Life and Health Actuarial Task Force
Amendment Proposal Form*

1.   Identify yourself, your affiliation and a very brief description (title) of the issue.

Dave Neve, chair, American Academy of Actuaries Life Financial Soundness / Risk Management Committee
Clarify issues having arisen from the NAIC Impact Study and the Academy Life PBR Practice Note Work Group regarding the VM-20 requirements.

2.   Identify the document, including the date if the document is "released for comment," and the location in the document where the amendment is proposed:

10/16/10 VM-20 Exposure Draft

3.   Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on "track changes" in Word®) version of the verbiage. (You may do this through an attachment.)

See attached.

4.   State the reason for the proposed amendment? (You may do this through an attachment.)

This Amendment Proposal Form (APF) includes 8 items that have been identified as needing clarification in VM-20. They arose from issues raised by the Academy Life PBR Practice Note Work Group and from questions submitted by companies participating in the NAIC VM-20 Impact Study.   We believe none of these 8 proposed changes represent a change in LATF's intent from what is in the current exposure draft, but only provide additional clarification to that intent.   These 8 changes include:

1.   Section 6: Exclusion Tests. Wording edits and re-numbering of the section to eliminate inconsistent wording.
2.   Section 6.A.1.b: Stochastic Exclusion Test.   Clarify the risks being addressed by the SET are interest rate and equity return risk.
3.   Section 6.B.2: Stochastic Exclusion Ratio Test.   Excluding the use of mortality improvement beyond the projection start date is to be considered a margin for the purpose of the SET.
4.   Section 7.C.6: Non-Guaranteed Elements.   Clarify treatment of policyholder dividends that are included in the statutory dividend liability.
5.   Section 7.F.1.d: Default costs are not subject to Section 7.F.1.d since default assumptions are prescribed.
6.   Section 8.D: Determining Pre-Reinsurance Minimum Reserves.   Reasonable approximations are permitted to determine the amount and composition of starting assets, and requirements of the 98% to 102% collar do not apply.
7.   Section 9.B.6: Assumption Margins. Section 9.B.6 doesn't preclude the ability of the company to modify the method used to determine margins from one year to the next.
8.   Section 9.C.2: Mortality Assumptions.   The industry basic table shall be the 2008 VBT.

NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered

Notes:

This draft includes two alternatives for determining the cash flows on reinvestment assets. Alternative 1 is based on a function of the appropriate U.S. Treasury interest rate plus a spread. Alternative 2 is based on deducting asset default costs and anticipated investment expenses form the gross investment income. There are two versions of Section 7.F and Section 9.F.6 for these alternatives.

VM-20: REQUIREMENTS FOR PRINCIPLE-BASED RESERVES FOR LIFE PRODUCTS

Table of Contents

Appendix 3.   Mortality Margin Table

Section 1.   Purpose

A.   These requirements establish the minimum reserve valuation standard for individual life insurance policies issued on or after the operative date of the valuation manual and subject to a principle-based reserve valuation with a net premium reserve floor under the Standard Valuation Law.

B.   These requirements constitute the Commissioner's Reserve Valuation Method (CRVM) for policies of individual life insurance.

Definitions

A.   The term "anticipated experience assumption" means an expectation of future experience for a risk factor given available, relevant information pertaining to the assumption being estimated.

B.   The term "clearly defined hedging strategy" means a strategy undertaken by a company to manage risks that meet the criteria specified in the applicable requirement.

C.   The term "credibility segment" means a group of policies subject to the same level of underwriting and same risk classification procedures that are grouped together for the purpose of determining whether the policies qualify for the simplified method to determine prudent estimate mortality assumptions in Section 9.C.

D.   The term "deterministic reserve" means a reserve amount calculated under a defined scenario and a single set of assumptions. Deterministic reserves include, but are not limited to reserves calculated using formula based methods.

E.   The term "gross reserve" means the minimum reserve held in the absence of any ceded reinsurance.

F.   The term "margin" means an amount included in a prudent estimate assumption that is intended to provide for estimation error and adverse deviation related to a corresponding anticipated experience assumption.

G.   The term "model segment" means a group of policies and associated assets that are modeled together to determine the path of net asset earned rates.

H.   The term "mortality experience cell" means a subset of policies from a mortality segment that are grouped together when determining credibility adjusted experience rates.

I.   The term "mortality segment" means a subset of policies from a credibility segment for which a separate mortality table representing the prudent estimate assumption will be determined.

J.   The term "net asset earned rates" means the path of earned rates reflecting the net general account portfolio rate in each projection interval (net of appropriate default costs and investment expenses).

K.   The term "net premium reserve" means the amount determined in Section 3.

L.   The term "non-guaranteed element (NGE)" means either: (a) dividends under participating policies or contracts; or (b) other elements affecting life insurance or annuity policyholder/contract holder costs or values that are both established and subject to change at the discretion of the insurer.

M.   The term "per policy reserve" means an amount determined for each policy that equals the greater of the cash surrender value and the seriatim reserve.

N.   The term "policy" means an individual life insurance policy included in the scope of these requirements.

O.   The term "policyholder efficiency" means the phenomenon that policy holders will act in their best interest with regard to the value of their policy. A policyholder acting with high policyholder efficiency would take actions permitted in their contract which would provide the greatest relative value. Such actions include but are not limited to not lapsing a low value or no value contract, persisting, surrendering, applying additional premium, exercising loan and partial surrender provisions.

P.	The term "pretax interest maintenance reserve" or "PIMR" means the statutory interest maintenance reserve liability adjusted to a pre-tax basis for each model segment at the projection start date and at the end of each projection interval.

Q.	The term "Principle-Based Reserve Actuarial Report" or "PBR Actuarial Report" means the document containing supporting information prepared by the company as required by VM-31.

R.	The term "prudent estimate assumption" means a risk factor assumption developed by applying a margin to the anticipated experience assumption for that risk factor.

S.	The term "reinsurance cash flows" means the amount paid under a reinsurance agreement between a ceding company and an assuming company. Positive reinsurance cash flows shall represent amounts payable from the assuming company to the ceding company; negative reinsurance cash flows shall represent amounts payable from the ceding company to the assuming company.

T.	The term "reinsurance aggregate cash flows" means the difference between reinsurance cash flows and reinsurance discrete cash flows, as defined below. An example of reinsurance aggregate cash flows includes experience refunds.

	Guidance Note: If a reinsurance agreement gives rise to reinsurance aggregate cash flows, the company should take care to examine and apply the guidance in Sections 8.A.3 through 8.A.5 with regard to the treatment of such cash flows.

U.	The term "reinsurance discrete cash flows" means reinsurance cash flows determined by applying reinsurance terms to an individual covered policy, without reference to the circumstances and events of other policies. Examples of reinsurance discrete cash flows would be proportional sharing of one or more items of revenue or expense associated with an underlying reinsured policy.

V.	The term "scenario" means a projected sequence of events used in the cash flow model, such as future interest rates, equity performance, or mortality.

W.	The term "scenario reserve" means the amount determined on an aggregated basis for a given scenario that is used as a step in the calculation of the stochastic reserve.

X.	A "secondary guarantee" is a guarantee that a policy will remain in force for some period of time (the secondary guarantee period) even if its fund value is exhausted, subject to one or more conditions.

Y.	The term "seriatim reserve" means the amount determined for a given policy that is used as a step in the calculation of the deterministic reserve.

Z.	The term "stochastic reserve" means the amount determined in Section 5.

AA.	The term "stochastic exclusion test" means a test of reserves under specified economic scenarios to determine whether a group of policies is required to comply with stochastic modeling requirements.

BB.	The term "universal life insurance policy" means a life insurance policy where separately identified interest credits (other than in connection with dividend accumulations, premium deposit funds, or other supplementary accounts) and mortality and expense charges are made to the policy. A universal life insurance policy may provide for other credits and charges, such as charges for cost of benefits provided by rider.

CC.	The term "variable life insurance policy" means a policy that provides for life insurance the amount or duration of which varies according to the investment experience of any separate account or accounts established and maintained by the insurer as to the policy.

**Section 2.	Minimum Reserve**

A.	Except as provided in subsection 2.B, the minimum reserve equals the aggregate net premium reserve for all polices (determined pursuant to Section 3) plus, the excess, if any, of the greater of the aggregate deterministic reserve for all policies (determined pursuant to Section 4) and the stochastic reserve for all policies (determined pursuant to

Section 5) over the difference between the aggregate net premium reserve and any deferred premium asset held on account of those policies.

B. The company may elect to exclude one or more groups of policies from the stochastic reserve calculation and the deterministic reserve calculation if the exclusion tests determined pursuant to section 6 are passed. If the company elects this alternative, the minimum reserve is the sum of the following:

    1. For the group of policies that pass both the stochastic exclusion and the deterministic exclusion test: the aggregate net premium reserve for those policies.

    2. For the group of policies that pass the stochastic exclusion test but fail the deterministic exclusion test: The aggregate net premium reserve plus, the excess, if any, of the deterministic reserve determined pursuant to Section 4 over the difference between the aggregate net premium reserve for those policies and any deferred premium asset held on account of those policies.

    3. For the group of policies that fail the stochastic exclusion test, and for the group of policies not subject to the exclusion tests: The aggregate net premium reserve plus, the excess, if any, of the greater of the deterministic reserve determined pursuant to Section 4 and the stochastic reserve determined pursuant to Section 5 over the difference between the aggregate net premium reserve for those policies and any deferred premium asset held on account of those policies.

C. For purposes of this Section, the aggregate net premium reserve for a group of policies is the sum of the net premium reserve pursuant to Section 3 for each of the policies of the group less any credit for reinsurance ceded pursuant to Section 8 for the same group of policies.

D. The minimum reserve for each policy is equal to the net premium reserve for each policy calculated as specified in Section 3 less the policy's portion of any credit for reinsurance ceded as specified in Section 8 plus the policy's allocated portion of any deterministic reserve excess plus the policy's allocated portion of any stochastic reserve excess.

Drafting Note: It is the intent of this section to prescribe a method to allocate the minimum reserve back to the individual policy that gave rise to the reserve. The allocation to individual policies is needed, among other reasons, to allocate assets under the Life and Health Insurance Guaranty Association Model Act. Further work is needed to determine the method to allocate the excess of the deterministic reserve and the stochastic reserve over the aggregate net premium reserve.

E. If the company elects to perform the stochastic and deterministic exclusion tests in Section 6 pursuant to section 2.B above, then:

    1. Stochastic reserves must be calculated for each group of policies that fail the stochastic exclusion test in Section 6.

    2. Deterministic reserves must be calculated for each group of policies that fail either the deterministic exclusion or stochastic exclusion tests in Section 6.

    3. If a company elects to calculate stochastic reserves for one or more groups of policies, the company is not required to perform the exclusion tests in Section 6 for those policies.

    4. A group of policies for which neither deterministic nor stochastic reserves are required or calculated are not principle-based valuation reserves as defined under the Standard Valuation Law.

F. The company may calculate the deterministic reserve and the stochastic reserve as of a date no earlier than 3 months before the valuation date, using relevant company data, provided an appropriate method is used to adjust those reserves to the valuation date. Company data used for experience studies to determine prudent estimate assumptions are not subject to this 3-month limitation.

G. If a company has separate account business, the company shall allocate the minimum reserve between the general and separate accounts subject to the following:

1. The amount allocated to the general account shall not be less than zero and shall include any liability related to contractual guarantees provided by the general account; and

2. The amount allocated to the separate account shall not be less than the sum of the cash surrender values and not be greater than the sum of the account values attributable to the variable portion of all such contracts.

H. A company may use simplifications and approximations to calculate the net premium reserve, the deterministic reserve and/or the stochastic reserve required by this section if the company can demonstrate that the impact of such simplifications and approximations does not materially understate the resulting minimum reserve.

I. The reserves for supplemental benefits and riders shall be calculated consistent with the requirements for "Riders and Supplemental Benefits" in VM-00, Section II.

Section 3.   Net Premium Reserve

A. Applicability

1. The net premium reserve for each term policy, universal life insurance with secondary guarantee policy (definitions of products to be included need to be determined) must be determined pursuant to Section 3.

2. Except for policies subject to Section 3.A.1 the net premium reserve shall be determined pursuant to applicable requirements in VM-A and VM-C.

B. For purposes of this Section 3, the following definitions apply:

1. A "fund based policy" is one where policyholder premiums are credited to a fund (or account value), from which explicit expense and/or mortality charges are deducted and to which explicit interest credits are added.

2. A "non-fund based policy" is one with guaranteed gross premiums over the lifetime of the contract, or gross premiums which are subject to a guaranteed maximum schedule of gross premiums over the lifetime of the contract, and for which policy benefits and values are fixed and determined at issue.

3. Any policy which satisfies the definition of a fund based policy in Section 3.B.1 and the definition of a non-fund based policy in Section 3.B.2 shall be considered a fund based policy for purposes of this Section 3.

4. The "fully funded secondary guarantee" at any time is:

   a. For a shadow account secondary guarantee, the minimum shadow account fund value necessary to fully fund the secondary guarantee for the policy at that time.

   b. For a cumulative premium secondary guarantee, the amount of cumulative premiums required to have been paid to that time that would result in no future premium requirements to fully fund the guarantee, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee.

5. The "actual secondary guarantee" at any time is:

   a. For a shadow account secondary guarantee, the actual shadow account fund value at that time.

   b. For a cumulative premium secondary guarantee, the actual premiums paid to that point in time, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee.

6. The "level secondary guarantee" at any time is:

   a. For a shadow account secondary guarantee, the shadow account fund value at that time assuming payment of the level gross premium determined according to Subsection 3.B.9.c.i.

b. For a cumulative premium secondary guarantee, the amount of cumulative level gross premiums determined according to Section 3.B.9.c.i, accumulated with any interest or accumulation factors per the contract provisions for the secondary guarantee.

Guidance Note: The definition of the net premium reserve in subsections 7, 78, and 9 is intended to result in a terminal net premium reserve under the assumption of an annual mode gross premium. The gross premium referenced should be the gross premium for the policy assuming an annual premium mode. The reported reserve as of any valuation date should reflect the actual premium mode for the policy and the actual valuation date relative to the policy issue date either directly or through adjusting accounting entries.

7. For non-fund based policies, on any valuation date the net premium reserve shall be equal to the actuarial present value of future benefits less the actuarial present value of future annual valuation net premiums as follows:

   a. The annual valuation net premiums shall be a uniform percent of the respective adjusted gross premiums, described in Section 3.B.7.b, such that at issue the actuarial present value of future valuation net premiums shall equal the actuarial present value of future benefits plus an amount equal to $2.50 per $1,000 of insurance for the first policy year only.

   For policies subject to the shock lapse provisions of Section 3.C.7.b.iii, valuation net premiums for policy years after the shock lapse shall be limited and may result in two uniform percents, one applicable to policy years prior to the shock lapse and one applicable to policy years following the shock lapse. For these policies, these percents shall be determined as follows:

      i. Compute the actuarial present value of benefits for policy years following the shock lapse.

      ii. Compute the actuarial present value of valuation net premiums for policy years following the shock lapse.

      iii. If ii/i is greater than 135%, reduce the net valuation premiums in ii uniformly to produce a ratio of ii/i of 135%.

      iv. If the application of iii produces an adjustment to the net valuation premiums following the shock lapse, increase the net valuation premiums for policy years prior to the shock lapse by a uniform percentage such that at issue the actuarial present value of future valuation net premiums at equals the actuarial present value of future benefits plus $2.50 per $1,000 of insurance for the first policy year only.

   b. Adjusted gross premiums shall be determined as follows:

      i. The adjusted gross premium for the first policy year shall be set at zero.

      ii. The adjusted gross premium for any year from the second through fifth policy year shall be set at 90% of the corresponding gross premium for that policy year.

      iii. The adjusted gross premium for any year after the fifth policy year shall be set equal to the corresponding gross premium for that policy year.

   c. The gross premium in any policy year is the maximum guaranteed gross premium for that policy year.

   d. Actuarial present values are calculated using the interest, mortality and lapse assumptions prescribed in Section 3.C.

8. For any fund based policy not containing a secondary guarantee and any fund based policy for which the longest secondary guarantee period is five (5) years or less, the net premium reserve shall be calculated as follows:

a. Determine the level gross premium at issue, assuming payments are made each year for which premiums are permitted to be paid, such period defined as "s" in this Subsection, that would keep the policy in force for the entire period coverage is to be provided based on the policy guarantees of mortality, interest and expenses.

b. Using the level gross premium from Section 3.B.8.a, determine the value of the expense allowance components for the policy at issue as x_1, y_{2-5}, and z defined below.

x_1 = the gross premium for the first policy year

y_{2-5} = 10% of the gross premium for each year from the second through fifth policy year

z = an amount of $2.50 per $1,000 of insurance for the first policy year only

c. Determine the annual valuation net premiums as that uniform percentage (the valuation net premium ratio) of the respective gross premiums, such that at issue the actuarial present value of future valuation net premiums shall equal the actuarial present value of future benefits.

d. For a policy issued at age x, on any valuation date t, the net premium reserve shall equal (m_{x+t}) multiplied by (r_{x+t}) where:

i. m_{x+t} = the actuarial present value of future benefits less the actuarial present value of future valuation net premiums and less the unamortized expense allowance for the policy,

E_{x+t}, determined as:

$$E_{x+t} = (a_{x+t:s-t}) \left[(x_1+z)/ a_{x:s} + y_{2-5} \cdot C_{x+t} \right] \text{ for } t < s$$

$$= 0 \quad t \geq s$$

Where:

$$C_{x+t} = 0 \qquad \text{when } t = 1$$

$$= \sum (1/ä_{x+w:s-w}) \text{ when } 2 \leq t \leq 5, \text{ w varying from } 1...(t-1)$$

$$= \sum (1/ä_{x+w:s-w}) \text{ when } t > 5, \text{ w varying from } 1...4$$

ii. r_{x+t} = equals the ratio $(e_{x+t})/(f_{x+t})$, but not greater than 1, with (e_{x+t}) and (f_{x+t}) defined as below:

e_{x+t} = the actual policy fund value on the valuation date t

f_{x+t} = The policy fund value on the valuation date t is that amount which, together with the payment of the future level gross premiums determined in subsection 3.B.8.a above, keeps the policy in force for the entire period coverage is to be provided, based on the policy guarantees of mortality, interest and expenses.

e. The future benefits used in determining the value of "m" shall be based on the policy fund value on the valuation date t together with the future payment of the level gross premiums determined in subsection 3.C.8.a above, and assuming the policy guarantees of mortality, interest and expenses.

f. The values of ä are determined using the net premium reserve interest, mortality and lapse assumptions applicable on the valuation date

g. Actuarial present values referenced in this subsection 3.B.8 are calculated using the interest, mortality, and lapse assumptions prescribed in Subsection C of this section.

9.   For any fund based policy for which the longest secondary guarantee period is more than five (5) years, during the secondary guarantee period the net premium reserve shall be the greater of the reserve amount determined according to subsection B.9, assuming the policy has no secondary guarantees, and the reserve amount for the policy determined according to the methodology and requirements subsections 3.B.9.b thru 3.B.9.e below.

         a.   After the expiration of the secondary guarantee period, the net premium reserve shall be the net premium reserve determined according to subsection 3.B.8 only.

         b.   If the policy has multiple secondary guarantees, the net premium reserve shall be calculated as below for the secondary guarantee that provides the longest period for which the policy can remain in force under the provisions of the secondary guarantee, such period defined as "n" in this Subsection. The resulting net premium reserve shall be used in the comparison with the net premium reserve calculated in accordance with subsection 3.B.8.

         c.   As of the policy issue date:

             i.   Determine the level gross premium at issue, assuming payments are made each year for which premiums are permitted to be paid, such period defined as "v" in this Subsection that would keep the policy in force to the end of the secondary guarantee period, based on the secondary guarantee assumptions as to mortality, interest and expenses. In no event shall "v" be greater than "n" for purposes of the net premium reserve calculated in this Subsection.

             ii.   Using the level gross premium from subsection 3.B.9.a above, determine the value of the expense allowance components for the policy at issue as x_1, y_{2-5}, and z defined below.

                 x_1 = the gross premium for the first policy year

                 y_{2-5} = 10% of the gross premium for each year from the second through fifth policy year

                 z = an amount of \$2.50 per \$1,000 of insurance for the first policy year only

             iii.   Determine the annual valuation net premiums at issue as that uniform percentage (the valuation net premium ratio) of the respective gross premiums such that at issue and over the secondary guarantee period the actuarial present value of future valuation net premiums shall equal the actuarial present value of future benefits. The valuation net premium ratio determined shall not change for the policy.

         d.   After the policy issue date, on each future valuation date, t, the net premium reserve shall be determined as follows:

             i.   Determine a level gross premium, assuming such payments are made each year for which premiums are permitted to be paid, such that it would keep the policy in force for the remainder of the secondary guarantee period, based on the secondary guarantee assumptions as to mortality, interest and expenses.

             ii.   Calculate the valuation net premiums, if any, by multiplying the gross premiums in subsection 3.B.9.d.i, above by the valuation net premium ratio determined for the policy in subsection 3.B.9.c.iii.

             iii.   The net premium reserve for an insured age x at issue at time t shall equal the actuarial present value of future benefits less the actuarial present value of future valuation net premiums, if any, over the remainder of the secondary guarantee period and less the unamortized expense allowance for the policy, E_{x+t}, determined as:

                 Where: $E_{x+t} = (a_{x+t:\overline{v-t}}) \left[(x_1+z)/ a_{x:\overline{n}} + y_{2-5} \cdot C_{x+t} \right]$ for $t < v$

$$= 0 \text{ for } t \geq v$$

$$C_{x+t} = 0 \qquad \text{when } t = 1$$

$$= \sum (1/ \ddot{a}_{x+w:v-w}) \quad \text{when } 2 \leq t \leq 5, \text{ w varying from } 1..(t-1)$$

$$= \sum (1/ \ddot{a}_{x+w:v-w}) \quad \text{when } t > 5, \text{ w varying from } 1\ldots4$$

and the expense allowance components x_1, y_{2-5}, and z are determined as in subsection 3.B.9.c.ii.

    e.   Actuarial present values referenced in this subsection B.9 are calculated using the interest, mortality and lapse assumptions prescribed in Subsection C of this section.

