level; equity returns that maintain the cumulative equity return at the 10% level.

5. Test Scenario 5 – Up/down, high equity - Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during "up" periods and at the 10% level during "down" periods. Equity returns that maintain the cumulative equity return at the 90% level.

6. Test Scenario 6 – Up/down, low equity – Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during "up" periods and at the 10% level during "down" periods. Equity returns that maintain the cumulative equity return at the 10% level.

7. Test Scenario 7 – Down/up, high equity – Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during "up" periods and at the 10% level during "down" periods. Equity returns that maintain the cumulative equity return at the 90% level.

8. Test Scenario 8 – Down/up, low equity – Interest rate shocks that, for each five-year period, are consistently in the same direction. The cumulative shock for each 5-year period is at the 90% level during "up" periods and at the 10% level during "down" periods. Equity returns that maintain the cumulative equity return at the 10% level.

9. Test Scenario 9 – Base scenario – All shocks are zero.

10. Test Scenario 10 – Inverted yield curves – Zero shocks to long term rates and equities. Shocks to the spread between short and long rates that are consistently in the same direction for each three-year period. The shocks for the first three-year period are in the direction of reducing the spread (usually causing an inverted yield curve). Shocks for each subsequent three year period alternate in direction. The cumulative shock for each 3-year period is at either the 90% level or the 10% level (alternating).

11. Test Scenario 11 – Volatile equity returns – Zero shocks to interest rates. Shocks to equity returns that are consistently in the same direction for each two-year period, and then switch directions. The cumulative shock for each two –year period is at either the 90% level or the 10% level (alternating).

12. Test Scenario 12 – Moderately adverse shock – Uniform downward shocks each month for 20 years, sufficient to get down to the 80% point on the distribution of 20 year shocks. After 20 years, shocks are at a level that keeps the cumulative shock at the 80% level (or the 20% level, depending on how you look at it).

13. Test Scenario 13 – Delayed pop up, high equity – Interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 times those in the first 10 years of Scenario 1. This gives the same 20-year cumulative shock as scenario 1 but all the shock is concentrated in the second 10 years. After 20 years, the same as scenario 1. Equity returns that maintain the cumulative equity return at the 90% level.

14. Test Scenario 14 – Delayed pop up, low equity – Interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 times those in the first 10 years of Scenario 2. This gives the same 20-year cumulative shock as scenario 2 but all the shock is concentrated in the second 10 years. After 20 years, the same as scenario 1. Equity returns that maintain the cumulative equity return at the 10% level.

15. Test Scenario 15 – Delayed pop down, high equity - Interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 times those in the first 10 years of Scenario 3. This gives the same 20-year cumulative shock as scenario 3 but all the shock is concentrated in the second 10 years. After 20 years, the same as scenario 3. Equity returns that maintain the cumulative equity return at the 90% level.

16. Test Scenario 16 – Delayed pop down, low equity – Interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 times those in the first 10 years of Scenario 4. This gives the same 20-year cumulative shock as scenario 4 but all the shock is concentrated in the second 10 years. After 20 years, the same as scenario 4. Equity returns that maintain the cumulative equity return at the 10% level.