    10.   The actuarial present value of future benefits equals the present value of future benefits including, but not limited to, death, endowment (including endowments intermediate to the term of coverage), and cash surrender benefits. Future benefits are before reinsurance and before netting the repayment of any policy loans.

C.   Net Premium Reserve Assumptions

    1.   Mortality Rates

    a.   Except as indicated in subsection 3.C.1.b., and subject to subsection 3.C.1.c., the mortality standard used in determining the present values described in Subsection B of this Section shall be the 2001 Commissioners Standard Ordinary (CSO) Mortality Table. The 2001 Commissioners' Standard Ordinary (CSO) Mortality Table means that mortality table, consisting of separate rates of mortality for male and female lives, developed by the American Academy of Actuaries CSO Task Force from the Valuation Basic Mortality Table developed by the Society of Actuaries Individual Life Insurance Valuation Mortality Task Force, and adopted by the NAIC in December 2002. The 2001 CSO Mortality Table is included in the *Proceedings of the NAIC (2nd Quarter 2002)* and supplemented by the 2001 CSO Preferred Class Structure Mortality Table. Unless the context indicates otherwise, the 2001 CSO Mortality Table includes both the ultimate form of that table and the select and ultimate form of that table and includes both the smoker and nonsmoker mortality tables and the composite mortality tables. . It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality table. The 2001 CSO Preferred Class Structure Mortality Table means mortality tables with separate rates of mortality for Super Preferred Nonsmokers, Preferred Nonsmokers, Residual Standard Nonsmokers, Preferred Smokers, and Residual Standard Smoker splits of the 2001 CSO Nonsmoker and Smoker tables as adopted by the NAIC at the September, 2006 national meeting and published in the *NAIC Proceedings {3[rd] Quarter 2006}*. Unless the context indicates otherwise, the 2001 CSO Preferred Class Structure Mortality Table includes both the ultimate form of that table and the select and ultimate form of that table. It includes both the smoker and nonsmoker mortality tables. It includes both the male and female mortality tables and the gender composite mortality tables. It also includes both the age-nearest-birthday and age-last-birthday bases of the mortality table.

Drafting Note: The company shall determine the appropriate table from the Preferred Structure Mortality Tables based on the anticipated mortality for the class of policies being valued. Need to bring in the requirements of Model 815 and AG 42.

    b.   For preneed insurance contracts, as defined in subsection 3.C.1.b., and similar policies and contracts, the minimum mortality standard for determining the present values described in Subsection B for both male and female insureds shall be the Ultimate 1980 CSO Mortality Table. The term Ultimate 1980 CSO means the Commissioners' 1980 Standard Ordinary Life Valuation Mortality Tables (1980 CSO) without ten-year (10-year) selection factors.

For the purposes of this section, preneed insurance is any life insurance policy or certificate that is issued in combination with, in support of, with an assignment to, or as a guarantee for a prearrangement agreement for goods and services to be provided at the time of and immediately following the death of the insured. Goods and services may include, but are not limited to

embalming, cremation, body preparation, viewing or visitation, coffin or urn, memorial stone, and transportation of the deceased. The status of the policy or contract as preneed insurance is determined at the time of issue in accordance with the policy form filing.

Drafting Note: The valuation manual can be updated by the NAIC to define a new valuation table. Because of the various implications to systems, form filings, and related issues, lead time is needed to implement new requirements without market disruption. It is recommended that this transition be for a period of about 4 years – that is, that the table be adopted by July 1 of a given year, that it be optional until January 1 of the 4th following calendar year, thereafter mandatory. It is further intended that the adoption of such tables would apply to all business issues since the adoption of this valuation manual. The details of how to implement any unlocking of mortality tables needs to be addressed in the future.

    2.   Interest Rates

Drafting Note: This section describing the determination of the "calendar year net premium reserve interest rate" is intended to communicate that, unlike the "unlocking" of the net premium reserve mortality and lapse assumptions, the interest rate used in the net premium reserve calculation for a block of policies issued in a particular calendar year does not change for the duration of each of the policies in that issue year block.

    a.   For net premium reserve amounts calculated according to:

        i.   Section 3.B.8 for policies and riders for which nonforfeiture benefits are provided; or

        ii.   Section 3.B.9.

The calendar year net premium reserve interest rate I shall be determined according to this subsection 3.C.2.a and subsections 3.C.2.b and 3.C.2.c below and the results rounded to the nearer one-quarter of one percent (1/4 of 1%). This rate shall be used in determining the present values described in Subsection B of this Section for all policies issued in the calendar year next following its determination.

$$I = .03 + W * (R_1 - .03) + (W/2) * (R_2 - .09)$$

Where: R_1 is the lesser of R and .09

          R_2 is the greater of R and .09

          R is the reference interest rate defined in Subsection 2.b. below

          W is the weighting factor for a policy, as defined in Subsection 2.c. below

However, if the calendar year net premium reserve interest rate I in any calendar year determined without reference to this sentence differs from the corresponding actual rate for the immediately preceding calendar year by less than one-half of one percent (1/2 of 1%), the calendar year net premium reserve interest rate shall be set equal to the corresponding actual rate for the immediately preceding calendar year.

    b.   The reference interest rate R for a calendar year shall equal the lesser of the average over a period of thirty-six (36) months and the average over a period of twelve (12) months, ending on June 30 of the calendar year, of the monthly average of the composite yield on seasoned corporate bonds, as published by Moody's Investors Service, Inc.

    c.   The weighting factor W for a policy shall be determined from the table below:

Guarantee Duration (Years)	Weighting Factor
10 or less	.50
More than 10 but not more than 20	.45
More than 20	.35

The guarantee duration for the coverage guarantee is the maximum number of years the life insurance can remain in force on the basis guaranteed in the policy or under options to convert to plans of life insurance with premium rates or nonforfeiture values or both which are guaranteed in the original policy.

d. For reserve amounts calculated according to:

    i. Section 3.B.8 of this Section for policies and riders for which no nonforfeiture benefits are provided; or

    ii. Section 3.B.9 of this Section

the calendar year net premium reserve interest rate shall be calculated by increasing the rate determined according to subsections 3.C.2.a thru 3.C.2.c above by 1.5%, but in no event greater than 125% of the rate determined according to subsection 3.C.2.a thru 3.C.2.c above.

Drafting Note: If a policy contains multiple coverage guarantees and each coverage guarantee stream is valued separately, it may be important to define which reserve interest rate(s) should be used for reporting and analysis purposes.

3. Lapse Rates

a. For non-fund based policies or riders which provide nonforfeiture values, fund based policies not containing a secondary guarantee, and fund based policies for which the longest secondary guarantee period is five (5) years or less the lapse rates used in determining the present values described in subsection 3.B shall be 0% per year during the premium paying period and 0% per year thereafter.

b. For non-fund based policies or riders which provide no nonforfeiture values (i.e. term policies), the lapse rates used to determine the present values described in subsection 3.B shall be:

    i. 6% per year during the initial level premium period and during any subsequent level premium period of 5 or more years.

    ii. 10% per year during any premium paying period after an initial level premium period of less than 5 years.

    iii. For policies or riders having a level premium over a 5 year or longer period, a shock lapse rate at the end of the initial level premium period based on the length of the next renewal level premium period and the percent increase in the gross premium as shown in the table below.

Initial premium period	Length of Next Renewal Period	Percent increase in gross premium per $1,000	Shock Lapse Rate
1	YRT	Any	10%
5	YRT	Any	50%
5	5	Any	25%
10	YRT	< 400%	70%
10	YRT	Over 400%	80%
10	5	Any	50%
10	10	Any	25%
20	YRT	< 400%	70%
20	YRT	Over 400%	80%
20	5	Any	70%

20	10	Any	50%
20	20	Any	50%

Drafting Note: The ACLI is pursing development of an algorithm to generalize this factor and eliminate cliffs between categories.

        c.   For fund based policies, for which the longest secondary guarantee period is more than five (5) years, the lapse rate, L_{x+t}, used to determine the present values described in Subsection B at time t for an insured age x at issue shall be determined as follow

           i.   Determine the ratio R_{x+t} where:

$$R_{x+t} = [FFSG_{x+t} - ASG_{x+t}] / [FFSGF_{x+t} - LSG_{x+t}] \text{ but not} > 1$$

Where:

$FFSG_{x+t}$ = the fully funded secondary guarantee at time t for the insured age x at issue

ASG_{x+t} = the actual secondary guarantee at time t for the insured age x at issue

LSG_{x+t} = the level secondary guarantee at time t for the insured age x at issue.

           ii.   The lapse rate for the policy for durations $t+1$ and later shall be set equal to:

$$L_{x+t} = R_{x+t} \times 0.01 + (1 - R_{x+t}) \times 0.005 \times r_{x+t}$$

Where r_{x+t} is the ratio determined in Subsection B.d.ii.

D.   Net Premium Reserve Calculation and Cash Surrender Value Floor

    1.   For a non-fund based policy, the net premium reserve shall not be less than the greater of:

        a.   The cost of insurance to the next paid to date. The cost of insurance for this purpose shall be determined using the mortality tables for the policy prescribed in subsection 3.C or

        b.   The policy cash surrender value, calculated as of the valuation date and in a manner that is consistent with that used in calculating the net premium reserve on the valuation date.

Drafting Note: It may be appropriate to consider potential simplifications for the net premium reserve for YRT reinsurance assumed. The unearned annual tabular cost of insurance ("interpolated C_x") is one potential option to examine.

    2.   For a fund based policy, the net premium reserve shall not be less than the greater of:

        a.   The amount needed to cover the cost of insurance to the next processing date on which cost of insurance charges are deducted with respect to the policy. The cost of insurance for this purpose shall be determined using the mortality tables for the policy prescribed in subsection 3.B. or

        b.   The policy cash surrender value, calculated as of the valuation date and in a manner that is consistent with that used in calculating the net premium reserve on the valuation date.

    The net premium reserve for fund based policies shall be determined assuming the premium payable for the policy is the level gross annual premium determined according to subsection 3.B.9.a., 3.B.10.c.i., or 3.B.10.d.i of this section, as applicable.

Section 4.   Deterministic Reserve

For a group of one or more policies for which a deterministic reserve must be calculated pursuant to Sections 2.A or 2.B, the company shall calculate the deterministic reserve for the group as follows:

A.   Calculate the deterministic reserve equal to the actuarial present value of benefits, expenses, and related amounts less the actuarial present value of premiums and related amounts where:

   1.   Cash flows are projected in compliance with the applicable requirements in Sections 7, 8 and 9 over the single economic scenario described in Section 7.E.3.

   2.   Present values are calculated using the path of discount rates for the corresponding model segment determined in compliance with Section 7.H.4.

   3.   The actuarial present value of benefits, expenses and related amount equals the sum of

      a.   Present value of future benefits, but before netting the repayment of any policy loans;

      Guidance Note: Future benefits include but are not limited to death and cash surrender benefits.

      b.   Present value of future expenses excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes;

      c.   Policy account value invested in the separate account at the valuation date; and

      d.   Policy loan balance at the valuation date with appropriate reflection of any relevant due, accrued, or unearned loan interest, if policy loans are explicitly modeled under Section 7.E.

   4.   The actuarial present value of premiums and related amounts equals the sum of the present values of

      a.   Future gross premium payments and/or other applicable revenue;

      b.   Future net cash flows to or from the general account, or from or to the separate account;

      c.   Future net policy loan cash flows, if policy loans are explicitly modeled under Section 7.E;

      Guidance Note: Future net policy loan cash flows include: loan interest paid in cash; additional loan principal; and repayments of principal, including repayments occurring at death or surrender (note that the future benefits in Section 4.A.3.a are before consideration of policy loans).

      d.   Future net reinsurance discrete cash flows determined in compliance with Section 8;

      e.   The future net reinsurance aggregate cash flows allocated to this group of policies as described in Subsection B of this section; and

      f.   The future derivative liability program net cash flows (i.e., cash received minus cash paid) that are allocated to this group of policies.

B.   Future net reinsurance aggregate cash flows shall be allocated as follows:

   1.   Future net reinsurance aggregate cash flows shall be allocated to each policy reinsured under a given reinsurance agreement in the same proportion as the ratio of each policy's present value of future net reinsurance discrete cash flows to total present value of future net reinsurance discrete cash flows under the reinsurance agreement;

   2.   Future net reinsurance aggregate cash flows allocated to a group of policies is equal to the sum of future net reinsurance aggregate cash flows allocated to each policy in the group.

Section 5.   Stochastic Reserve

The company shall calculate the stochastic reserve for all policies (pursuant to section 2.A) or for a group of policies (pursuant to section 2.B) as follows:

A. Project cash flows in compliance with the applicable requirements in Sections 7, 8 and 9 using the stochastically generated scenarios described in Section 7.G.

B. Calculate the scenario reserve for each stochastically generated scenario as follows:

    1. For each model segment at the end and start of each projection year, calculate the discounted value of the negative of the projected statement value of general account and separate account assets using the path of discount rates for the model segment determined in compliance with Section 7.H.5 from the projection start date to the end of the respective projection year.

    Guidance Note: The projected statement value of general account and separate account assets for a model segment may be negative or positive.

    2. Sum the amounts calculated in Subparagraph 1a above across all model segments at the end and start of each projection year.

    Guidance Note: The amount in Subparagraph 2b. above may be negative or positive.

    3. Set the scenario reserve equal to the sum of the statement value of the starting assets across all model segments and the maximum of the amounts calculated in Subparagraph b above.

C. Rank the scenario reserves from lowest to highest.

D. Calculate CTE 70.

E. Add an additional amount to CTE 70 to capture any material risk included in the scope of these requirements but not already reflected in the cash flow models using an appropriate and supportable method and supporting rationale.

F. The stochastic reserve equals the amount determined in Subsection 5.E. If the company defines two or more subgroups for aggregation purposes as described in Section 7.B.2.b, the company shall calculate the amount determined in Section 5.E for each subgroup of policies on a standalone basis, and sum together those amounts for each subgroup to determine the total stochastic reserve.

Section 6.   **Stochastic and Deterministic Reserve Exclusion Tests**

A. Stochastic Reserve Exclusion Test

    1. Groups of policies pass the stochastic reserve exclusion test if

        a. Annually and within 12 months before the valuation date the company demonstrates that the groups of policies pass the stochastic exclusion ratio test defined in Section 6.B; or

        b. For groups of policies other than variable life or universal life with a secondary guarantee, the company provides a certification by a qualified actuary (as defined in Section 6.C) that the group of policies is not subject to material interest rate risk or equity return tail risk, or asset risk. The company shall provide the certification to the Commissioner upon request.

    2. A company may not exclude a group of policies for which there is one or more clearly defined hedging strategies from stochastic reserve requirements.

    3. If a group of policies is excluded from the stochastic reserve requirements, the company may not include future transactions associated with non-hedging derivative programs in determining the deterministic reserve for those policies.

B. Stochastic Exclusion Ratio Tests

    1. In order to exclude a group of policies from the stochastic reserve requirements using the method allowed under Section 6.A.1.a, a company shall demonstrate that the ratio of (b-a)/c is less than 4.5% where:

a. a = the adjusted deterministic reserve described in subsection 6.B.2.a using the baseline economic scenario described in subsection 6.B.2.b.

b. b = the largest adjusted deterministic reserve described in subsection 6.B.2.a under any of the other 15 economic scenarios described in subsection 6.B.2.b.

c. c = an amount calculated from the baseline economic scenario described in subsection 6.B.2.b that represents the present value of benefits for the policies, adjusted for reinsurance by subtracting ceded benefits. For clarity, premium, ceded premium, expense, reinsurance expense allowance, modified coinsurance reserve adjustment and reinsurance experience refund cash flows shall not be considered "benefits," but items such as death benefits, surrender or withdrawal benefits and policyholder dividends shall be. For this purpose, the company shall use the benefits cash flows from the calculation of quantity "a," and calculate the present value of those cash flows using the same path of discount rates as used for "a."

Drafting Note: Empirical testing of the reinsurance adjustment to "c" should encompass its impact in the case of YRT reinsurance as well as consistency of results among similar coinsurance, coinsurance with funds withheld, and modified coinsurance forms. A Guidance Note may prove necessary to address further judgment in the case of YRT.

2. In calculating the ratio in Paragraph 1 above, the company

a. Shall calculate an adjusted deterministic reserve for the group of polices for each of the 16 scenarios that is equal to the deterministic reserve defined in Section 4.A, but with the following differences:

i. using anticipated experience assumptions with no margins,

ii. using the interest rates and equity return assumptions specific to each scenario, and

iii. using net asset earned rates specific to each scenario to discount the cash flows.

b. Shall use the most current available baseline economic scenario and the 15 other economic scenarios published by the NAIC. The methodology for creating these scenarios can be found in Appendix 1 of the valuation manual.

c. Shall use anticipated experience assumptions within each scenario that are dynamically adjusted as appropriate for consistency with each tested scenario.

d. May not group together contract types with significantly different risk profiles for purposes of calculating this ratio.

e. The requirement to exclude mortality improvement beyond the projection start date (as defined in Section 9.C.4.d) is deemed to be a margin for the purposes of section 2.a.i. above. Thus, mortality improvement may be reflected in anticipated experience assumptions for the purpose of the calculating the stochastic exclusion ratio.

C.3. Stochastic Exclusion Requirements if the Stochastic Exclusion Ratio Test is Not Used

1. In order to exclude a group of policies from the stochastic reserve requirements using the method as allowed under Section 6.A.1.b above, the company must provide a demonstration in the PBR Actuarial Report in the first year and at least once every three calendar years thereafter that complies with the following:

a. The demonstration shall provide a reasonable assurance that if the stochastic reserve was calculated on a standalone basis for those polices subject to the stochastic reserve exclusion, the minimum reserve for those policies would not increase. The demonstration shall take into account whether changing conditions over the current and two subsequent calendar years would be likely to change the conclusion to exclude the group of policies from the stochastic reserve requirements.

b.	If, as of the end of any calendar year, the company determines the minimum reserve for the group of policies no longer adequately provides for all material risks, the exclusion shall be discontinued and the company fails the stochastic reserve exclusion test for those policies.

c.	The demonstration may be based on analysis from a date that proceeds the initial or subsequent exclusion period.

d.	The demonstration shall provide an effective evaluation of the residual risk exposure remaining after risk mitigation techniques such as derivative programs and reinsurance.

24.	The company may use one of the following or another method acceptable to the commissioner to demonstrate compliance with subsection 6.C.1B.3:

a.	Demonstrate that the greater of the deterministic reserve and the net premium reserve, less any associated deferred premium asset, is greater than the stochastic reserve calculated on a standalone basis.

b.	Demonstrate that the greater of the deterministic reserve and the net premium reserve, less any associated deferred premium asset, is greater than the scenario reserve that results from each of a sufficient number of adverse deterministic scenarios.

c.	Demonstrate that the greater of the deterministic reserve and the net premium reserve, less any associated deferred premium asset, is greater than the stochastic reserve calculated on a standalone basis, but using a representative sample of policies in the stochastic reserve calculations. or

d.	Demonstrate that any risk characteristics that would otherwise cause the stochastic reserve calculated on a standalone basis to exceed greater of the deterministic reserve and the net premium reserve, less any associated deferred premium asset, are not present or have been substantially eliminated through actions such as hedging, investment strategy, reinsurance, or passing the risk on to the policyholder by contract provision.

DC.	Deterministic Reserve Exclusion Test

1.	Group of policies that do not pass the stochastic exclusion test in Section 6.A do not pass the deterministic reserve exclusion test. Therefore it is not necessary to perform the and the company is not required to calculate the deterministic exclusion reserve test for that group of policies.

2.	Except as provided in subsection 6.DC.1, a group of policies passes the deterministic reserve exclusion test, if the company demonstrates that the sum of the valuation net premiums for the group of policies, determined according to Section 3, is less than the sum of the corresponding guaranteed gross premiums for such policies.

3.	A company may not group together policies of different contract types with significantly different risk profiles for purposes of the calculation in subsection 6.CD.2.

4.	For purposes of determining the valuation net premiums used in the demonstration in subsection 6.DC.2:

a.	If pursuant to Section 2 the net premium reserve is the minimum reserve required under Section 2.A of the Standard Valuation Law for policies issued prior to the operative date of the valuation manual, the valuation net premiums are determined according to those minimum reserve requirements;

b.	If the net premium reserve is determined according to Section 3.A.1:

i.	The lapse rates assumed for all durations are 0%;

ii.	For policies with guaranteed gross premium patterns that subject the policy to shock lapses, as defined in Section 3.E, the valuation net premiums comparison to the guaranteed gross premiums indicated in subsection 6.B.1 shall be performed twice, once

considering only the initial premium period and another considering the contract over its entire lifetime;

  iii. The guaranteed gross premium shall be the level gross premium at issue that would keep the policy in force for the entire period coverage is to be provided, based on the policy guarantees of mortality, interest and expenses;

  iv. If the anticipated mortality for the group of policies exceeds the valuation mortality, then the company shall substitute the anticipated mortality to determine the net premium.

Section 7. **Cash Flow Models**

A. Model Structure

 1. The company shall design and use a cash flow model that

  a. Complies with applicable Actuarial Standards of Practice in develop cash flow models and projecting cash flows.

  b. Uses model segments consistent with the company's asset segmentation plan, investment strategies, or approach used to allocate investment income for statutory purposes.

  c. Assigns each policy subject to these requirements to only one model segment and shall use a separate cash flow model for each model segment.

  d. Projects cash flows for a period that extends far enough into the future so that no obligations remain.

 2. The company may use a simplified approach to developing cash flows, if the company shows that the approach produces reserves that are no less than those produced by a more robust cash flow model.

Guidance Note: For example, it may be reasonable to assume 100% deaths or 100% surrenders after some appropriate period of time.

B. General Description of Cash Flow Projections

 1. For the deterministic reserve and for each scenario for the stochastic reserve, the company shall project cash flows ignoring federal income taxes and reflecting the dynamics of the expected cash flows for the entire model segment. The company shall reflect the effect of all material product features, both guaranteed and non-guaranteed. The company shall project cash flows including the following:

  a. Revenues received by the company including gross premiums received from the policyholder.

  b. Amounts charged to account values on general accounts business and use those amounts to determine any effects on future policy benefits, and not as revenue.

  Guidance Note: Amounts charged to account values on general accounts business examples include cost of insurance and expense charges.

  c. All material benefits paid to policyholders, including but not limited to, death claims, surrender benefits, and withdrawal benefits, reflecting the impact of all material guarantees.

  d. Net cash flows between the general account and separate account for variable products.

  Guidance Note: Cash flows going out from the general account to the separate account increase the reserve and cash flows coming in to the general account from the separate account decrease the reserve. Examples include allocation of net premiums to the separate account, policyholder-initiated transfers between fixed and variable investment options, transfers of separate account values to pay death or withdrawal benefits, and amounts charged to separate account values for cost of insurance, expense, etc.

e.   Insurance company expenses (including overhead expenses), commissions, fund expenses, contractual fees and charges, and taxes (excluding federal income taxes and expenses paid to provide fraternal benefits in lieu of federal income taxes).

f.   Revenue sharing income received by the company (net of applicable expenses) and other applicable revenue and fees associated with the policies and adjusting the revenue to reflect the uncertainty of revenue sharing income that is not guaranteed.

g.   Net cash flows associated with any reinsurance as described in Section 8.

h.   Cash flows from derivative liability and derivative asset programs, as described in Section 7.L.

i.   Cash receipts or disbursements associated with investment income, realized capital gains and losses, principal repayments, asset default costs, investment expenses, asset prepayments, and asset sales. Cash flows related to policy loans are handled in the reserve calculation in a manner similar to cash flows to and from separate accounts.

Guidance Note: Since the projection of cash flows reflect premium mode directly, deferred premiums are zero under this approach.

2.   In determining the deterministic reserve and stochastic reserve the company may perform the cash flow projections for each policy in force on the date of valuation or by grouping policies into representative cells of model plans using all characteristics and criteria having a material impact on the size of the reserve. If the company groups policies in representative cells the company shall develop the groups such that the resulting reserve is not materially different than the reserve that would result with no grouping.

Guidance Note: The actuary shall rely on guidance from applicable ASOPs to show compliance with this requirement.

Drafting Note: The Actuarial Standards Board is in the process of developing a new ASOP for principle-based reserves for life products.   It is anticipated that this ASOP will provide guidance on how to group policies into representative modeling cells, as well as providing guidance on model granularity versus model accuracy

3.   In determining the stochastic reserve, the company shall determine the number and composition of subgroups for aggregation purposes in a manner that is consistent with how the company manages risks across the different product types, and that reflects the likelihood of any change in risk offsets that could arise from shifts between product types. If a company is managing the risks of two or more different product types as part of an integrated risk management process, then the products may be combined into the same subgroup.

Guidance Note: Aggregation refers to the number and composition of subgroups of polices that are used to combine cash flows. Aggregating policies into a common subgroup allows the cash flows arising from the policies for a given stochastic scenario to be netted against each other (i.e., allows risk offsets between policies to be recognized).

C.   Non-Guaranteed Element Cash Flows

1.   Except as noted in subsection 7.C.5, the company shall include non-guaranteed elements (NGE) in the models to project future cash flows beyond the time the company has authorized their payment or crediting.

2.   The projected NGE shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):

a.   The nature of contractual guarantees;

b.   The company's past NGE practices and established NGE policies;

c.   The timing of any change in NGE relative to the date of recognition of a change in experience;

d.   The benefits and risks to the company of continuing to authorize NGE.

3.   Projected NGE shall be established based on projected experience consistent with how actual NGE are determined.

4.   Projected levels of NGE in the cash flow model must be consistent with the experience assumptions used in each scenario. Policyholder behavior assumptions in the model must be consistent with the NGE assumed in the model.

5.   The company may exclude any portion of an NGE that:

a.   is not based on some aspect of the policy's or contract's experience, and

b.   is authorized by the Board of Directors and documented in the Board minutes, where the documentation includes the amount of the NGE that arises from other sources.

However, if the Board has guaranteed a portion of the NGE into the future, the company must model that amount (unless excluded by subsection 7.C.6). In other words, the company cannot exclude from its model any NGE that the Board has guaranteed for future years, even if they could have otherwise excluded them, based on this subsection.

6.   The liability for policyholder dividends declared but not yet paid that has been established according to statutory accounting principles as of the valuation date is reported separately from the statutory reserve. The policyholder dividends that give rise to this dividend liability as of the valuation date ~~This liability~~ may or may not be included in the Cash Flow Model at the company's option.

a.   If the policyholder dividends that give rise to the dividend liability are not ~~is~~ included in the cash flow model, then no adjustment is needed to the resulting aggregate modeled (whether deterministic or stochastic) reserve.

b.   If the policyholder dividends that give rise to the dividend liability are included in the cash flow model, then the resulting aggregate modeled (whether stochastic or deterministic) reserve should be reduced by the amount of the dividend liability. ~~starting liabilities in the Cash Flow Model, then the policyholder dividends that give rise to the liability need not be included in the model.~~

D.   Starting Assets

1.   For each model segment, the company shall select starting assets such that the aggregate annual statement value of the assets at the projection start date equals the estimated value of the minimum reserve allocated to the policies in the appropriate model segment subject to the following:

a.   Starting asset values shall include the relevant balance of any due, accrued or unearned investment income.

b.   For an asset portfolio that supports both policies that are subject and not subject to these requirements, the company shall determine an equitable method to apportion the total amount of starting assets between the subject and non-subject policies.

c.   If for all model segments combined, the aggregate annual statement value of starting assets is less than 98% or greater than 102% of the final aggregate modeled (whether stochastic or deterministic) reserve, the company shall provide documentation in the PBR Actuarial Report that provides reasonable assurance that the aggregate modeled reserve is not materially understated as a result of the estimate of the amount of starting assets.

2.   The company shall select starting assets for each model segment that consists of the following:

a.   All separate account assets supporting the policies.

b.   All policy loans supporting the policies that are explicitly modeled under Section 7.F~~E~~.

c.   All derivative instruments held at the projection start date that are part of a derivative program and can be appropriately allocated to the model segment.

d.   The negative of any pretax interest maintenance reserve liability that can be allocated to each model segment at the projection start date subject to the following:

   i.   The amount of PIMR allocable to each model segment is the approximate statutory interest maintenance reserve liability that would have developed for the model segment assuming applicable capital gains taxes are excluded. The allocable PIMR may be either positive or negative, resulting in either a decrease or increase to starting assets.

   ii.   In performing the allocation to each model segment, the company shall use a reasonable approach to allocate any portion of the total company balance that is disallowable under statutory accounting procedures (i.e., when the total company balance is an asset rather than a liability).

   iii.   The company may use a simplified approach to allocate the PIMR, if the impact of the PIMR on the minimum reserve is minimal.

e.   An amount of other general account assets such that the aggregate value of starting assets meets the requirements in Section 7.D.1. These assets shall generally be selected on a consistent basis from one reserve valuation to the next. Any material change in the selection methodology shall be documented in the PBR Actuarial Report.

3.   The aggregate value of general account starting assets is the sum of the amounts in subsections 7.D.2.b through 7.D.2.e above.

   Guidance Note: The aggregate value of general account assets in subsection 7.D.3 may be negative. This may occur for example for model segments in which a substantial portion of policyholder funds are allocated to separate accounts. The assets in subsection 7.D2.e above may include negative assets or short-term borrowing, resulting in a projected interest expense.

4.   The company shall calculate the projected values of starting assets in a manner consistent with their values at the start of the projection.

5.   When calculating the projected statement value of assets at any date, the company shall include the negative of any outstanding PIMR. For purposes of these requirements, the projected PIMR for any model segment and for all model segments combined may be negative.

E.   Reinvestment Assets and Disinvestment (Applies to Alternative 2 Only)

1.   At the valuation date and each projection interval as appropriate, model the purchase of general account reinvestment assets with available cash and net asset and liability cash flows in a manner that is representative of and consistent with the company's investment policy for each model segment, subject to the following requirements:

a.   The model investment strategy may incorporate a representation of the actual investment policy that ranges from relatively complex to relatively simple. In any case, the PBR actuarial report shall include documentation supporting the appropriateness of the representation relative to actual investment policy.

   Guidance Note: A complex model representation may include, for example, illiquid or callable assets whereas a simple model representation may involve mapping of more complex assets to combinations of, for example, public non-callable corporate bonds, U.S. Treasuries, and cash.

b. The final maturities and cash flow structures of assets purchased in the model, such as the patterns of gross investment income and principal repayments, and fixed or floating rate interest basis, shall be determined by the company as part of the model representation.

c. The combination of price and structure for fixed income investments and derivative instruments associated with fixed income investments shall appropriately reflect the then-current U.S. Treasury curve along the relevant scenario and the requirements for gross asset spread assumptions stated below.

d. For purchases of public non-callable corporate bonds, use the gross asset spreads over Treasuries prescribed in Section 9.F. (For purposes of this subsection, "public" incorporates both registered and 144a securities.) The prescribed spreads reflect current market conditions as of the model start date and grade to long-term conditions based on historical data at the start of projection year four.

e. For transactions of derivative instruments associated with fixed income investments, reflect the prescribed assumptions in Section 9.F for interest rate swap spreads.

f. For purchases of other fixed income investments, if included in the model investment strategy, set assumed gross asset spreads over Treasuries in a manner that is consistent with, and results in reasonable relationships to, the prescribed spreads for public non-callable corporate bonds and interest rate swaps.

g. Notwithstanding the above requirements, the model investment strategy and/or any non-prescribed asset spreads shall be adjusted as necessary so that the minimum reserve is not less than would be obtained by substituting an alternative investment strategy in which all fixed income reinvestment assets are public non-callable corporate bonds with gross asset spreads, asset default costs, and investment expenses by projection year that are consistent with a credit quality blend of 50% PBR credit rating 6 ("A2/A") and 50% PBR credit rating 9 ("Baa2/BBB"). The following pertains to this requirement:

   i. Policy loans, equities, and derivative instruments associated with the execution of a clearly defined hedging strategy (in compliance with Sections 7.L and 7.M) are not impacted by this requirement.

   ii. The PBR actuarial report shall include documentation demonstrating compliance with this requirement.

Guidance Note: In many cases, particularly if the model investment strategy does not involve callable assets, it is expected that the demonstration of compliance will not require running the reserve calculation twice. For example, an analysis of the weighted average net reinvestment spread on new purchases by projection year (gross spread minus prescribed default costs minus investment expenses) of the model investment strategy compared to the weighted average net reinvestment spreads by projection year of the alternative strategy may suffice. The assumed mix of asset types, asset credit quality, or the levels of non-prescribed spreads for other fixed income investments may need to be adjusted to achieve compliance.

2. Model at each projection interval any disinvestment in a manner that is consistent with the company's investment policy and that reflects the company's cost of borrowing where applicable. Gross asset spreads used in computing market values of assets sold in the model shall be consistent with but not necessarily the same as the gross asset spreads in Sections 7.E.1.d and 7.E.1.f above, recognizing that starting assets may have different characteristics than modeled reinvestment assets.

3. Determine the values of reinvestment assets at the valuation date and each projection interval in a manner consistent with the values of starting assets that have similar investment characteristics.

F. Cash Flows from Invested Assets (Alternative 2)

The company shall determine cash flows from invested assets, including starting and reinvestment assets, as follows:

1. Determine cash flows for each projection interval for general account fixed income assets including derivative asset programs associated with these assets as follows:

    a. Model gross investment income and principal repayments in accordance with the contractual provisions of each asset and in a manner consistent with each scenario. Grouping of assets is allowed if the company can demonstrate that grouping does not materially understate the minimum reserve than would have been obtained using a seriatim approach.

    b. Reflect asset default costs as prescribed in Section 9.F and anticipated investment expenses through deductions to the gross investment income.

    c. Model the proceeds arising from modeled asset sales and determine the portion representing any realized capital gains and losses.

    Guidance Note: Examples of general account fixed income assets include public bonds, convertible bonds, preferred stocks, private placements, asset backed securities, commercial mortgage loans, residential mortgage loans, mortgage backed securities, and collateralized mortgage obligations.

    d. Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values directly in the projection of asset cash flows. Asset defaults are not subject to this requirement since asset default assumptions must be determined by the prescribed method in Section 9.F.

2. Determine cash flows for each projection interval for general account equity assets (i.e., non-fixed income investments having substantial volatility of returns such as common stocks and real estate investments) including derivative programs associated with these assets as follows:

    a. Determine the grouping for equity asset categories (e.g. large cap stocks, international stocks, owned real estate, etc.) and the allocation of specific assets to each category as described in Section 7.J.

    b. Project the gross investment return including realized and unrealized capital gains for each investment category in a manner that is consistent with the prescribed general account equity return described in Section 7.G.

    c. Model the timing of an asset sale in a manner that is consistent with the investment policy of the company for that type of asset. Reflect expenses through a deduction to the gross investment return using prudent estimate assumptions.

3. Determine cash flows for each projection interval for policy loan assets by modeling existing loan balances either explicitly, or by substituting assets that are a proxy for policy loans (e.g., bonds, cash, etc.) subject to the following:

    a. If the company substitutes assets that are a proxy for policy loans, the company must demonstrate that such substitution

        i. Produces reserves that are no less than those produced by modeling existing loan balances explicitly; and

        ii. Complies with the policyholder behavior requirements stated in Section 9.D.

    b. If the company models policy loans explicitly, the company shall:

        i. Treat policy loan activity as an aspect of policyholder behavior and subject to the requirements of Section 9.D.

        ii. For both the deterministic reserve and the stochastic reserve, assign loan balances either to exactly match each policy's utilization or to reflect average utilization over a model segment or sub-segments.

iii. Model policy loan interest in a manner consistent with policy provisions and with the scenario. In calculating the deterministic reserve, include interest paid in cash as a loan cash flow in that projection interval, but do not include interest added to the loan balance as a loan cash flow (the increased balance will require increased repayment cash flows in future projection intervals).

iv. Model principal repayments, including those which occur automatically upon death or surrender.

v. Model any investment expenses allocated to policy loans and include them either with loan cash flows or insurance expense cash flows.

4. Determine cash flows for each projection interval for all other general account assets by modeling asset cash flows on other assets that are not described in subsections 7.F.1 through 7.F.3 using methods consistent with the methods described in subsections 7.F.1 and 7.F.2. This includes assets that are a hybrid of fixed income and equity investments.

5. Determine cash flows or total investment returns as appropriate for each projection interval for all separate account assets in a manner that is consistent with the prescribed separate account asset returns described in Section 7.G as follows:

Drafting Note: Section F was retained for testing Alternative 1 pursuant to amendment VM-20_100325_029.

F. Cash Flows from Reinvestment Assets (Alternative 1)

The company shall determine cash flows from reinvestment assets as follows:

1. Model any purchase of general account reinvestment assets with available net asset and liability cash flows in a manner that is representative of and consistent with the company's investment policy for each model segment. Determine the value in a manner consistent with the value of starting assets that have similar investment characteristics. Model any disinvestment in a manner consistent with the company's investment policy and that reflects the cost of borrowing.

2. Determine cash flows for each projection interval for general account fixed income assets including derivative asset programs associated with these assets as following:

a. For fixed income investments including derivative asset programs associated with these assets, at purchase of each asset, determine an appropriate combination of market price and future contractual cash flow provisions for which the resulting purchase yield appropriately reflects the then-current U.S. Treasury interest rate curve plus 4% of the appropriate U.S. Treasury interest rate curve plus .25%.

Drafting Note: The NAIC shall define the structure and levels of the prescribed net spreads over Treasuries. One recommendation being considered is that only the option-adjusted net spreads be prescribed. In such case, the company could add an appropriate option premium to the purchase yield as long as it also fully models the associated cash flow risks such as calls or prepayments.

b. For fixed income assets including derivative asset programs associated with these assets, after purchase, model the cash flows using the contractual provisions determined in Paragraph 2.a above and following the same methodology as described in Subsection 7.F.1 of the Section F for Alternative 2, except that no deduction for default costs and investment expenses is necessary since they are implicit in the prescribed net spreads.

3. Determine cash flows for general account equity assets assuming a 3% annual return.

4. Determine the cash flows for new policy loans following the same methodology as described in Subsection 7.F.3 of the Section F for Alternative 2.

5. Determine the cash flows for all other general account assets following the same methodology as described in Subsection 7.F.4 of the Section F for Alternative 2.

6. Determine the cash flows for separate account fixed income, equity and other assets following the same methodology as described in subsection 7.F.5 of the Section F for Alternative 2.

G. Economic Scenarios

1. Deterministic Economic Scenarios

a. For purposes of calculating the deterministic reserve under Section 4, the company shall use:

i. U.S. Treasury interest rate curves following Scenario 12 from the set of prescribed scenarios used in the stochastic exclusion ratio test defined in Section 6.B; and

ii. Total investment return paths for general account equity assets and separate account fund performance consistent with the total investment returns for corresponding investment categories contained in Scenario 12 from the set of prescribed scenarios used in the stochastic exclusion ratio test defined in Section 6.B.

b. The company shall map each of the proxy funds defined in Sections 7J and 7K to the prescribed fund returns defined in Section 7.G.1.a following the mapping process described in Section 7.G.2.b.

Guidance Note: The Scenario 12 interest rate yield curves and total investment returns are based on approximately a one standard deviation shock to the Economic conditions as of the projection start date, where the shock is spread uniformly over the first 20 years of the projection. It is anticipated that Scenario 12 will be updated quarterly and posted on the NAIC website, reflecting the current yield curve at the end of each quarter. The values in Scenario 12 are based on the same generator that is anticipated to be used for the stochastic scenarios, but that generator has not yet been adopted

2. Stochastic Economic Scenarios

a. For purposes of calculating the stochastic reserve under Section 4, the company shall use

i. U.S. Treasury interest rate curves following a prescribed economic scenario generator with prescribed parameters; and

ii. Total investment return paths for general account equity assets and separate account fund performance generated from a prescribed economic scenario generator with prescribed parameters.

Guidance Note: It is expected that the prescribed generator will produce prescribed returns for several different investment categories (similar to the 19 categories provided by the American Academy of Actuaries for C3P2: Treasuries at different tenors, money market/short term investments, U.S. Intermediate Term Government Bonds, U.S. Long Term Corporate Bonds, Diversified Fixed Income, Diversified Balanced Allocation, Diversified Large Capitalized U.S. Equity, Diversified International Equity, Intermediate Risk Equity, and Aggressive or Specialized Equity).

b. The company shall map each of the proxy funds defined in Sections 7J and 7K to the prescribed fund returns defined in Section 7.G.2.a. This mapping process may involve blending the accumulation factors from two or more of the prescribed fixed income and/or equity returns to create the projected returns for each proxy fund. If a proxy fund cannot be appropriately mapped to some combination of the prescribed returns, the company shall determine an appropriate return and disclose the rationale for determining such return.

Guidance Note: Mapping of the returns on the proxy funds to the prescribed funds returns is left to the judgment of the actuary, but the returns so generated must be consistent with the prescribed returns. This does not imply a strict functional relationship between the model parameters for various markets/funds, but it would generally be inappropriate to assume that a market or fund consistently "outperforms" (lower risk, higher expected return relative to the efficient frontier) over the long term.

When parameters are fit to historic data without consideration of the economic setting in which the historic data emerged, the market price of risk may not be consistent with a reasonable long-term model of market equilibrium. One possibility for establishing 'consistent' parameters (or scenarios) across all funds would be to assume that the market price of risk is constant (or nearly constant) and governed by some functional (e.g., linear) relationship. That is, higher expected returns can only be garnered by assuming greater risk (For example, the standard deviation of log returns is often used as a measure of risk).

Specifically, two return distributions X and Y would satisfy the following relationship:

$$\text{Market Price of Risk} = \left(\frac{E[R_X] - r}{\sigma_X} \right) = \left(\frac{E[R_Y] - r}{\sigma_Y} \right)$$

where $E[R]$ and σ are respectively the (unconditional) expected returns and volatilities and r is the expected risk-free rate over a suitably long holding period commensurate with the projection horizon. One approach to establish consistent scenarios would set the model parameters to maintain a near-constant market price of risk.

A closely related method would assume some form of 'mean-variance' efficiency to establish consistent model parameters. Using the historic data, the mean-variance (alternatively, 'drift-volatility') frontier could be a constructed from a plot of (mean, variance) pairs from a collection of world market indices. The frontier could be assumed to follow some functional form (quadratic polynomials and logarithmic functions tend to work well) with the coefficients determined by standard curve fitting or regression techniques. Recognizing the uncertainty in the data, a 'corridor' could be established for the frontier. Model parameters would then be adjusted to move the proxy market (fund) inside the corridor.

Clearly, there are many other techniques that could be used to establishing consistency between the return on the proxy funds and the prescribed returns. While appealing, the above approaches do have drawbacks and the actuary should not be overly optimistic in determining the fund returns.

    c.   A scenario reduction technique is a methodology that derives a reduced set of economic scenarios from a larger set while maintaining the characteristics and robustness of the larger set.

        Scenario reduction techniques may be considered acceptable as long as:

        i.   the larger set of scenarios is prescribed by the NAIC;

        ii.   the scenario reserves of a representative subset of policies, run using the reduced scenario set, are consistent with the scenario reserves of the same subset of policies, run using the larger scenario set; and

        iii.   use of the full set of scenarios would not result in a materially greater reserve.

Drafting Note: Other necessary additions include: added documentation and a definition of the calibration criteria

Drafting Note: More guidance is needed on how many scenarios a company should generate.

H.   Determination of Net Asset Earned Rates and Discount Rates

    1.   In calculating the deterministic reserve the company shall determine a path of net asset earned rates for each model segment that reflects the net general account portfolio rate in each projection interval (i.e., monthly, quarterly, annually) in compliance with Section 7, which will depend primarily on:

a. Projected net investment earnings from the portfolio of starting assets.

b. Pattern of projected asset cash flows from the starting assets and subsequent reinvestment assets.

c. Pattern of net liability cash flows.

d. Projected net investment earnings from reinvestment assets.

2. The company shall calculate the net asset earned rate as the ratio of net investment earnings divided by invested assets subject to the following:

a. The impact of separate accounts and policy loans is excluded.

b. The net asset earned rate for each projection interval is calculated in a manner that is consistent with the timing of cash flows and length of the projection interval of the related cash flow model.

c. Net investment earnings include:

i. Investment income plus capital gains and losses (excluding capital gains and losses that are included in the PIMR), minus appropriate default costs and investment expenses;

ii. Income from derivative asset programs; and

iii. Amortization of the PIMR.

d. Invested assets are determined in a manner that is consistent with the timing of cash flows within the cash flow model and the length of the projection interval of the cash flow model.

e. Invested assets are adjusted to reflect the negative of the outstanding PIMR.

f. The annual statement value of derivative instruments or a reasonable approximation thereof is in invested assets.

g. All items reflected in the ratio are consistent with statutory asset valuation and accrual accounting, including reflection of due, accrued or unearned investment income where appropriate.

3. The company may use a grouped liability model to calculate the path of net asset earned rates for the deterministic reserve and then perform the seriatim reserve calculation for each policy based on those net asset earned rates.

Guidance Note: Section 7.A.2 permits the use of simplified approaches to calculate the deterministic reserve and stochastic reserve. This availability for simplification includes ways to determine appropriate net asset earned rates. Small to intermediate size companies, or any size company with smaller blocks of business, have options to create net asset earned rates under simplified approaches if they continue to meet the requirement that the approach produces reserves that are no less than those produced by a more robust cash flow model.

4. The company shall use the path of net asset earned rates as the discount rates for each model segment in the deterministic reserve calculations in Section 4, and the stochastic exclusion test in Section 6.

5. The company shall use the path of one-year U.S. Treasury interest rates in effect at the beginning of each projection year multiplied by 1.05 for each model segment within each scenario as the discount rates in the stochastic reserve calculations in Section 5.

Guidance Note: The use of different discount rate paths for the seriatim and scenario reserves is driven by differences in methodology. The seriatim reserve is based on a present value of all liability cash flows, with the discount rates reflecting the investment returns of the assets backing the liabilities. The scenario reserve is based on a starting estimate of the reserve, and assets that support that estimate, plus the greatest present value of accumulated

deficiencies. Here, the discount rates are a standard estimate of the investment returns of only the marginal assets needed to eliminate either a positive or negative deficiency.

I.   Future Pretax Interest Maintenance Reserve Amounts

The company shall spread realized capital gains and losses arising from changes in interest rates over future projection intervals by establishing a new PIMR amount and future amortization schedule in a manner that is reasonably consistent with statutory accounting procedures under the assumption that capital gains tax is zero.

J.   Grouping of Equity Investments in the General Account

1.   The company may group the portion of the general account starting assets that are equity investments (e.g., common stocks, real estate investments) for modeling using an approach that establishes various equity investment categories with each investment category defined to reflect the different types of equity investments in the portfolio.

2.   The company shall design a proxy for each equity investment category in order to develop the investment return paths and map each investment category to an appropriately crafted proxy investment category normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific equity investment category.

K.   Grouping of Variable Funds and Subaccounts for Separate Accounts

1.   Similar to the approach used for general account equity investments, the company may group the portion of the starting asset amount held in the separate account represented by the variable funds and the corresponding account values for modeling using an approach that recognizes the investment guidelines and objectives of the funds.

2.   Similar to the approach used for general account equity investments, the company shall design an appropriate proxy for each variable subaccount in order to develop the investment return paths and map each variable account to an appropriately crafted proxy fund normally expressed as a linear combination of recognized market indices (or sub-indices). The company shall include an analysis in the proxy construction process that establishes a firm relationship between the investment return on the proxy and the specific variable funds.

L.   Modeling of Derivative Programs

1.   When determining the deterministic reserve and the stochastic reserve, the company shall include in the projections the appropriate costs and benefits of derivative instruments that are currently held by the company in support of the policies subject to these requirements. The company shall also include the appropriate costs and benefits of anticipated future derivative instrument transactions associated with the execution of a clearly defined hedging strategy; and the appropriate costs and benefits of anticipated future derivative instrument transactions associated with non-hedging derivative programs (e.g. replication, income generation) undertaken as part of the investment strategy supporting the policies provided they are normally modeled as part of the company's risk assessment and evaluation processes.

Guidance Note: The prohibition in these minimum reserve requirements against projecting future hedging transactions other than those associated with a clearly defined hedging strategy is intended to address initial concerns expressed by various parties that reserves could be unduly reduced by reflection of programs whose future execution and performance may have greater uncertainty. The prohibition appears however to be in conflict with Principle 2 listed in the valuation manual. Companies may actually execute and reflect in their risk assessment and evaluation processes hedging strategies similar in many ways to clearly defined hedging strategies but lack sufficient clarity in one or more of the qualification criteria. By excluding the associated derivative instruments, the investment strategy that is modeled may also not reflect the investment strategy the company actually uses. Further, since the future hedging transactions may be a net cost to the company in some scenarios and a net benefit in other scenarios, the exclusion of such transactions can result in a minimum reserve that is either lower or higher than it would have been if the transactions were not excluded. The direction of such impact on the reserves could also change from period to period as the actual and projected paths of economic conditions change. A more graded

approach to recognition of non-qualifying hedging strategies may be more theoretically consistent with Principle 2. The requirements stated here for handling hedging strategies are essentially consistent with those included in the CTE methodology portion of the September 2006 exposure draft of Actuarial Guideline VACARVM for variable annuity reserving. It is recommended that, as greater experience is gained by actuaries and regulators with the principle-based approach, and as industry hedging programs mature, the various requirements of this section be reviewed.

2. For each derivative program that is modeled, the company shall reflect the company's established investment policy and procedures for that program, project expected program performance along each Scenario, and recognize all benefits, residual risks, and associated frictional costs. The residual risks include, but are not limited to: basis, gap, price, parameter estimation, and variation in assumptions (mortality, persistency, withdrawal, etc.). Frictional costs include, but are not limited to: transaction, margin (opportunity costs associated with margin requirements) and administration. For clearly defined hedging strategies, the company may not assume that residual risks and frictional costs have a value of zero, unless the company demonstrates in the PBR Actuarial Report that "zero" is an appropriate expectation.

3. In circumstances where one or more material risk factors related to a derivative program is not fully captured within the cash flow model used to calculate CTE 70, the company shall reflect such risk factors by increasing the stochastic reserve as described in Section 5.B.5.

Guidance Note: The previous two paragraphs address a variety of possible situations. Some hedging programs may truly have zero or minimal residual risk exposure, such as when the hedge program exactly replicates the liability being hedged. With dynamic hedging strategies, residual risks are typically expected; however, in some cases the cash flow model supporting the CTE calculation may be able to adequately reflect such risks through margins in program assumptions, adjustments to costs and benefits, etc. In other cases, reference to additional external models or analyses may be necessary where such results cannot be readily expressed in a format directly amenable to a CTE calculation. In such cases, the company will need to combine the results of such models by some method that is consistent with the objectives of these requirements. Emerging actuarial practice will be relied on to provide approaches for a range of situations that may be encountered.

Guidance Note: Statutes, laws or regulations of any state or jurisdiction related to the use of derivative instruments for hedging purposes supersede these provisions and therefore these provisions should not be used to determine whether a company is permitted to use such instruments in any state or jurisdiction.

M. Clearly Defined Hedging Strategy

1. A clearly defined hedging strategy must identify:

a. The specific risks being hedged (e.g., cash flow, policy interest credits, delta, rho, vega, etc.).

b. The hedge objectives.

c. The risks that are not hedged (e.g., variation from expected mortality, withdrawal, and other utilization or decrement rates assumed in the hedging strategy, etc.).

d. The financial instruments used to hedge the risks.

e. The hedge trading rules including the permitted tolerances from hedging objectives.

f. The metrics for measuring hedging effectiveness.

g. The criteria used to measure effectiveness.

h. The frequency of measuring hedging effectiveness.

i. The conditions under which hedging will not take place.

j. The person or persons responsible for implementing the hedging strategy.

k.   Areas where basis, gap or assumption risk related to the hedging strategy have been identified.

l.   The circumstances under which hedging strategy will not be effective in hedging the risks.

2.   A clearly defined hedging strategy may be dynamic, static or a combination of dynamic and static.

3.   Hedging strategies involving the offsetting of the risks associated with other products outside of the scope of these requirements is not a clearly defined hedging strategy.

Guidance Note: For purposes of the above criteria, "effectiveness" need not be measured in a manner as defined in NAIC Accounting Practices and Procedures.

Section 8.   Reinsurance

A.   General Considerations

1.   In this section reinsurance includes retrocession and assuming company includes retrocessionaire.

Guidance Note: In determining reserves, one party to a reinsurance transaction may make use of reserve calculations of the other party. If the company chooses assumptions that differ from those used by the other party, the company must either rerun the reserve calculation or be prepared to demonstrate that appropriate adjustments to the other party calculation have been made.

2.   The company shall assume that the laws and regulations in place as of the valuation date regarding credit for reinsurance remain in effect throughout the projection period.

3.   A company shall include a reinsurance agreement or amendment in calculating the minimum reserve if,, under the terms of the Accounting Practices and Procedures Manual, the agreement or amendment qualifies for credit for reinsurance.

4.   4If a reinsurance agreement or amendment does not qualify for credit for reinsurance, but treating the reinsurance agreement or amendment as if it did so qualify would result in a reduction to the company's surplus, then the company shall increase the minimum reserve by the absolute value of such reductions in surplus.

Guidance Note: Section 8.A.3 provides that, in general, if a treaty does not meet the requirements for credit for reinsurance, it should not be allowed to reduce the reserve. Thus, it should not be allowed a reinsurance credit to the net premium reserve and its cash flows should not be included in the cash flow models used to calculate the deterministic or stochastic reserve. Section 8.A.4 introduces the exception that if allowing a net premium credit and including the treaty cash flows in the cash flow models would produce a more conservative result, then that more conservative result should prevail.

B.   Determination of a credit to the net premium reserve to reflect reinsurance ceded

1.   Determination of the credit to the net premium reserve to reflect reinsurance shall be done in accordance with SSAP No. 61.

Guidance Note: The credit taken under a coinsurance arrangement shall be calculated using the same methodology and assumptions used in determining its net premium reserve, but only for the percentage of the risk that was reinsured. If the reinsurance is on a yearly renewable term basis, the credit shall be calculated using the assumptions used in determining the net premium reserve, but for the net amount at risk.

Drafting Note: The wording in subsection 8.B.1 may be replaced after the VM-20 Impact Study is completed.

2.   If a company cedes portions of a policy under more than one reinsurance agreement, then the company shall calculate a credit separately for each such agreement. The credit for reinsurance ceded for the policy shall be the sum of the credits for all such agreements.

3. The credit for reinsurance ceded applied to a group of policies shall be the sum of the credit for reinsurance ceded for each of the policies of the group.

C. Reflection of reinsurance cash flows in the deterministic reserve or stochastic reserve

In calculations of the deterministic reserve or stochastic reserve pursuant to Sections 4 and 5:

1. The company shall use assumptions and margins that are appropriate for each company pursuant to a reinsurance agreement. In such instance, the ceding and assuming companies are not required to use the same assumptions and margins for the reinsured policies.

2. To the extent that a single deterministic valuation assumption for risk factors associated with certain provisions of reinsurance agreements will not adequately capture the risk the company shall:

    a. Stochastically model the risk factors directly in the cash flow model when calculating the stochastic reserve; or

    b. Perform a separate stochastic analysis outside the cash flow model to quantify the impact on reinsurance cash flows to and from the company. The company shall use the results of this analysis to adjust prudent estimate assumptions or to determine an amount to adjust the stochastic reserve to adequately make provision for the risks of the reinsurance features.

    Guidance Note: Examples of reinsurance provisions where a single deterministic valuation assumption will not adequately capture the risk are stop-loss reinsurance.

Drafting Note: Additional guidance in an ASOP may be needed to explain further what features give rise to this stochastic modeling requirement.

3. The company shall determine cash flows for reinsurance ceded subject to the following:

    a. The company shall include the effect of projected cash flows received from or paid to assuming companies under the terms of ceded reinsurance agreements in the cash flows used in calculating the deterministic reserve in Section 4 and stochastic reserves in Section 5.

    b. If cash flows received from or paid to assuming companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to assuming companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.

    c. The company shall use assumptions to project cash flows to and from assuming companies that are consistent with other assumptions used by the company in calculating the deterministic or stochastic reserve for the reinsured policies, and that reflect the terms of the reinsurance agreements.

4. The company shall determine cash flows for reinsurance assumed subject to the following:

    a. The company shall include the effect of cash flows projected to be received from and paid to ceding companies under the terms of assumed reinsurance agreements in the cash flows used in calculating the deterministic reserve in Section 4 and the stochastic reserve in Section 5.

    b. If cash flows received from or paid to ceding companies under the terms of any reinsurance agreement are dependent upon cash flows received from or paid to ceding companies under other reinsurance agreements, the company shall first determine reinsurance cash flows for reinsurance agreements with no such dependency and then use the reinsurance cash flows from these independent agreements to determine reinsurance cash flows for the remaining dependent agreements.

5.   If a company assumes a policy under more than one reinsurance agreement, then the company may treat each agreement separately for the purposes of calculating the reserve.

6.   6An assuming company shall use assumptions to project cash flows to and from ceding companies that reflect the assuming company's experience for the business segment to which the reinsured policies belong, and reflect the terms of the reinsurance agreement.

7.   The company shall assume that the counterparties to a reinsurance agreement are knowledgeable about the contingencies involved in the agreement and likely to exercise the terms of the agreement to their respective advantage, taking into account the context of the agreement in the entire economic relationship between the parties. In setting assumptions for the non-guaranteed elements in reinsurance cash flows the company shall include, but not be limited to the following:

   a.   The usual and customary practices associated with such agreements.

   b.   Past practices by the parties concerning the changing of terms, in an economic environment similar to that projected.

   c.   Any limits placed upon either party's ability to exercise contractual options in the reinsurance agreement.

   d.   The ability of the direct-writing company to modify the terms of its policies in response to changes in reinsurance terms.

   e.   Actions that might be taken by a party if the counterparty is in financial difficulty.

8.   The company shall account for any actions that the ceding company and, if different, the direct-writing company have taken or are likely to take that could affect the expected cash flows of the reinsured business in determining assumptions for the minimum reserve.

   Guidance Note: Examples of actions the direct-writing company could take include 1) instituting internal replacement programs or special underwriting programs, both of which could change expected mortality rates, or 2) changing non-guaranteed elements in the reinsured policies, which could affect mortality, policyholder behavior, and possibly expense and investment assumptions. Examples of actions the ceding company could take include: 1) the exercise of contractual options in a reinsurance agreement to influence the setting of non-guaranteed elements in the reinsured policies, or 2) the ability to participate in claim decisions.

9.   For actions taken by the ceding company, and, if different, the direct-writing company, set assumptions in a manner consistent with Section 9.D. Note that these assumptions are in addition to, rather than in lieu of, assumptions as to the behavior of the underlying policyholders.

10.   The company shall use assumptions in determining the minimum reserve that account for any actions that the assuming company has taken or is likely to take that could affect the expected cash flows of the reinsured business.

   Guidance Note: Examples of such actions include, but are not limited to changes to the current scale of reinsurance premiums and changes to expense allowances.

11.   The company shall consider all elements of a reinsurance agreement that the assuming company can change and assumptions for those elements are subject to the requirements in Section 7.C. Appropriate assumptions for these elements may depend on the scenario being tested. The company shall take into account all likely consequences of the assuming company changing an element of the reinsurance agreement, including any potential impact on the probability of recapture by the ceding company.

   Guidance Note: The ability of an assuming company to change elements of reinsurance agreement, such as reinsurance premiums or expense allowances, may be thought of as comparable to the ability of a direct-writing company to change non-guaranteed elements on policies.

12.   The company shall set assumptions in a manner consistent with subsection 8.C.8 taking into account any ceding company option to recapture reinsured business. Appropriate assumptions may depend on the scenario being tested (analogous to interest-sensitive lapses).

        Guidance Note: The right of a ceding company to recapture is comparable to policyholder surrender options for a direct-writing company. Cash flows associated with recapture include recapture fees or other termination settlements.

13.   The company shall set assumptions in a manner consistent with subsection 8.C.10 taking into account an assuming company's right to terminate in-force reinsurance business. In the case in which the assuming company's right to terminate is limited to cases of non-payment of amounts due by the ceding company or other specific, limited circumstances, the company may assume that the termination option would be expected to have insignificant value to either party and therefore may exclude recognition of this right to terminate in the cash flow projections. However, if a reinsurance agreement contains other termination provisions with material impact, the company shall set appropriate assumptions for these provisions consistent with the particular scenario being tested.

14.   If under the terms of the reinsurance agreement, some of the assets supporting the reserve are held by the counterparty or by another party, the company shall

        a.   Consider the following in order to determine whether to model such assets for purposes of projecting cash flows:

                i.   The degree of linkage between the portfolio performance, and the calculation of the reinsurance cash flows.

                ii.   The sensitivity of the valuation result to the asset portfolio performance.

        b.   If the company concludes that modeling in unnecessary, document the testing and logic leading to that conclusion.

        c.   If the company determines that modeling is necessary, comply with the requirements in Section 7.E and Section 9.F and taking into account:

                i.   The investment strategy of the company holding the assets, as codified in the reinsurance agreement or otherwise based on current documentation provided by that company; and

                ii.   Actions that may be taken by either party that would affect the net reinsurance cash flows (e.g. a conscious decision to alter the investment strategy within the guidelines).

        Guidance Note: In some situations, it may not be necessary to model the assets held by the other party. An example would be modeling by an assuming company of a reinsurance agreement containing provisions, such as experience refund provisions, under which the cash flows and effective investment return to the assuming company are the same under all Scenarios.

        Guidance Note: Special considerations for modified coinsurance. Although the modified coinsurance (ModCo) reserve is called a reserve, it is substantively different from other reserves. It is a fixed liability from the ceding company to the assuming company in an exact amount, rather than an estimate of a future obligation. The ModCo reserve is analogous to a deposit. This concept is clearer in the economically identical situation of funds withheld. Therefore, the value of the modified coinsurance reserve will generally not have to be determined by modeling. However, the projected modified coinsurance interest may have to be modeled. In many cases, the modified coinsurance interest is determined by the investment earnings of an underlying asset portfolio, which in some cases will be a segregated asset portfolio or in others the ceding company's general account. Some agreements may use a rate not tied to a specific portfolio.

15.   If a ceding company has knowledge that an assuming company is financially impaired, the ceding company shall establish a margin for the risk of default by the assuming company. In the absence of knowledge that

the assuming company is financially impaired, the ceding company is not required to establish a margin for the risk of default by the assuming company.

16. If an assuming company has knowledge that a ceding company is financially impaired, the assuming company shall establish a margin for the risk of default by the ceding company. Such margin may be reduced or eliminated if the assuming company has a right to terminate the reinsurance upon non-payment by the ceding company. In the absence of knowledge that a ceding company is financially impaired, the assuming company is not required to establish a margin for the risk of default by the ceding company.

17. In setting any margins required by subsections 8.C.15 and 8.C.16 to reflect potential uncertainty regarding the receipt of cash flows from a counterparty, the company shall take into account the ratings, risk-based capital ratio or other available information related to the probability of the risk of default by the counterparty, as well as any security or other factor limiting the impact on cash flows.

D. Determination of a pre-reinsurance-ceded minimum reserves

1. The minimum reserve pursuant to Section 2 is a post-reinsurance-ceded minimum reserve. The company shall also calculate a pre-reinsurance-ceded reserve as specified in D.2 below, for financial statement purposes where such a pre-reinsurance ceded amount is required. Similarly, where a reserve credit for reinsurance may be required, the credit for reinsurance ceded shall be the excess, if any, of the pre-reinsurance ceded minimum reserve over the post-reinsurance-ceded minimum reserve. Note that due allowance for reasonable approximations may be used where appropriate.

2. The pre-reinsurance-ceded minimum reserve shall be calculated pursuant to the requirements of this Valuation Manual VM-20, using methods and assumptions consistent with those used in calculating the minimum reserve, but excluding the effect of ceded reinsurance.

   a. If, when ceded reinsurance is excluded, a group of policies is not able to pass the exclusion tests pursuant to Section 6, then the required deterministic or stochastic reserves shall be calculated in determining the pre-reinsurance-ceded minimum reserve even if not required for the minimum reserve.

   b. The company shall use assumptions that represent company experience in the absence of reinsurance, for example assuming that the business was managed in a manner consistent with the manner that retained business is managed, when computing such reserves.

   c. Reasonable approximations shall be made to adjust the amount and composition of the starting assets when excluding the effect of reinsurance. The requirement in section 7.D.1.c regarding the 98% to 102% collar does not apply when determining the amount of starting assets excluding the effect of ceded reinsurance.

Drafting Note: After the VM-20 Impact Study is completed, the allocation of the reinsurance credit to each reinsurance agreement should be reevaluated. The Task Force needs some basis for the allocation.

Section 9.   Assumptions

A. General Assumption Requirements

1. The company shall use prudent estimate assumptions in compliance with this section for each risk factor that is not prescribed or is not stochastically modeled by applying a margin to the anticipated experience assumption for the risk factor.

2. The company shall establish the prudent estimate assumption for each risk factor in compliance with the requirements in Section 12 of the NAIC Standard Valuation Law and must periodically review and update the assumptions as appropriate in accordance with these requirements.

3. The company shall model the following risk factors stochastically unless the company elects the stochastic modeling exclusion defined in Section 6:

a.   Interest rate movements (i.e., Treasury interest rate curves) and

b.   Equity performance (e.g., S&P 500 returns and returns of other equity investments).

4.   If the company elects to stochastically model risk factors in addition to those listed in A.3 above, the requirements in this section for determining prudent estimate assumptions for these risk factors do not apply.

5.   In determining the stochastic reserve the company shall use prudent estimate assumptions that are consistent with those prudent estimate assumptions used for determining the deterministic reserve, modified as appropriate to reflect the effects of each scenario.

6.   The company shall use its own experience, if relevant and credible, to establish an anticipated experience assumption for any risk factor. To the extent that company experience is not available or credible, the company may use industry experience or other data to establish the anticipated experience assumption, making modifications as needed to reflect the circumstances of the company.

   a.   For risk factors (such as mortality) to which statistical credibility theory may be appropriately applied, the company shall establish anticipated experience assumptions for the risk factor by combining relevant company experience with industry experience data, tables, or other applicable data in a manner that is consistent with credibility theory and accepted actuarial practice.

   b.   For risk factors (such as premium patterns on flexible premium contracts) that do not lend themselves to the use of statistical credibility theory, and for risk factors (such as the current situation with some lapse assumptions) to which statistical credibility theory can be appropriately applied, but cannot currently be applied due to lack of industry data, the company shall establish anticipated experience assumptions in a manner that is consistent with accepted actuarial practice and that reflects any available relevant company experience, any available relevant industry experience, or any other experience data that are available and relevant. Such techniques include:

      i.   Adopting standard assumptions published by professional, industry or regulatory organizations to the extent they reflect any available relevant company experience or reasonable expectations;

      ii.   Applying factors to relevant industry experience tables or other relevant data to reflect any available relevant company experience and differences in expected experience from that underlying the base tables or data due to differences between the risk characteristics of the company experience and the risk characteristics of the experience underlying the base tables or data;

      iii.   Blending any available relevant company experience with any available relevant industry experience and/or other applicable data using weightings established in a manner that is consistent with accepted actuarial practice and that reflects the risk characteristics of the underlying policies and/or company practices.

   c.   For risk factors that have limited or no experience or other applicable data to draw upon, the assumptions shall be established using sound actuarial judgment and the most relevant data available, if such data exists.

   d.   For any assumption that is set in accordance with the requirements of Section 9.A.6.c, the actuary shall use sensitivity testing and disclose the analysis performed to assure that the assumption is set at the conservative end of the plausible range.

   The appointed actuary shall annually review relevant emerging experience for the purpose of assessing the appropriateness of the anticipated experience assumption. If the results of statistical or other testing indicate that previously anticipated experience for a given factor is inadequate, then the appointed actuary shall set a new, adequate, anticipated experience assumption for the factor.

7.   The company shall examine the results of sensitivity testing to understand the materiality of prudent estimate assumptions on the minimum reserve and the company shall:

    a.   Perform sensitivity testing using samples of the policies in force and is not required that the entire valuation be done for each alternative assumption set. The company's choice of sample must not have a material impact on the results of the sensitivity testing;

    b.   Perform sensitivity testing using data from prior periods when appropriate; and

    c.   Update the sensitivity tests as appropriate, considering the materiality of the results of the tests. The company may update the tests less frequently when the tests show less sensitivity of the minimum reserve to changes in the assumptions being tested or the experience is not changing rapidly.

8.   The company shall vary the prudent estimate assumptions from scenario to scenario within the stochastic reserve calculation in an appropriate manner to reflect the scenario dependent risks.

B.   Assumption Margins

The company shall include margins to provide for adverse deviations and estimation error in the prudent estimate assumption for each risk factor that is not stochastically modeled or prescribed, subject to the following:

1.   The company shall determine an explicit set of initial margins for each material assumption independently (i.e., ignoring any correlation among risk factors) in compliance with this section. Next, if applicable, the level of a particular initial margin may be adjusted to take into account the fact that risk factors are not normally 100% correlated. However, in recognition that risk factors may become more heavily correlated as circumstances become more adverse, the initially determined margin may only be reduced to the extent the company can demonstrate that the method used to justify such a reduction is reasonable considering the range of scenarios contributing to the CTE calculation or considering the scenario used to calculate the deterministic reserve as applicable or considering appropriate adverse circumstances for risk factors not stochastically modeled.

    If not stochastically modeled or prescribed, assumptions that are generally considered material include but are not limited to mortality, morbidity, interest, equity returns, expenses, lapses, partial withdrawals, loans, and option elections.

2.   The greater the uncertainty in the anticipated experience assumption, the larger the required margin, with the margin added or subtracted as needed to produce a larger minimum reserve than would otherwise result. For example, the company shall use a larger margin when:

    a.   The experience data have less relevance or lower credibility.

    b.   The experience data are of lower quality, such as incomplete, internally inconsistent, or not current.

    c.   There is doubt about the reliability of the anticipated experience assumption, such as, but not limited to recent changes in circumstances or changes in company policies.

    d.   There are constraints in the modeling that limit an effective reflection of the risk factor.

3.   In complying with the sensitivity testing requirements in Subsection A.7 above greater analysis and more detailed justification are needed to determine the level of uncertainty when establishing margins for risk factors that produce greater sensitivity on the minimum reserve.

4.   A margin is not required for assumptions when variations in the assumptions do not have a material impact on the minimum reserve.

5.   A margin should reflect the magnitude of fluctuations in historical experience of the company for the risk factor, as appropriate.

6.   The company shall apply the method used to determine the margin consistently on each valuation date, but is permitted to change the method from the prior year if the rationale for the change and the impact on minimum reserve is disclosed.

C.   Mortality Assumptions

1.   Procedure for Setting Prudent Estimate Mortality Assumptions

a.   The company shall determine credibility segments for the purpose of determining which policies will qualify for the simplified method described in subsection 9.C.1.e. The determination of each credibility segment shall be subject to the following:

i.   Each credibility segment shall consist of policies with similar underwriting and mortality experience characteristics.

ii.   The company may group policies with different plans of insurance into the same credibility segment, if underwriting and mortality experience characteristics are similar for all the policies.

Guidance Note: It is anticipated that most companies will define a credibility segment to be a block of policies with similar underwriting rules, such as guaranteed issue, or regularly underwritten policies.

iii.   The company may remove from the credibility segments any policies for which the experience is reflected through adjustments to the prudent estimate mortality rate assumptions under Paragraph f below, including policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.

b.   The company shall determine mortality segments for the purpose of determining separate credibility adjusted experience rates and prudent estimate mortality tables by grouping policies within each credibility segment that the company expects will have similar underwriting methods and mortality experience.

c.   The company shall determine the credibility data set subject to the following:

i.   The company shall review the mortality experience described in subparagraph i and ii above at least once every three years and update as needed.

ii.   The credibility data set for each credibility segment shall include the most recent three year study as defined in subparagraph i and shall include the in force and claim data pertaining to the study period for all policies currently in the credibility segment or that would have been in the credibility segment at any time during the period over which experience is being evaluated.

iii.   The period of time used for data should be at least three years and should not exceed ten years.

iv.   The company shall use actual mortality experience directly applicable to the credibility segment, when available.

v.   The company may use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the credibility segment have underwriting methods and mortality experience characteristics similar to those of the policies in the pool and the aggregate pool data are available to the company.

d.   If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall establish mortality assumptions using experience mortality rates, blended with industry experience as appropriate. The company should use the following procedure:

    i.   Select a credibility procedure that describes the method by which the experience data for a mortality segment and appropriate industry experience are used to produce credibility adjusted experience rates subject to the following:

        1)   The credibility procedure shall be based on a statistical method consistent with accepted actuarial practice; and

        2)   As the credibility in the experience data set for a mortality segment or for a cell or group of call included in a mortality segment increases, the credibility adjusted experience rates produced by the credibility procedure shall approach the actual experience rates.

    ii.   Use the procedure described in subsection 9.C.2 to determine which of the industry basic tables shall serve as the applicable industry table for that mortality segment required by the selected credibility procedure.

    iii.   Determine the experience mortality rates.

    iv.   Apply the selected credibility procedure to determine credibility adjusted experience rates, as provided in subsection 9.C.3.

    v.   Determine the Credibility Factor for the credibility segment using the same credibility procedure as in subsection 9.C.1.d.i.

    vi.   Determine margin for each credibility segment as provided in subsection 9.C.4 below using the Credibility Factor determined in subsection 9.C.1.d.v.

    vii.   Set the prudent estimate mortality assumption equal to the credibility adjusted experience rates increased by the margin determined in subsection 9.C.1.d.vi.

In order to determine mortality expectations for the mortality experience of subsets of a credibility segment that were recently subdivided into smaller classes, mortality for the new classes could be determined by using the actual experience from the credibility segment prior to being subdivided and reclassifying policies based on the new criteria used for more recent issues.

Other actuarially sound methods of determining credibility blended mortality expectations are also acceptable.

Guidance Note: Based on a Limited Fluctuation Method calculation which sets the standard for full credibility as being within 3% of the true value with 90% probability, assuming a Poisson distribution for the number of deaths and assuming no variation in net amount at risk, the number of deaths required for 10% credibility is 30 and for 20% credibility it is 120. Because the purpose of the credibility criterion is to provide a simple test that would improve the efficiency of the principles-based valuation process by exempting small blocks of business, it may be appropriate to determine the level of deaths that is consistent with this goal by, for example, surveying small companies.

e.   If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall use the following simplified method to determine prudent estimate assumption for the credibility segment:

    i.   Determine the applicable industry basic table using the underwriting scoring procedure described in subsection 9.C.2, or by other actuarially sound methods.

    ii.   Set the Credibility Factor for the credibility segment equal to zero.

iii.   Determine the margin as provided in subsection 9.C.4.

iv.   Set the prudent estimate mortality equal to the applicable industry basic table determined in Subparagraph 9.C.1e.i increased by the margin determined in subparagraph e.iii above.

f.   Adjust the prudent estimate mortality assumptions to reflect differences associated with impaired lives, and differences due to policyholder behavior if there is a reasonable expectation that due to conditions such as changes in premiums or other policy provisions, policyholder behavior will lead to mortality results that vary from the mortality results that would otherwise be expected.

      i.   The adjustment for impaired lives shall follow established actuarial practice, including the use of mortality adjustments determined from clinical and other data.

      ii.   The adjustment for policyholder behavior shall follow accepted actuarial practice, including the use of dynamic adjustments to base mortality.

2.   Determination of Applicable Industry Basic Tables

a.   The company may apply the underwriting criteria scoring procedure described in Subparagraph b below to determine:

      i.   The industry basic table that can serve as the industry table under the selected credibility procedure for mortality segments within those credibility segments that do not qualify for the simplified method to determine the prudent estimate mortality assumptions as described in subsection 9.C.1.d above.

      ii.   The applicable industry basic table for mortality segments within those credibility segments that qualify for the simplified method to determine prudent estimate mortality assumptions as described in subsection 9.C.1.e above.

b.   The underwriting criteria scoring procedure is the algorithm described in pages 8 to 27 of the Interim 2007 Report of the Society of Actuaries and American Academy of Actuaries Joint Preferred Mortality Project and embedded in the Underwriting Criteria Score Calculator which is maintained on the Society of Actuaries web site, **http://www.soa.org/research/individual-life/2008-score-calc.aspx** .

      i.   In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for a particular mortality segment, the company shall take into account factors that are not recognized in the underwriting scoring algorithm but which are applicable to policies that are issued in that mortality segment.

      Guidance Note: Examples of such factors include the number of underwriting exceptions that are made, the quality and experience level of the underwriters, and characteristics of the distribution system. For example, if a company deviates from its preferred criteria on a regular basis, then it needs to take that into consideration since the underwriting criteria scoring procedure is not designed to quantify that risk.

      ii.   In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for policies that are issued subject to simplified underwriting and policies that are issued without underwriting, the company shall take into account factors not recognized in the underwriting scoring algorithm but which are applicable to such policies.

      iii.   In taking into account factors that are not recognized in the underwriting scoring algorithm, a company may adjust the industry basic tables up or down 2 tables from that determined by application of the underwriting criteria scoring procedures. Further adjustments to reflect risk characteristics not captured within the underwriting criteria scoring tool may be allowed upon approval by the Commissioner.

Drafting Note: Should the number of tables that could be adjusted equal 2 in subparagraph iii?

    c.   As an alternative to the Underwriting Criteria Scoring Tool, the company may use other actuarially sound methods to determine the applicable basic tables related to subdivisions of mortality segments . The company shall document the analysis performed to demonstrate the applicability of the chosen method and resulting choice in tables and reasons why the results using the Underwriting Criteria Scoring Tool may not be suitable.

Guidance Note: For example, the company may determine a more all inclusive basic table as a table appropriate for the whole credibility segment (appropriately modified by the removal of classified lives, term conversions or any other legitimately excludable class) and then subdivide that segment using actuarially sound methods including but not limited to the UCS

    d.   If no industry basic table appropriately reflects the risk characteristics of the mortality segment, the company may use any well-established industry table that is based on the experience of policies having the appropriate risk characteristics in lieu of an industry basic table.

Guidance Note: Subsection 9.C.2.de above is intended to provide flexibility needed to handle products based on group-type mortality, etc., for which there might not be an industry basic table.

    e.   The industry basic table shall be the 2008 Valuation Basic Table (VBT).

3.   Determination of Company Experience Mortality Rates

    a.   For each mortality segment, the company shall determine experience mortality rates based on the experience data set defined in subsection 9.C.3.b.

    b.   If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall set the mortality experience rates equal to the applicable industry table determined in subsection 9.C.1.e.i.

    c.   If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall determine the experience data set used to determine experience mortality rates as follows:

          i.   The experience data set shall include, at a minimum, the portion of the credibility data set defined in subsection 9.C.1.c for the class of business.

          ii.   The company may use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the credibility segment have underwriting and mortality experience characteristics similar to those of the policies in the pool and the aggregate pool data are available to the company.

          iii.   If actual experience data is not available or has limited credibility, the company may include in the experience data set data from other sources if available and appropriate. Data from other sources is appropriate if the source has underwriting and mortality experience characteristics that are similar to policies in the credibility segment.

          iv.   The company shall review, and update as needed, the experience mortality described in subsections 9.C.3.c.i, 9.C.3.c.ii and 9.C.3.c.iii, whether based on actual experience or data from other sources, at least every five years; however, whenever updated experience data becomes available, the company shall reflect changes implied by the updated data to the extent such changes are significant and are expected to continue into the future. More frequent updates should result in lower margins under in subsection 9.C.4.

d. The company may adjust the mortality experience rates for each mortality segment to reflect the expected incremental change due to the adoption of risk selection and underwriting practices different from those underlying the experience data identified above, provided that:

    i. The adjustments are supported by published medical or clinical studies; and

    ii. The rationale and support for the use of the study and for the adjustments are disclosed in the PBR Actuarial Report.

Guidance Note: It is anticipated that such adjustments to experience will rarely be made. Since these adjustments are expected to be rare, and since it is difficult to anticipate the nature of these adjustments, the commissioner may wish to determine the level of documentation or analysis that is required to allow such adjustments. The NAIC may want to consider whether approval by a centralized examination office would be preferable to approval by the commissioner.

4. Process to Blend Company and Industry Experience Rates.

a. If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall determine credibility adjusted experience rates using the credibility procedure selected in accordance with subsection 9.C.1.d above.

b. The company shall use, in conjunction with the credibility method, the industry basic table or appropriate weighted average of industry basic tables determined in subsection 9.C.2 for the mortality segment or the mortality segments to which the mortality experience cell or cells belong.

c. If company experience mortality rates by age and duration only exist for some of the mortality experience cells within a mortality segment, the company shall determine the remainder of the table by grading into an industry mortality table or a modified industry mortality table where the modification is based on the credible experience in the earlier policy years. Such grading must be reasonable and consistent with accepted actuarial practice and shall take into account the level of partial credibility, the trend in actual to expected ratios, the shape and level of the resulting mortality rates, and the reasons for differences in mortality results relative to industry mortality rates such as differences in underwriting, market and other factors.

d. The company may reflect mortality improvement only up to the projection start date based on applicable published industry-wide experience in the credibility adjusted experience rates. Any adjustment made shall be for the period from the experience weighted average date underlying the company experience used in the credibility process to the projection start date.

Drafting Note: Because mortality improvement beyond the projection start date is not allowed to be reflected in the prudent estimate assumption, then the lack of using mortality improvement is an implicit margin, and should be treated ~~and~~ as a margin for the stochastic exclusion ratio test in Section 6.B. and should be included in the disclosure of the total margin (in addition to the explicit margin for mortality defined in Section 9.B).

5. Determination of Mortality Margin

a. The mortality margin shall be in the form of a percentage increase applied to the Anticipated Experience Assumption.

b. A mortality margin shall be included for Random Fluctuation Risk and Company Variation Risk.

    i. Random Fluctuation Risk covers deviations in the mortality experience resulting from periodic variations of the experience from the mean (i.e., random fluctuation from the expected results of credible component of a company's mortality). The margin for random fluctuation risk shall:

        1) take into consideration the sophistication of the method used to estimate credibility and the number of years experience modeled, i.e. using the number of claims to determine credibility might or fewer years to measure variation in

experience from year to year indicate the need for a greater margin than using a more robust statistical approach or less years to measure variability;

2)   be no less than 1% and no greater than 10%; and

3)   vary by the size of the credibility factor whereby mortality segments with a lower credibility factor have a load at the higher end of the permitted range.

ii.   Company variation risk covers deviations from a selected industry mortality due to differences in underwriting practices and the demographics of the underlying insured lives. The margin for company variation risk shall:

1)   be set to zero for credibility segments in which the credibility factor is 1.00;

2)   for credibility segments where the credibility factor is less than 1.00, be equal to the percentages in the American Academy of Actuaries' Mortality Margin Table in Appendix 3.

c.   Within each mortality segment, the mortality margin shall be set equal to the Credibility Factor as determined in subsection 9.C.1.d.4 or subsection 9.C.1.e.ii times the margin for random fluctuation risk determined in Subparagraph 9.C.5.b.i plus (1 - the Credibility Factor) times the margin for company variation risk determined in subsection 9.C.5.b.ii.

d.   This margin shall be increased, as appropriate to reflect the level of uncertainty related to situations, including but not limited to the following:

i.   The reliability of the company's experience studies is low due to imprecise methodology, length of time since the data was updated or other reasons. The longer the time since the experience data was updated, the larger the margin.

ii.   The underwriting or risk selection risk criteria associated with the mortality segment have changed since the experience on which the credibility adjusted experience rates are based was collected.

iii.   The data underlying the credibility adjusted experience rates lack homogeneity.

iv.   Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.

v.   The company's marketing or administrative practices or market forces expose the policies to the risk of anti-selection.

Guidance Note: For example, the secondary market for life insurance policies

vi.   Underwriting is less effective than expected.

vii.   Errors occur.

D.   Policyholder Behavior Assumptions

1.   General Prudent Estimate Policyholder Behavior Assumption Requirements

The company shall determine prudent estimate policyholder behavior assumptions such that the assumptions

a.   Reflect expectations regarding variations in anticipated policyholder behavior relative to characteristics that have a material impact on the minimum reserve, which, may include gender, attained age, issue age, policy duration, time to maturity, tax status, level of account and cash

value, surrender charges, transaction fees or other policy charges; distribution channel, product features and whether the policyholder and insured are the same person or not.

    b.   Are appropriate for the block of business being valued, giving due consideration to other assumptions used in conjunction with the cash flow model and to the Scenarios whose results are likely to contribute to the minimum reserve.

    c.   Are based on actual experience data directly applicable to the block of business being valued (i.e., direct data) when available. In the absence of directly applicable data, the company should next use available data from any other block of business that is similar to the block of business being valued, whether or not that block of business is directly written by the company. If data from a similar block of business are used, the company shall adjust the anticipated experience assumption to reflect material differences between the business being valued and the similar block of business.

    d.   Reflect the outcomes and events exhibited by historical experience only to the extent such experience are relevant to the risk being modeled.

    e.   Reflect the likelihood that policyholder behavior will be affected by any significant increase in the value of a product option, such as term conversion privileges or policy loans.

    f.   Are assigned to policies in a manner that provides an appropriate level of granularity.

Guidance Note: Anticipated experience policyholder behavior assumptions for policyholder behavior risk factors include, but are not limited to, assumptions for premium payment patterns, premium persistency, surrenders, withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections. For fixed premium products, many of the premium payment patterns, premium persistency and partial withdrawal behavior assumptions may not apply and do not need to be considered.

2.   Dynamic Modeling

    a.   The company shall use a dynamic model or other scenario-dependent formulation to determine anticipated policyholder behavior unless the behavior can be appropriately represented by static assumptions.

    b.   For risk factors that are modeled dynamically the company shall use a reasonable range of future expected behavior that is consistent with the economic scenarios and other variables in the model.

    c.   The company is not required to model extreme or "catastrophic" forms of behavior in the absence of evidence to the contrary.

3.   Margins for Prudent Estimate Policyholder Behavior Assumptions

The company shall establish margins for policyholder behavior assumptions in compliance with subsection 9.B subject to the following:

    a.   To the extent that there is an absence of relevant and fully credible data, the company shall determine the margin such that the policyholder behavior assumption is shifted toward the conservative end of the plausible range of behavior which is the end of the range that serves to increase the minimum reserve.

    b.   The company must assume that policyholders' efficiency will increase over time unless the company has relevant and credible experience or clear evidence to the contrary.

    c.   The company must reflect the data uncertainty associated with using data from a similar but not identical block of business to determine the anticipated experience assumption.

    d.   The company shall establish a higher margin for partial withdrawal and surrender assumptions in the case where the company's marketing or administrative practices encourages anti-selection.

4. Additional Sensitivity Testing for Policyholder Behavior Assumptions

    The company shall examine the sensitivity of assumptions on the minimum reserve as required under Subsection A.3 of this section and shall at a minimum sensitivity test:

    a. Premium payment patterns, premium persistency, surrenders, partial withdrawals, allocations between available investment and crediting options, benefit utilization, and other option elections if relevant to the risks in the product;

    b. For policies that give policyholders flexibility in the timing and amount of premium payments

        i.   Minimum premium scenario.

        ii.   No further premium payment scenario.

        iii.   Pre-payment of premiums – Single premium scenario.

        iv.   Pre-payment of premiums – Level premium scenario.

5. For a universal life policy that guarantees coverage to remain in force as long as the secondary guarantee requirement is met and during projection periods in which the cash value is zero or minimal, industry experience, for purposes of complying with Section 9.A.6, shall be the *Lapse Experience under Term-to-100 Insurance Policies* published by the Canadian Institute of Actuaries in October, 2007. During projection periods in which the cash value is zero or minimal, the assumption shall grade from credible company experience to the rates in the *Lapse Experience under Term-to-100 Insurance Policies* published by the Canadian Institute of Actuaries in October, 2007 in 5 projection years from the last duration where substantially credible experience is available.

    Guidance Note: The term "minimal cash value" means that the cash value is of such small value that its presence would not significantly impact a policyholder's decision to lapse the policy in comparison to a situation with zero cash value.

E. Expense Assumptions

    1. General Prudent Estimate Expense Assumption Requirements

        In determining prudent estimate expense assumptions the company:

        a. Shall use expense assumptions for the deterministic and stochastic scenarios that are the same except for differences arising from application of inflation rates.

        b. May spread certain information technology development costs and other capital expenditures over a reasonable number of years in accordance with accepted statutory accounting principles as defined in the Statements of Statutory Accounting Principles.

        Guidance Note: Care should be taken with regards to the potential interaction with the considerations above.

        c. Shall assume that the company is a going-concern.

        d. Shall choose an appropriate expense basis that properly aligns the actual expense to the assumption. If values are not significant they may be aggregated into a different base assumption.

        Guidance Note: For example, death benefit expenses should be modeled with an expense assumption that is per death incurred

        e. Shall reflect the impact of inflation.

        f. May not assume future expense improvements.

g.   Shall not include assumptions for federal income taxes (and expenses paid to provide fraternal benefits in lieu of federal income taxes) and foreign income taxes.

h.   Shall use assumptions that are consistent with other related assumptions.

i.   Use fully allocated expenses.

Guidance Note: Expense assumptions should reflect the direct costs associated with the block of policies being modeled as well as indirect costs and overhead costs that have been allocated to the modeled policies;

j.   Shall allocate expenses using an allocation method that is consistent across company lines of business. Such allocation must be determined in a manner that is within the range of actuarial practice and methodology and consistent with applicable Actuarial Standards of Practice. Allocations may not be done for the purpose of decreasing the minimum reserve.

k.   Shall reflect expense efficiencies that are derived and realized from the combination of blocks of business due to a business acquisition or merger in the expense assumption only when any future costs associated with achieving the efficiencies are also recognized.

Guidance Note: For example, the combining of two similar blocks of business on the same administrative system may yield some expense savings on a per unit basis, but any future cost of the system conversion should also be considered in the final assumption. If all costs for the conversion are in the past then there would be no future expenses to reflect in the valuation.

l.   Shall reflect the direct costs associated with the policies being modeled as well as an appropriate portion of indirect costs and overhead (i.e. expense assumptions representing fully allocated expenses should be used.) including expenses categorized in the annual statement as 'taxes, licenses and fees' (Exhibit 3 of the Annual Statement) in the expense assumption.

m.   Shall include acquisition expenses associated with business in force as of the valuation date and significant non-recurring expenses expected to be incurred after the valuation date in the expense assumption.

n..   For policies sold under a new policy form or due to entry into a new product line the company shall use expense factors that are consistent with the expense factors used to determine anticipated experience assumptions for policies from an existing block of mature policies taking into account:

      i.   Any differences in the expected long term expense levels between the block of new policies and the block of mature policies; and

      ii.   That all expenses must be fully allocated as required under Subparagraph b above.

2.   Margins for Prudent Estimate Expense Assumptions

The company shall determine margins for expense assumptions according to the requirements given in subsection 9.B.

F.   Asset Assumptions

Guidance Note: This subsection includes requirements for prescribed asset default costs, certain prescribed asset spreads, and handling of uncertainty of timing and amounts of cash flows due to embedded options in the assets.

1.   Procedure for Setting Annual Default Cost Factors by Projection Year for Starting Fixed Income Assets with an NAIC Designation

The company shall determine a set of total annual default cost factors, by projection year, for each starting fixed income asset that has an NAIC designation, expressed as percentages of the statement value in each projection year. In making such determination for each asset, the company shall use certain inputs from

company records according to 9.F.2, assign a PBR credit rating according to the procedure in 9.F.3, and use prescribed tables or other sources as indicated in this subsection and contained or referenced in Appendix 2. The total annual default cost factor in each year shall be the sum of three prescribed components (a) + (b) + (c) as follows:

a.   The "baseline annual default cost factor" in all projection years shall be taken from the most current available baseline default cost table published by the NAIC using the PBR credit rating and weighted average life (WAL) of the asset on the valuation date. The methodology for creating this table can be found in Appendix 2 of this section VM-20. Table A of Appendix 2 shall be the initial NAIC table for this purpose.

b.   The "spread related factor" shall grade linearly in yearly steps from the prescribed amount in year one to zero in years four and after. The prescribed amount in year one may be positive or negative and shall be calculated as follows:

   i.   Multiply 25% by the result of (ii) minus (iii).

   ii.   The current market benchmark spread published by the NAIC consistent with the PBR credit rating and WAL of the asset on the valuation date.

   iii. The most current available long-term benchmark spread published by the NAIC consistent with the PBR credit rating and WAL of the asset on the valuation date.

   iv.   The resulting amount shall not be less than the negative of the baseline annual default cost in year one and shall not be greater than two times the baseline annual default cost in year one.

Drafting Note: Table H (investment grade spreads) and Table I (below investment grade spreads) in Appendix 2 need to be combined into one table.

c.   The "maximum net spread adjustment factor" shall be the same amount for each starting fixed income asset within a model segment and shall grade linearly in yearly steps from the prescribed amount in year one to zero in years four and after. The prescribed amount in year one shall be calculated as follows:

   i.   For each asset included in the model segment and subject to this subsection 9.F.1 calculate a preliminary year one net spread equal to the option adjusted spread of the asset on the valuation date less the sum of the amounts from 9.F.1.a and 9.F.1.b for the asset and less the investment expense for the asset.

   ii.   Calculate a weighted average preliminary year one net spread for the model segment using a weight applied to the amount in 9.F.1.c.i for each asset equal to that asset's statement value on the valuation date multiplied by the lesser of 3 years and the asset's WAL on the valuation date.

   iii. Calculate the amount in 9.F.1.c.i above for a hypothetical asset with the following assumed characteristics (the regulatory threshold asset):

      1)   A PBR credit rating of 9.

      2)   A WAL equal to the average WAL on the valuation date for the assets in the model segment and subject to this subsection 9.F.1.

      3)   An option adjusted spread equal to the current market benchmark spread published by the NAIC for the assumed PBR credit rating and WAL. The methodology for determining this published spread can be found in Appendix 2.

      4)   Investment expense of 0.10%.

Drafting Note: Table F of Appendix 2 provides illustrative current benchmark spreads as of a particular date, but the intent of the requirement is that the published spread be as of or close to the valuation date.

       iv.   The prescribed amount in year one is the excess, if any, of the result in 9.F.1.c.ii over the result in 9.F.1.c.iii.

Guidance Note: A broader explanation for this factor. For each model segment, a comparison is to be made of two spread amounts, both being net of the default costs calculated thus far and net of investment expenses. In each case, the gross option adjusted spread is based on current market prices at the valuation date. The first result represents the weighted average net spread for all the assets in the model segment (and subject to this subparagraph), as if all the assets were purchased at their current market spreads. The second result represents the net spread for a portfolio of index Baa bonds (NAIC 2, PBR credit rating of 9) as if the index Baa portfolio were purchased at the current average market spread. If the first result is higher than the second, additional default costs must be added to each asset until the two results are equal for the first projection year. This additional amount of default cost on each asset then grades off linearly in the model until it reaches zero in year four and after. This process is repeated each actual valuation date. A company that invests in an asset mix earning an average gross spread greater than Baa bonds initially, or an asset mix whose average market spread could widen significantly relative to market spreads for Baa bonds are examples of situations likely to trigger additional assumed default costs either initially or in the future.

Drafting Note: The maximum net spread adjustment factor still needs further study as to potential reserve volatility it could produce.

    2.   Company-Determined Inputs for Each Asset

        The company shall determine certain items for each asset that are necessary to calculate the total annual default cost factors.

       a.   "Investment expense" for each asset shall mean the company's anticipated experience assumption for assets of the same type, expressed as an annual percentage of statement value.

       b.   "Option adjusted spread (OAS)" for each asset shall mean the average spread over zero coupon Treasury bonds that equates a bond's market price as of the valuation date with its modeled cash flows across an arbitrage free set of stochastic interest rate scenarios. For floating rate bonds, the OAS shall be calculated as the equivalent spread over Treasuries if the bonds were swapped to a fixed rate. Market conventions and other approximations are acceptable for the purposes of this subsection.

       c.   "Weighted average life (WAL)" for each asset shall mean the weighted average number of years until 100% of the outstanding principal is expected to be repaid, rounded to the nearest whole number but not less than 1. For bonds or preferred stocks that are perpetual or mature after 30 years, the WAL shall be 30. Market conventions and other approximations are acceptable for the purposes of this subsection.

Guidance Note: OAS is a metric used for callable corporate bonds and other bonds with optionality such as residential mortgage backed securities. Any excess of the nominal spread of an asset over its OAS represents additional return for taking on the risk of embedded options. This additional return is not considered when using OAS to make adjustments to annual default cost factors because the additional return is assumed to be related to the cost of embedded options which must be modeled directly by the company along each scenario in the cash flow model (see 9.F.8). OAS is dependent on market prices, which may be gathered by companies in a variety of ways for financial reporting purposes. For instance, prices and OAS may be developed internally for assets with less relative liquidity such as private placements. The general sources of market prices used to determine OAS as well as the method or source for the OAS calculation should be documented in the PBR actuarial report. In some cases OAS may not be available due to unavailability of market prices. When such is the case the asset may be excluded from the particular calculation.

    3.   Determination of PBR Credit Rating

a.   Table K of Appendix 2 converts the ratings of NAIC Approved Ratings Organizations (AROs) and NAIC designations to a numeric rating system from 1-20 that is to be used in the steps below. A rating of 21 applies for any ratings of lower quality than those shown in the table.

b.   For an asset with an NAIC designation that is derived solely by reference to underlying ARO ratings without adjustment, the company shall determine the PBR credit rating as the average of the numeric ratings corresponding to each available ARO rating, rounded to the nearest whole number.

c.   For an asset with an NAIC designation that is not derived solely by reference to underlying ARO ratings without adjustment, the company shall determine the PBR credit rating as the second least favorable numeric rating associated with that NAIC designation.

Guidance Note: The 1-21 PBR credit rating system attempts to provide a more granular assessment of credit risk than has been used for establishing NAIC designations for risk based capital and asset valuation reserve purposes. The reason is that unlike for RBC and AVR, the VM-20 reserve cash flow models start with the gross yield of each asset and make deductions for asset default costs. The portion of the yield represented by the purchase spread over Treasuries is often commensurate with the more granular rating assigned, such as A+ or A-. Thus, use of the PBR credit rating system may provide a better match of risk and return for an overall portfolio in the calculation of VM-20 reserves. However, for assets that have an NAIC designation that does not rely directly on ARO ratings, a more granular assessment consistent with the designation approach is not currently available.

Guidance Note: The Purposes and Procedures Manual of the NAIC Securities Valuation Office which establishes the rules for setting NAIC designations has been undergoing significant change during 2009-2010, particularly in the area of assessing the credit risk of structured securities. The Valuation of Securities Task Force of the NAIC (VOSTF) implemented an interim solution in 2009 to set designations for non-agency residential mortgage-backed securities based on modeling by a third party firm. VOSTF is developing a long-term solution for these and other structured securities such as commercial mortgage-backed securities that may involve a combination of modeling and other methods such as "notching up" or "notching down" the result derived by reference to ARO ratings. In all such cases where the ARO rating basis is either not used at all or is adjusted in some way, the intent is that paragraph (c) be used to determine the PBR credit rating. Another common example where (c) is to be used would be securities that are not SVO Filing Exempt, such as many private placement bonds. For example, a private placement that was not Filing Exempt and was rated by the SVO as NAIC 1 would be assigned a PBR credit rating of 6 (second least favorable), equivalent to A2.

4.   Special Situations

For an asset handled under 9.F.3.c, and for which the NAIC designation varies depending on the company's carrying value of the asset, the company must avoid overstatement of the net return of the asset when projecting future payments of principal and interest together with the prescribed annual default costs.

Guidance Note: For example, if a non-agency residential mortgage-backed security is rated NAIC 2 if held at a particular company's carrying value but NAIC 4 if held at par, and that company's cash flow model first projects the full recovery of scheduled principal and interest, it would be more appropriate to then deduct annual default costs consistent with NAIC 4 rather than NAIC 2. If the company's cash flow model has already incorporated a reduced return of principal and interest consistent with the company's carrying value, then it would be more appropriate to deduct annual default costs consistent with NAIC 2. Modeling of assets with impairments is an emerging topic, and methods for handling in vendor and company projection models vary.

5.   Annual Default Cost Factors for Starting Fixed Income Assets without an NAIC Designation

For starting assets that do not have an NAIC Designation, the default assumption shall be established such that the net yield shall be capped at 104% of the applicable corresponding historical U.S. Treasury yield rate most closely coinciding with the dates of purchase and maturity structure of supporting assets plus 25 basis points.

6.   Annual Default Cost Factors for Reinvestment Fixed Income Assets

Alternative 1

Drafting Note: The version below was retained for testing Alternative 1 pursuant to amendment VM-20_100325_029.

Purchase spreads over Treasuries on reinvestment assets are prescribed as an amount that is already net of default costs. Therefore, the annual default cost factors for these assets are zero.

Alternative 2

Drafting Note: The version below was added for testing Alternative 2 pursuant to amendment VM-20_100325_029.

The sets of annual default cost factors for reinvestment fixed income assets are determined following the same process as for starting fixed income assets except that subsection 9.F.c does not apply to reinvestment assets.

7.   Amount of Assumed Default Costs

The assumed default costs in the cash flow model for a projection interval shall be the sum over all fixed income assets of the result of the total annual default cost factor for each asset, adjusted appropriately for the length of the projection interval, multiplied by the appropriate credit exposure for each asset.

Drafting Note: The following subsection 8 and 9 were added for testing Alternative 2 pursuant to amendment VM-20_100325_029.

8.   Procedure for Setting Prescribed Gross Asset Spreads by Projection Year for Certain Asset Transactions and Operations in the Cash Flow Model

a.   Gross asset spreads over Treasuries for public non-callable corporate bonds purchased in projection year one shall be the current market benchmark spreads published by the NAIC consistent with the PBR credit rating and WAL of assets purchased.

b.   Gross asset spreads over Treasuries for public non-callable corporate bonds purchased in projection years four and after shall be the most current available long-term benchmark spreads published by the NAIC consistent with the PBR credit rating and WAL of assets purchased.

c.   The prescribed gross asset spreads for these asset types shall grade linearly between year one and year four in yearly steps.

d.   Interest rate swap spreads over Treasuries shall be prescribed by the NAIC for use throughout the cash flow model wherever appropriate for transactions and operations including but not limited to purchase, sale, settlement, and cash flows of derivative positions, and reset of floating rate investments. A current and long-term swap spread curve shall be prescribed for year one and years four and after, respectively, with yearly grading in between. The 3-month and 6-month points on the swap spread curves represent the corresponding LIBOR spreads over Treasuries.

9.   Basis of NAIC Long-Term Benchmark Spreads

Drafting Note: The detailed methodology and data source used to create the initial long-term benchmark spread table is described in Appendix 2 of this section VM-20. Until a different table is published by the NAIC, Table H of Appendix 2 shall be the NAIC table for this purpose. This subsection spells out the principles to be used by the NAIC to apply to any particular data source for developing future tables. It is expected that the current table would be reviewed annually.

The prescribed long-term benchmark spread table established by the NAIC shall to the extent practicable:

a.   Reflect recent historical market data based on actual daily trading activity.

b.   Reflect an expanding observation period that uses the most recent reported data, with a minimum observation period of seven years expanding to a maximum observation period of 15fifteen years.

    c.   Be based on an "85% conditional mean" of the periodic market data. This measure is defined as the mean obtained after excluding from the observation period the trading days involving the 7.5% highest and 7.5% lowest observed spreads for "A" rated 7-10 year maturities or other most similar asset category available from the source data. For other asset categories, the mean shall be obtained after excluding the same trading days that were excluded for the primary asset category.

    d.   Provide a table of bond spreads by PBR credit rating and WAL and swap spreads by maturity. If needed, interpolation and/or smoothing techniques should be applied to the source data to provide sufficient granularity and logical relationships by credit quality.

Guidance Note: Long-term prescribed spreads are targeted at the historical mean because any biased measure could either add or subtract conservatism depending on whether assets are predominantly being purchased or being sold in the cash flow model. The conditional mean concept is intended to limit the volatility of the long-term prescribed spreads from one valuation date to the next by excluding a limited number of observations in both tails within the averaging period. Empirical analysis during the 2000-2009 time period showed little change in volatility or the level of prescribed spreads from excluding more than the highest and lowest 7.5% observations.

10.   Modeling of Embedded Options in Assets

    Reflect any uncertainty in the timing and amounts of asset cash flows related to the paths of interest rates, equity returns, or other economic values contained in the various Scenarios directly in the projection of asset cash flows under the various scenarios within the stochastic reserve calculation model and under the deterministic scenario within the deterministic reserve calculation model.

Guidance Note: For example, model the impact on cash flows of embedded prepayment, extension, call and put options in a manner consistent with current asset adequacy analysis practice.

G.   Revenue Sharing Assumptions

1.   The company may include income from projected future revenue sharing (as defined in these requirements equals gross revenue sharing income (GRSI)) net of applicable projected expenses (net revenue sharing income) in cash flow projections, if:

    a.   The GRSI is received by the company;

    b.   Signed contractual agreement or agreements are in place as of the valuation date and support the current payment of the GRSI; and

    c.   The GRSI is not already accounted for directly or indirectly as a company asset.

2.   For purposes of this section, GRSI is considered to be received by the company if it is paid directly to the company through a contractual agreement with either the entity providing the GRSI or an affiliated company that receives the GRSI. GRSI would also be considered to be received if it is paid to a subsidiary that is owned by the company and if 100% of the statutory income from that subsidiary is reported as statutory income of the company. In this case the actuary shall assess the likelihood that future GRSI is reduced due to the reported statutory income of the subsidiary being less than future GRSI received.

3.   If the requirements in Section 9.G.1 are not met, and GRSI is not included in cash flow projections, applicable projected expenses are also not included.

4.   In determining the anticipated experience assumption for GRSI, the company shall reflect factors that include but are not limited to the following (not all of these factors will necessarily be present in all situations):

    a.   The terms and limitations of the agreement(s), including anticipated revenue, associated expenses and any contingent payments incurred or made by either the company or the entity providing the GRSI as part of the agreement(s);

b.   The relationship between the company and the entity providing the GRSI that might affect the likelihood of payment and the level of expenses;

c.   The benefits and risks to both the company and the entity paying the GRSI of continuing the arrangement;

d.   The likelihood that the company will collect the GRSI during the term(s) of the agreement(s) and the likelihood of continuing to receive future revenue after the agreement(s) has ended;

e.   The ability of the company to replace the services provided to it by the entity providing the GRSI or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide; and

f.   The ability of the entity providing the GRSI to replace the services provided to it by the company or to provide the services itself, along with the likelihood that the replaced or provided services will cost more to provide.

5.   The company shall include all expenses required or assumed to be incurred by the company in conjunction with the arrangement providing the GRSI, as well as any assumed expenses incurred by the company in conjunction with the assumed replacement of the services provided to it in the projections as a company expense. In addition, the company shall include expenses incurred by either the entity providing the net revenue sharing income or an affiliate of the company in the applicable expenses that reduce the GRSI.

6.   In determining the prudent estimate of projected GRSI the company shall reflect a margin (which decreases the assumed GRSI) related to the uncertainty of the revenue. Such uncertainty is driven by many factors including but not limited to the potential for changes in industry trends. Contractually guaranteed GRSI shall not reflect a margin, although Company expenses related to contractually guaranteed GRSI shall reflect a margin.

7.   The actuary is responsible for reviewing the revenue sharing agreements, verifying compliance with these requirements, and documenting the rationale for any source of GRSI used in the projections.

8.   The amount of net revenue sharing income assumed in a given scenario shall not exceed the sum of a) and b), where:

a.   Is the contractually guaranteed GRSI, net of applicable expenses projected under the scenario, and

b.   Is the actuary's estimate of non-contractually guaranteed net revenue sharing income multiplied by the following factors:

i.   1.0 in the first projection year;

ii.   0.9 in the second projection year;

iii.   0.8 in the third projection year;

iv.   0.7 in the fourth projection year;

v.   0.6 in the fifth projection year;

vi.   0.5 in the sixth and all subsequent projection years. The resulting amount of non-contractually guaranteed net revenue sharing Income after application of this factor shall not exceed 0.25% per year on separate account assets in the sixth and all subsequent projection years.

Guidance Note: Provisions such as one that gives the entity paying the gross revenue sharing income the option to stop or change the level of income paid would prevent the income from being guaranteed. However, if such an option becomes available only at a future point in time, and the revenue up to that time is guaranteed, the income is considered guaranteed up to the time the option first becomes available.

Guidance Note: If the agreement allows the company to unilaterally take control of the underlying fund fees that ultimately result in the gross revenue sharing income then the revenue is considered guaranteed up until the time at which the company can take such control. Since it is unknown whether the company can perform the services associated with the revenue sharing arrangement at the same expense level, it is presumed that expenses will be higher in this situation. Therefore, the revenue sharing income shall be reduced to account for any actual or assumed additional expenses.

Appendix 1. Stochastic Exclusion Test Scenarios

This appendix describes the set of 16 scenarios for the Stochastic Exclusion Test in VM-20. Starting with yield curve on the valuation date, the scenarios are created using the American Academy of Actuaries' stochastic scenario generator using predefined sets of random numbers, where each random number is a sample from a normal distribution with mean zero and variance 1.

The rationale for this approach is twofold. First, the scenarios should be realistic in that they could be produced by the generator. Second, in some way the likelihood of any scenario occurring can be measured.

One way to measure the likelihood of a scenario occurring is to measure the likelihood of its series of random shocks, that is, the random numbers used in the generator. Given any sequence of random numbers, their sum can be compared with a mean of zero and a standard error equal to the square root of the number of deviates in the sequence. With the mean and standard error, we can determine, in a crude way, where the sum of deviates in our sequence lies in the distribution of the sum of all such sequences.

For example, if we want a sequence that is always one standard error above average, we start with a value of 1.0 as the first deviate. The value of the nth deviate is the excess of the square root of n over the square root of n-1. So the second value is 1.414 – 1 = 0.414 and the third value is 1.732 - 1.414 = 0.318.

A.   Generating Interest Rates

      The American Academy of Actuaries'interest rate generator uses 3 random numbers per period. These are:

            1.   A random shock to the 20-year treasury rate

            2.   A random shock to the spread between 1-year and 20-year treasury rates

            3.   A random shock to the volatility

      In generating the scenarios for the test, zero shocks to volatility are used.

      When generating scenarios for the test, upward shocks to the 20-year treasury are associated with downward shocks to the spread, making the yield curve less steep (or potentially inverted).

B.   Generating Equity Returns

      The American Academy of Actuaries' equity generators (C3 phase 2) use two random numbers per period. These are:

            1.   A random shock to make the return more or less than the mean

            2.   A random shock to the volatility

      This test uses zero shocks to volatility in defined scenarios.

      The random numbers that define the scenarios are as follows:

      <u>Scenario 1 – Pop up, high equity</u>

            Interest rate shocks are selected to maintain the cumulative shock at the 90% level (1.282 standard errors).

            Equity returns are selected to maintain the cumulative equity return at the 90% level.

      <u>Scenario 2 – Pop up, low equity</u>

            Interest rate shocks are selected to maintain the cumulative shock at the 90% level (1.282 standard errors).

            Equity returns are selected to maintain the cumulative equity return at the 10% level.

<u>Scenario 3 – Pop down, high equity</u>

Interest rate shocks are selected to maintain the cumulative shock at the 10% level (1.282 standard errors).

Equity returns are selected to maintain the cumulative equity return at the 90% level.

<u>Scenario 4 – Pop down, low equity</u>

Interest rate shocks are selected to maintain the cumulative shock at the 10% level (1.282 standard errors).

Equity returns are selected to maintain the cumulative equity return at the 10% level.

<u>Scenario 5 – Up/down, high equity</u>

Interest rate shocks are selected 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 are selected to maintain the cumulative equity return at the 90% level.

<u>Scenario 6 – Up/down, low equity</u>

Interest rate shocks are selected 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 are selected to maintain the cumulative equity return at the 10% level.

<u>Scenario 7 – Down/up, high equity</u>

Interest rate shocks are selected 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 are selected to maintain the cumulative equity return at the 90% level.

<u>Scenario 8 – Down/up, low equity</u>

Interest rate shocks are selected 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 are selected to maintain the cumulative equity return at the 10% level.

<u>Scenario 9 – Base scenario</u>

All shocks are zero.

<u>Scenario 10 – Inverted yield curves</u>

There are no shocks to long term rates and equities.

There are 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.

<u>Scenario 11 – Volatile equity returns</u>

There are no shocks to interest rates

There are shocks to equity returns that are consistently in the same direction for each two-year period, and then switch directions.

Scenario 12 – Deterministic scenario for valuation

There are 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).

Scenario 13 – Delayed pop up, high equity

There are interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 (square root of 2) 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 are selected to maintain the cumulative equity return at the 90% level.

Scenario 14 – Delayed pop up, low equity

There are interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 (square root of 2) 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 are selected to maintain the cumulative equity return at the 10% level.

Scenario 15 – Delayed pop down, high equity

There are interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 (square root of 2) 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 are selected to maintain the cumulative equity return at the 90% level.

Scenario 16 – Delayed pop down, low equity

There are interest rate shocks that are zero for the first 10 years, followed by 10 years of shocks each 1.414 (square root of 2) 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 are selected to maintain the cumulative equity return at the 10% level.

Appendix 2.   Tables for Calculating Asset Default Costs and Asset Spreads, Including Basis of Tables

This appendix describes the basis for certain prescribed asset default cost and asset spread tables to be updated and published periodically by the NAIC via website. These tables are needed for insurers to comply with the requirements of Subsection 9.F for asset default costs and asset spreads in VM-20. In some cases, as specified in 9.F, tables published in this appendix will serve as the NAIC published table until a different table is published. The development of the various tables is described in subsections A-E of this appendix. The actual tables are shown in subsection F of this appendix. Certain tables were developed based on various source material referenced herein. Other tables are simply compilations or presentations of data from such sources.

It is important to note up front that the development of prescribed default costs is based entirely on analysis of corporate bonds. Default costs for other fixed income securities are assumed to follow those of corporate bonds with similar NAIC designations through a mapping tool called "PBR credit rating." Examples of other fixed income securities are structured securities, private placements, and preferred stocks. Discussions at the NAIC during 2009-2010, particularly at the Valuation of Securities Task Force (VOSTF), have focused on the observation that similarly-rated assets of different types may have similar likelihood of default or loss of principal but may have a significantly different distribution of the severity of that loss. Discussions have particularly focused on the different drivers of severity between structured securities and corporate bonds. As a result, VOSTF has been developing updated methods to assign NAIC designations for C-1 risk based capital purposes for structured securities in order to better take into account these differences. The VM-20 procedure to assign a PBR credit rating has been structured so that in the cases where VOSTF decides to go away from directly using the ratings of approved ratings organizations, the PBR credit rating will be based on the NAIC designation rather than underlying ratings. Where VOSTF continues to authorize use of underlying ratings, the PBR credit rating will also be based on those ratings. However, VM-20 uses the underlying ratings to assign the PBR credit rating in a somewhat different manner.

Subsection 9.F.3 describes the process the company must follow to assign a PBR credit rating for any fixed income asset with an NAIC designation.

A.   Baseline Annual Default Cost Factors

   The general process followed to determine the baseline annual default cost factors shown in Table A (see subsection F) was as follows:

   1.   Determine from historical corporate bond data a matrix of cumulative default rates, for maturities of 1 to 10 years and for 20 ratings classes (Aaa, Aa1, Aa2, Aa3 … Caa2, Caa3, Ca).

   2.   Determine also from historical corporate bond data a set of recovery rates that varies only by rating class.

   3.   Determine a matrix of baseline annual default cost factors (in basis points), where for a given rating the Baseline Annual Default Cost Factor for a bond with maturity or weighted average life of t = 10,000* (1-Recovery Rate) * (1-[1-Cumulative Default Rate (t)]^[1/t]).

   4.   Items 1) and 2) above were determined from Moody's reports that were published in February 2008. In February 2009 and February 2010, Moody's published updated versions of these reports but there is no commitment from Moody's to continue updating these reports in the future. It was not explored whether another source for one or both elements might be preferable. If the NAIC decides to use Moody's as the source going forward, then the matrix of baseline annual default cost factors could be updated after Moody's publishes any updated research.

   Details of steps 1 and 2 above are contained in subsections B and C below. Essentially though, step 1 involved gathering from Moody's historical data the cumulative default rates for key maturities over many cohort years, ranking those rates, and applying a CTE 70 metric. For example, for the period 1970-2007, representing 37 years, there were 37 one year cohorts, 33 five year cohorts, and 28 ten year cohorts. A CTE 70 for ten year maturities involved averaging the 8 cohorts with the highest ten year cumulative default rates. Step 2 involved gathering from Moody's historical data the annual recovery rates for various bond categories from 1982-2007, ranking those rates, and calculating sample mean and CTE 70 statistics. The final recovery rate table uses the mean for higher quality investment grade rating classes, uses the CTE 70 for lower quality below investment grade rating classes, and grades in between.

   In subsection F below,

1.   Table A shows Baseline Default Costs using Moody's Data as of February 2008, and

2.   Table B shows Baseline Default Cost Margin as of February 2008 (Table A rates minus the historical mean rates).

B.   Cumulative Default Rates Used in Baseline Annual Default Cost Factors

The current process to determine cumulative default rates is as follows:

1.   Obtain the most recent Moody's report on Default Rates (e.g., Moody's 2008-02-11 Special Comment - Corporate Default & Recovery Rates 1920-2007).

2.   Extract 1 year, 5 year and 10 year average cumulative default rate data by whole letter rating (e.g., Aaa, Aa, …CCC) from the report (e.g., Exhibit 27 - Average Cumulative Issuer-Weighted Global Default Rates, 1970-2007*).

3.   Extract 1 year, 5 year and 10 year cumulative default rate cohort data by whole letter rating from the report (e.g., Exhibit 36 - Cumulative Issuer-Weighted Default Rates by Annual Cohort, 1970-2007). Calculate the mean of these 1y, 5y and 10y cumulative default rates, which should be close to the result in (2) for each whole letter rating.

4.   Sort the data in 3) to calculate preliminary CTE 70 1y, 5y and 10y cumulative default rates at each whole letter rating.

5.   Adjust the result in 4) to reflect any differences between 2) and 3). 5) = 4) + [2) - 3)].

6.   Use linear interpolation to determine cumulative default rates for maturities 2 to 4 and 6 to 9.

7.   Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,…, Caa2, Caa3, Ca) using an algorithm to ensure that in the new matrix the rows are monotonic by maturity, the columns are monotonic by rating, and to the extent possible the new matrix has a shape comparable to another Moody's cumulative default rate table that varies by notch (e.g., Moody's Idealized Cumulative Default Rates).

8.   For maturities greater than 10 years define baseline annual default cost factors as equal to those for 10 year maturities.

In subsection F below,

1.   Table C shows Empirical CTE 70 Default Rates from Moody's Data as of Feb 2008.

2.   Table D shows Prescribed Cumulative Default Rates derived from Moody's Data as of Feb 2008.

C.   Recovery Rate Used in Baseline Annual Default Cost Factors

The current process to determine the recovery rate is as follows:

1.   Obtain the most recent Moody's report on Recovery Rates (e.g., Moody's 2008-02-11 Special Comment - Corporate Default & Recovery Rates 1920-2007).

2.   Extract historical annual data on recovery rates (e.g., the All Bonds column from Exhibit 22 - Annual Average Defaulted Bond and Loan Recovery Rates, 1982-2007).

3.   Determine the mean and CTE 70 of the annual sample observations for each of the different lien position categories as well as for the All Bonds category.

In subsection F below,

1. Table E1 shows a sorted version of "Exhibit 22 - Annual Average Defaulted Bond and Loan Recovery Rates, 1982-2007," and develops the CTE 70 Recovery Rates and the implied Margin.

   Table E1 develops Mean and CTE 70 Recovery Rates for All Bonds as well as for Senior Bank Loans and five bond lien position categories that make-up the All Bonds statistics. Implementation will be facilitated if VM-20 uses one recovery rate based on All Bonds rather than using all six lien position categories. Using the more detailed data would require either companies or the SVO to assign each asset to one of the categories.

   Table E1 also illustrates that bonds that are more senior in the issuer's capital structure tend to have higher recovery rates than bonds that are subordinated.

2. Table E2 shows the final Recovery Rates that vary by PBR credit rating. This table was determined by assuming CTE 70 applies for Ba3/BB- and below, Mean applies for Baa1/BBB+ and above, and interpolated recovery rates apply for ratings that are between Ba3/BB- and Baa1/BBB+. This approach recognizes that investment grade bonds are more likely to be senior in the issuer's capital structure, and below investment grade bonds are more likely to be subordinated. Differentiating by actual seniority position of each bond was not considered practical. In addition, since recovery rates and default rates are not 100% correlated, and the cumulative default rates were set at CTE 70, use of the mean recovery rate at least for the higher quality bonds helps to avoid overly conservative prescribed default costs for those bonds.

D.   Illustrative Current Market Benchmark Spreads

Current market benchmark spreads published by the NAIC are intended to represent average market spreads at the valuation date for public non-callable corporate bonds and interest rate swaps. They are used to establish the initial spread environment in the cash flow model for purposes of modeling reinvestment assets and disinvestment and for modeling prescribed default costs. Section 9.F calls for both spreads and default costs to grade from initial to long-term conditions by the start of projection year four. Ultimately, the NAIC will need to publish current market benchmark spreads on a website on a quarterly basis. The current process to determine current market benchmark spreads is as follows:

1. Extract valuation date Investment Grade bond index spread data by ratings category and maturity bucket (e.g., download JULI (JPMorgan US Liquid Index) Interpolated Spread over Treasury data for All Industries).

2. Extract valuation date Below Investment Grade bond index spread data by ratings category (e.g., download JPMorgan Domestic High Yield Index Spread to Worst data by Rating Tier), and assume that the Below Investment Grade spread curve is flat across maturities.

3. Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,…, Caa2, Caa3, Ca) and maturity (1, 2, …, 30) using an algorithm to ensure that in the new matrix: (a) the rows are monotonic by rating, (b) the investment grade columns are monotonic by maturity, and (c) the columns on the borderline between investment grade and below investment grade (Baa3/BBB-) is interpolated between Baa2/BBB and Ba1/BB+.

In subsection F below,

1. Table F shows Current Market Benchmark Spreads as of 9/30/2009 for Investment Grade bonds.

2. Table G shows Current Market Benchmark Spreads as of 9/30/2009 for Below Investment Grade bonds.

E.   Long-Term Benchmark Spreads

Long-term benchmark spreads published by the NAIC are the assumed long-term average spreads for non-callable public bonds and interest rate swaps. They are used to establish the long-term spread environment in the cash flow model for purposes of modeling reinvestment assets and disinvestment. They are also used as the normative spreads when calculating the spread related factor in the asset default cost methodology. Ultimately, the NAIC will need to publish these spreads on a website. The current process to determine mean benchmark spreads is as follows:

1. Extract daily Investment Grade bond index spread data for the prescribed observation period by ratings category and maturity bucket (e.g., download JULI (JPMorgan US Liquid Index) Interpolated Spread over Treasury data for All Industries).

2. Extract daily date Below Investment Grade bond index spread data for the prescribed observation period by ratings category (e.g., download JPMorgan Domestic High Yield Index Spread to Worst data by Rating Tier), and assume that the Below Investment Grade spread curve is flat across maturities.

3. For the whole letter "A" rated 7-10 year maturity bucket, or nearest similar category, calculate the "85% conditional mean average" by first excluding the 7.5% highest and 7.5% lowest daily observations over the prescribed observation period and then computing the mean of the remaining daily observations.

4. Calculate for each other ratings category and maturity bucket the mean over the prescribed observation period after excluding the observations from the same trading days excluded in step 3. In developing Tables H and I, a 9.25 year averaging period was used, specifically 7/1/2000 through 09/30/2009.

5. Transform the data into a matrix that varies by rating notch (e.g., Aaa, Aa1, Aa2, Aa3, A1,…, Caa2, Caa3, Ca) and maturity (1, 2, …, 30) using an algorithm to ensure that in the new matrix: (a) the rows are monotonic by rating, (b) the investment grade columns are monotonic by maturity, and (c) the columns on the borderline between investment grade and below investment grade (Baa3/BBB-) are interpolated between Baa2/BBB and Ba1/BB+.

Drafting Note: A description of the development of the prescribed interest rate swap spreads needs to be added. The process is similar but the data source is different.

Drafting Note: Two key considerations for the NAIC going forward will be the source of the spread data and the historical observation period. It has not yet been explored whether a source other than JULI (JP Morgan) would be preferable. Ideally the current and long-term benchmark spreads should come from the same source. A seven year observation period was originally chosen because consistent and reliable data was only available back to 2000, and examples were being created based on a 2007 valuation date. It is recommended that the observation period be allowed to lengthen as more years of data are available, and that ultimately a rolling average of a maximum numbers of years be established such as 10 years or 15 years.

In subsection F below,

1. Table H shows Long-Term Mean Benchmark Spreads as of 9/30/2009 for Investment Grade bonds.

2. Table I shows Long-Term Mean Benchmark Spreads as of 9/30/2009 for Below Investment Grade bonds.

3. Table J shows Long-Term Benchmark Swap Spreads

F.   Tables

Table A.   Prescribed Baseline Annual Default Costs (in bps) using Moody's Data as of February 2008

PBR credit rating	Moody's\WAL	1	2	3	4	5	6	7	8	9	10
1	Aaa	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
2	Aa1	0.0	0.1	0.3	0.5	0.5	0.6	0.7	0.8	0.8	0.9
3	Aa2	0.1	0.4	0.8	1.0	1.2	1.3	1.4	1.5	1.7	1.8
4	Aa3	0.2	0.9	1.7	2.2	2.4	2.7	2.9	3.1	3.3	3.7
5	A1	0.4	1.7	3.4	4.1	4.5	4.9	5.2	5.5	5.9	6.4
6	A2	0.8	3.3	6.5	7.5	8.1	8.6	9.2	9.5	10.1	11.1
7	A3	2.8	7.0	10.6	11.8	12.6	13.5	14.4	14.9	15.6	16.7
8	Baa1	6.4	13.0	16.5	18.1	19.1	20.4	21.7	22.7	23.5	24.3
9	Baa2	16.3	26.3	32.5	36.9	39.8	40.3	42.4	44.0	44.7	45.2
10	Baa3	42.0	61.4	70.0	76.8	81.0	80.0	80.6	81.4	81.9	81.8
11	Ba1	90.5	123.4	134.7	143.1	148.8	143.9	140.4	138.4	137.2	135.7
12	Ba2	173.5	226.2	243.5	257.9	267.6	253.8	241.0	232.5	228.0	224.1
13	Ba3	262.0	295.0	311.3	328.6	349.6	334.4	321.0	313.1	308.2	305.9
14	B1	436.4	453.8	468.5	480.1	495.0	464.0	441.5	425.5	415.2	409.4
15	B2	621.8	573.8	565.2	560.8	567.4	525.7	492.9	467.1	449.6	436.4
16	B3	1,009.1	832.5	789.8	779.3	788.6	726.3	689.6	663.7	641.2	626.1
17	Caa1	1,440.9	1,095.2	1,004.3	983.8	999.3	922.7	879.6	855.0	840.7	839.5
18	Caa2	2,026.5	1,427.1	1,253.0	1,191.4	1,191.9	1,089.4	1,023.7	982.5	960.8	952.3
19	Caa3	3,974.3	2,806.9	2,385.2	2,269.9	2,316.1	2,090.5	1,942.9	1,850.2	1,809.0	1,815.6
20	Ca	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1	7,090.1

Table B.   Default Cost Margin (in bps) included in Table A

PBR credit rating	Moody's\WAL	1	2	3	4	5	6	7	8	9	10
1	Aaa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Aa1	0.0	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4
3	Aa2	0.1	0.3	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9
4	Aa3	0.1	0.6	1.1	1.3	1.4	1.4	1.5	1.6	1.7	1.8
5	A1	0.3	1.2	2.2	2.4	2.5	2.6	2.7	2.8	2.9	3.1
6	A2	0.5	2.3	4.2	4.5	4.5	4.6	4.8	4.9	5.0	5.4
7	A3	1.9	4.9	6.9	7.0	7.0	7.3	7.5	7.6	7.8	8.1
8	Baa1	4.3	9.2	10.7	10.8	10.6	11.0	11.4	11.7	11.8	11.8
9	Baa2	12.4	19.8	23.8	26.2	27.6	26.7	27.4	28.0	28.0	17.6
10	Baa3	24.5	34.2	35.4	36.2	37.4	34.2	32.9	32.1	31.3	34.2
11	Ba1	54.4	71.1	70.9	71.0	72.7	65.6	61.4	58.9	56.8	61.0
12	Ba2	108.7	136.0	137.3	139.8	144.6	129.0	118.7	112.2	108.1	103.7
13	Ba3	154.9	148.9	146.3	153.0	166.2	147.3	134.3	127.9	124.8	124.9
14	B1	258.0	230.2	222.5	227.1	240.0	209.2	189.6	178.9	173.5	173.0
15	B2	348.8	260.2	230.1	222.7	231.4	193.1	165.4	148.4	138.3	133.1
16	B3	587.1	409.8	368.9	371.0	392.0	344.0	320.9	307.4	297.3	294.4
17	Caa1	818.3	513.1	439.6	441.5	475.9	423.6	403.1	393.9	389.7	395.2
18	Caa2	1,095.1	595.6	453.7	416.2	435.6	361.6	317.1	282.1	250.6	224.8
19	Caa3	2,164.5	1,290.9	1,017.4	999.6	1,131.9	987.6	918.2	870.1	841.8	843.8
20	Ca	790.1	790.1	790.1	790.1	790.1	790.1	790.1	790.1	790.1	790.1

Table C.   Empirical CTE 70 Default Rates (%) from Moody's Data as of February 2008

Rating \ WAL	1	2	3	4	5	6	7	8	9	10
Aaa	0.0000	0.0942	0.1884	0.2825	0.3767	0.6800	0.9833	1.2866	1.5899	1.8932
Aa	0.0492	0.2182	0.3873	0.5563	0.7253	0.8800	1.0347	1.1895	1.3442	1.4989
A	0.0583	0.3600	0.6617	0.9634	1.2651	1.6266	1.9881	2.3496	2.7111	3.0726
Baa	0.5481	1.2977	2.0474	2.7971	3.5467	4.1928	4.8389	5.4850	6.1311	6.7771
Ba	2.6013	6.6703	10.7393	14.8082	18.8772	21.0961	23.3149	25.5337	27.7526	29.9714
B	9.9611	16.9257	23.8903	30.8549	37.8196	41.2080	44.5965	47.9850	51.3735	54.7619
Caa	34.5818	41.8637	49.1457	56.4277	63.7096	66.1152	68.5208	70.9263	73.3319	75.7375

Table D.   Cumulative Default Rates at CTE 70 derived from Moody's Data as of February 2008

Rating \ Term	1	2	3	4	5	6	7	8	9	10
Aaa	0.0001%	0.0003%	0.0011%	0.0027%	0.0043%	0.0061%	0.0080%	0.0103%	0.0129%	0.0157%
Aa1	0.0007%	0.0048%	0.0151%	0.0313%	0.0458%	0.0639%	0.0834%	0.1046%	0.1288%	0.1571%
Aa2	0.0017%	0.0128%	0.0393%	0.0701%	0.1004%	0.1354%	0.1715%	0.2107%	0.2576%	0.3142%
Aa3	0.0037%	0.0303%	0.0892%	0.1506%	0.2097%	0.2784%	0.3506%	0.4245%	0.5137%	0.6284%
A1	0.0071%	0.0590%	0.1770%	0.2818%	0.3855%	0.5020%	0.6271%	0.7492%	0.9001%	1.0997%
A2	0.0132%	0.1116%	0.3358%	0.5143%	0.6897%	0.8869%	1.0967%	1.2939%	1.5426%	1.8851%
A3	0.0473%	0.2391%	0.5445%	0.8051%	1.0781%	1.3844%	1.7146%	2.0290%	2.3877%	2.8277%
Baa1	0.1096%	0.4463%	0.8470%	1.2374%	1.6245%	2.0842%	2.5796%	3.0748%	3.5658%	4.0844%
Baa2	0.2684%	0.8635%	1.5933%	2.4024%	3.2287%	3.9116%	4.7777%	5.6428%	6.4307%	7.1958%
Baa3	0.6631%	1.9290%	3.2827%	4.7647%	6.2327%	7.3466%	8.5839%	9.8402%	11.0552%	12.1929%
Ba1	1.3735%	3.7110%	6.0086%	8.4083%	10.7897%	12.4098%	13.9960%	15.6215%	17.2477%	18.7890%
Ba2	2.5368%	6.5040%	10.3058%	14.2473%	18.0898%	20.2970%	22.2031%	24.1689%	26.2970%	28.3259%
Ba3	3.6955%	8.1474%	12.6022%	17.2882%	22.3370%	25.1659%	27.6984%	30.3257%	32.9668%	35.6626%
B1	6.1549%	12.3912%	18.5430%	24.4577%	30.3603%	33.3742%	36.2428%	39.0509%	41.9040%	44.8307%
B2	8.7700%	15.5309%	22.0600%	28.0790%	34.1026%	37.0125%	39.6120%	42.0311%	44.5486%	47.0164%
B3	14.2329%	22.1052%	29.8341%	37.2322%	44.5424%	47.7158%	51.1441%	54.4483%	57.3933%	60.3261%
Caa1	20.3231%	28.5079%	36.7603%	44.9831%	53.2154%	56.6807%	60.4333%	64.2277%	67.8897%	71.6386%
Caa2	28.5824%	36.2037%	44.2010%	52.0905%	60.1578%	63.2458%	66.4304%	69.6787%	73.0350%	76.3641%
Caa3	56.0548%	63.5055%	70.7783%	78.6366%	86.1597%	87.7061%	89.3719%	91.1008%	92.9422%	94.8089%
Ca	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%

Table E1.   Development of Prescribed Recovery Rates from Moody's Data as of February 2008

Summary Statistics	Sr. Secured Bank Loans	Sr. Secured Bonds	Sr. Unsecured Bonds	Sr. Subordinated Bonds	Subordinated Bonds	Jr. Subordinated Bonds	All Bonds
Moody's 2008-02-11 Special Comment - Corporate Default & Recovery Rates 1920-2007							
Sorted Version of Exhibit 22 - Annual Average Defaulted Bond and Loan Recovery Rates, 1982-2007*							
	51.40	33.81	21.45	19.82	12.31	7.79	22.21
	53.40	37.98	23.81	20.75	15.94	10.70	25.18
	58.80	39.23	29.69	23.21	18.19	13.50	25.50
	61.13	40.00	35.79	25.64	19.09	15.50	30.18
	66.16	43.00	36.66	26.06	22.60	16.85	32.31
	67.59	46.54	37.01	28.01	24.42	30.58	34.33
	67.74	47.58	37.13	29.61	24.51	36.50	35.53
	68.32	48.14	38.04	30.88	26.36	47.00	35.57
	73.43	48.37	41.63	33.41	29.99	48.50	38.98
	74.67	48.39	41.87	34.30	31.86	62.00	39.65
	75.25	55.40	43.81	34.57	33.77	NA	40.69
	75.44	59.22	45.24	37.27	35.64	NA	41.54
	75.82	62.02	47.60	41.41	35.96	NA	43.08
	76.02	62.05	49.19	41.82	38.04	NA	43.28
	78.75	63.46	49.41	43.50	38.23	NA	43.64
	82.07	69.25	51.02	43.75	39.42	NA	43.66
	87.74	71.00	52.60	44.73	40.54	NA	45.49
	88.23	71.93	52.72	44.81	41.54	NA	45.57
	NA	72.50	53.73	44.99	42.58	NA	45.89
	NA	73.25	54.25	46.54	44.15	NA	48.38
	NA	74.63	54.88	48.09	44.26	NA	49.39
	NA	75.50	55.02	49.40	46.89	NA	50.48
	NA	80.54	56.10	50.16	51.25	NA	53.53
	NA	83.63	60.16	51.91	56.11	NA	55.02
	NA	NA	62.73	54.47	94.00	NA	55.97
	NA	NA	62.75	67.88	NA	NA	59.12
Issuer-weighted, based on 30-day post-default market prices. Discounted debt excluded.							
** Loan recoveries in 2007 are based on 5 loans from 2 issuers, one of the 5 loans is 2nd lien debt*							
# observations	18	24	26	26	25	10	26
1-70 CTE	30%	30%	30%	30%	30%	30%	30%
#obs. for 70 CTE	5.4	7.2	7.8	7.8	7.5	3.0	7.8
low 70CTEestimate	59.7%	40.1%	30.7%	23.9%	18.8%	10.7%	28.3%
high70CTEestimate	60.9%	41.2%	31.6%	24.7%	19.6%	11.9%	29.3%
70 CTE	60.2%	40.3%	31.5%	24.6%	19.2%	10.7%	29.1%
Mean	71.2%	58.6%	45.9%	39.1%	36.3%	28.9%	41.7%
Margin	11.0%	18.3%	14.5%	14.5%	17.1%	18.2%	12.6%

Table E2.   Prescribed Recovery Rates from Moody's Data as of February 2008

PBR Credit Rating	Moody's Rating	Recovery Rate
1	Aaa	41.7%
2	Aa1	41.7%
3	Aa2	41.7%
4	Aa3	41.7%
5	A1	41.7%
6	A2	41.7%
7	A3	41.7%
8	Baa1	41.7%
9	Baa2	39.2%
10	Baa3	36.7%
11	Ba1	34.1%
12	Ba2	31.6%
13	Ba3	29.1%
14	B1	29.1%
15	B2	29.1%
16	B3	29.1%
17	Caa1	29.1%
18	Caa2	29.1%
19	Caa3	29.1%
20	Ca	29.1%

Table F.   **Illustrative Current Market Benchmark Spreads as of 09/30/2009 for Investment Grade Bonds**

WAL (Weighted Average Life)	Investment Grade PBR credit rating and Moody's / S&P Ratings									
	1	2	3	4	5	6	7	8	9	10
	Aaa/AAA	Aa1/AA+	Aa2/AA	Aa3/AA-	A1/A+	A2/A	A3/A-	Baa1/BBB+	Baa2/BBB	Baa3/BBB-
1	108.9	114.6	120.3	128.6	136.9	145.2	176.6	208.1	239.5	338.7
2	116.4	122.1	127.8	136.1	144.4	152.7	182.8	212.9	243.0	340.4
3	123.9	129.6	135.3	143.6	151.9	160.2	189.0	217.7	246.5	342.2
4	131.3	137.0	142.7	151.0	159.3	167.6	195.0	222.5	249.9	343.9
5	138.8	144.5	150.2	158.5	166.8	175.1	201.2	227.2	253.3	345.6
6	146.2	151.9	157.6	165.9	174.2	182.5	207.2	232.0	256.7	347.3
7	153.7	159.4	165.1	173.4	181.7	190.0	213.4	236.8	260.2	349.0
8	156.6	162.3	168.0	176.3	184.6	192.9	215.8	238.6	261.5	349.7
9	159.5	165.2	170.9	179.2	187.5	195.8	218.2	240.5	262.9	350.4
10	162.4	168.1	173.8	182.1	190.4	198.7	220.5	242.4	264.2	351.0
11	163.3	169.0	174.7	183.0	191.3	199.6	221.3	242.9	264.6	351.2
12	164.1	169.8	175.5	183.8	192.1	200.4	221.9	243.5	265.0	351.4
13	165.0	170.7	176.4	184.7	193.0	201.3	222.7	244.0	265.4	351.6
14	165.8	171.5	177.2	185.5	193.8	202.1	223.3	244.6	265.8	351.8
15	166.7	172.4	178.1	186.4	194.7	203.0	224.1	245.1	266.2	352.0
16	167.5	173.2	178.9	187.2	195.5	203.8	224.7	245.6	266.5	352.2
17	168.4	174.1	179.8	188.1	196.4	204.7	225.4	246.2	266.9	352.4
18	169.2	174.9	180.6	188.9	197.2	205.5	226.1	246.7	267.3	352.6
19	170.1	175.8	181.5	189.8	198.1	206.4	226.8	247.3	267.7	352.8
20	170.9	176.6	182.3	190.6	198.9	207.2	227.5	247.8	268.1	353.0
21	171.8	177.5	183.2	191.5	199.8	208.1	228.2	248.4	268.5	353.2
22	172.6	178.3	184.0	192.3	200.6	208.9	228.9	248.9	268.9	353.4
23	173.5	179.2	184.9	193.2	201.5	209.8	229.6	249.5	269.3	353.6
24	174.3	180.0	185.7	194.0	202.3	210.6	230.3	250.0	269.7	353.8
25	175.2	180.9	186.6	194.9	203.2	211.5	231.0	250.6	270.1	354.0
26	176.0	181.7	187.4	195.7	204.0	212.3	231.7	251.0	270.4	354.1
27	176.9	182.6	188.3	196.6	204.9	213.2	232.4	251.6	270.8	354.3
28	177.7	183.4	189.1	197.4	205.7	214.0	233.1	252.1	271.2	354.5
29	178.6	184.3	190.0	198.3	206.6	214.9	233.8	252.7	271.6	354.7
30	179.4	185.1	190.8	199.1	207.4	215.7	234.5	253.2	272.0	354.9

Table G.   Illustrative Current Market Benchmark Spreads as of 09/30/2009 for Below Investment Grade Bonds

WAL (Weighted Average Life)	Below Investment Grade PBR credit rating and Moody's / S&P Ratings									
	11	12	13	14	15	16	17	18	19	20
	Ba1/BB+	Ba2/BB	Ba3/BB-	B1/B+	B2/B	B3/B-	Caa1/CCC+	Caa2/CCC	Caa3/CCC-	Ca/CC
1	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
2	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
3	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
4	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
5	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
6	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
7	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
8	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
9	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
10	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
11	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
12	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
13	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
14	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
15	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
16	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
17	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
18	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
19	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
20	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
21	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
22	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
23	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
24	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
25	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
26	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
27	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
28	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
29	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9
30	437.8	529.8	596.8	663.9	730.9	876.8	1,022.8	1,168.7	1,314.7	1,478.9

Table H.   Long-Term Benchmark Spreads as of 09/30/2009 for Investment Grade Bonds

WAL (Weighted Average Life)	Investment Grade PBR credit rating and Moody's / S&P Ratings									
	1	2	3	4	5	6	7	8	9	10
	Aaa/AAA	Aa1/AA+	Aa2/AA	Aa3/AA-	A1/A+	A2/A	A3/A-	Baa1/BBB+	Baa2/BBB	Baa3/BBB-
1	60.3	68.3	76.3	83.4	90.5	97.6	125.0	152.5	179.9	252.0
2	66.0	74.0	82.0	89.3	96.6	103.9	130.3	156.6	183.0	253.5
3	71.7	79.7	87.7	95.2	102.7	110.2	135.5	160.8	186.1	255.1
4	77.4	85.4	93.4	101.1	108.7	116.4	140.7	164.9	189.2	256.6
5	83.1	91.1	99.1	107.0	114.8	122.7	145.9	169.1	192.3	258.2
6	88.8	96.8	104.8	112.8	120.9	128.9	151.0	173.2	195.3	259.7
7	94.5	102.5	110.5	118.7	127.0	135.2	156.3	177.3	198.4	261.2
8	96.7	104.7	112.7	121.0	129.4	137.7	158.3	179.0	199.6	261.8
9	99.0	107.0	115.0	123.4	131.7	140.1	160.3	180.6	200.8	262.4
10	101.2	109.2	117.2	125.7	134.1	142.6	162.4	182.2	202.0	263.0
11	101.9	109.9	117.9	126.4	134.8	143.3	163.0	182.7	202.4	263.2
12	102.5	110.5	118.5	127.0	135.5	144.0	163.6	183.1	202.7	263.4
13	103.2	111.2	119.2	127.7	136.2	144.7	164.2	183.6	203.1	263.6
14	103.8	111.8	119.8	128.4	136.9	145.5	164.8	184.1	203.4	263.7
15	104.5	112.5	120.5	129.1	137.6	146.2	165.4	184.6	203.8	263.9
16	105.1	113.1	121.1	129.7	138.3	146.9	166.0	185.0	204.1	264.1
17	105.8	113.8	121.8	130.4	139.0	147.6	166.6	185.5	204.5	264.3
18	106.4	114.4	122.4	131.0	139.7	148.3	167.1	186.0	204.8	264.4
19	107.1	115.1	123.1	131.7	140.4	149.0	167.7	186.5	205.2	264.6
20	107.7	115.7	123.7	132.4	141.1	149.8	168.4	187.0	205.6	264.8
21	108.4	116.4	124.4	133.1	141.8	150.5	169.0	187.4	205.9	265.0
22	109.0	117.0	125.0	133.7	142.5	151.2	169.6	187.9	206.3	265.2
23	109.7	117.7	125.7	134.4	143.2	151.9	170.1	188.4	206.6	265.3
24	110.3	118.3	126.3	135.1	143.8	152.6	170.7	188.9	207.0	265.5
25	111.0	119.0	127.0	135.8	144.5	153.3	171.3	189.3	207.3	265.7
26	111.6	119.6	127.6	136.4	145.2	154.0	171.9	189.8	207.7	265.9
27	112.3	120.3	128.3	137.1	146.0	154.8	172.5	190.3	208.0	266.0
28	112.9	120.9	128.9	137.8	146.6	155.5	173.1	190.8	208.4	266.2
29	113.6	121.6	129.6	138.5	147.3	156.2	173.7	191.2	208.7	266.4
30	114.2	122.2	130.2	139.1	148.0	156.9	174.3	191.7	209.1	266.6

Table I.   **Long-Term Benchmark Spreads as of 09/30/2009 for Below Investment Grade Bonds**

WAL (Weighted Average Life)	Below Investment Grade PBR credit rating and Moody's / S&P Ratings									
	11	12	13	14	15	16	17	18	19	20
	Ba1/BB+	Ba2/BB	Ba3/BB-	B1/B+	B2/B	B3/B-	Caa1/CCC+	Caa2/CCC	Caa3/CCC-	Ca/CC
1	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
2	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
3	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
4	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
5	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
6	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
7	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
8	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
9	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
10	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
11	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
12	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
13	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
14	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
15	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
16	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
17	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
18	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
19	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
20	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
21	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
22	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
23	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
24	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
25	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
26	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
27	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
28	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
29	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5
30	324.0	389.7	476.6	563.6	650.5	870.7	1,090.9	1,311.1	1,531.3	1,788.5

Table J.   Long-Term Benchmark Swap Spreads

(85% Conditional Mean--July 2000 through September 2009)

WAL	Swap Spread
3 M	29.3
6 M	29.9
1 Y	38.8
2 Y	47.5
3 Y	52.3
4 Y	53.4
5 Y	55.2
6 Y	55.4
7 Y	53.8
8 Y	50.6
9 Y	47.0
10 Y	43.6
11 Y	40.0
12 Y	37.7
13 Y	34.9
14 Y	33.3
15 Y	33.0
16 Y	31.7
17 Y	31.4
18 Y	32.0
19 Y	33.3
20 Y	35.1
21 Y	35.7
22 Y	36.4
23 Y	37.4
24 Y	38.5
25 Y	39.7
26 Y	40.7
27 Y	41.7
28 Y	42.7
29 Y	43.8
30 Y	44.2

Table K.   Conversion from NAIC ARO Ratings and NAIC Designations to PBR Numeric Rating

Moody's Rating	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3
S&P Rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-
Fitch Rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-
DBRS Rating	AAA	AA high	AA	AA low	A high	A	A low	BBB high	BBB	BBB low
RealPoint Rating	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-
AM Best Rating	aaa	aa+	aa	aa-	a+	a	a-	bbb+	bbb	bbb-
NAIC Designation	1	1	1	1	1	1	1	2	2	2
Numeric Rating	1	2	3	4	5	6	7	8	9	10

Moody's Rating	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca
S&P Rating	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	CC
Fitch Rating	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	CC
DBRS Rating	BB high	BB	BB low	B high	B	B low	CCC high	CCC	CCC low	CC
RealPoint Rating	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	D
AM Best Rating	bb+	bb	bb-	b+	b	b-	ccc+	ccc	ccc-	cc
NAIC Designation	3	3	3	4	4	4	5	5	5	6
Numeric Rating	11	12	13	14	15	16	17	18	19	20

Appendix 3.   Mortality Margin Table

Issue Age	Load	Issue Age	Load
< 40	21%	65	11%
40	21%	66	11%
41	21%	67	11%
42	21%	68	11%
43	21%	69	10%
44	21%	70	10%
45	21%	71	10%
46	20%	72	10%
47	20%	73	10%
48	19%	74	10%
49	19%	75	10%
50	18%	76	10%
51	18%	77	9%
52	17%	78	9%
53	17%	79	9%
54	16%	80	9%
55	16%	81	9%
56	15%	82	9%
57	15%	83	9%
58	14%	84	9%
59	14%	85	9%
60	13%	86	9%
61	13%	87	9%
62	12%	88	9%
63	12%	89	9%
64	11%	90	9%

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