RISK MITIGATION FOR INSURERS: HEDGING AND RISK BASED CAPITAL

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Contents

EXECUTIVE SUMMARY

Many insurers use derivatives to hedge asset risk (C-1), specifically either default risk or the risk of adverse changes in fair value. The risk-based capital (RBC) formula does not currently reflect this risk reductive activity. As a result, not only are company risk levels misstated, but also the RBC framework fails to provide an incentive for insurers to mitigate risk in this manner.

For several years various technical groups within the NAIC have recognized this shortcoming. The task of finding a remedy has been referred to the Life RBC Working Group, which has made this a top priority project in 2009 and 2010. ACLI has worked with Life RBC to develop recommended modifications to the RBC framework to reflect such derivatives.

The following is a summary of ACLI's recommendations:

- The proposal is limited to the hedging of C-1 asset risk of fixed income securities and common stocks. Hedges which are already considered in the determination of RBC (e.g. in C-3 modeling) are excluded from the scope of this report and the related recommendations.

- The objective is to determine RBC credit as an offset to the C-1 asset charge in proportion to the risk reduction for each basic hedge and in proportion to each individual element of an intermediate hedge.

- We categorize hedges as basic, intermediate, or advanced, making it is easier to determine the degree to which risk is mitigated, to identify the implications for the current RBC framework, and to deliberate recommendations.
    - *Basic hedging* pairs single assets and derivatives.
    - *Intermediate hedging* pairs a portfolio of assets with a very closely matched basket or index-based derivative containing the same or very similar components as the asset portfolio.
    - *Advanced hedging* involves hedging strategies which cannot be measured using the Basic or Intermediate methodology, including tranched transactions, equity options and first to default baskets. ACLI is not making recommendations concerning advanced hedging at this time.

- For basic and intermediate hedges, our proposal limits RBC credit to a fraction of the C-1 RBC Asset charge in order to make provision for residual risks created by the hedging program.

- For credit hedges (credit default swaps), we propose C-1 credit based on the following formula:

    RBC Credit as a percent of C-1 Asset Charge = ((Time to maturity of CDS/Time to maturity of Bond) X (94%-10%)) + 10%

- For complete hedges on specific common stocks, we propose RBC credit of 94% of the C-1 asset charge.

- The proposal treats an intermediate hedge as a group of basic hedges. For any credit to be granted, intermediate hedges must have sufficient overlap with the hedged portfolio to be considered for purposes of this proposal.

- In order to maximize transparency, we recommend calculating credit on an asset-by-asset basis and reporting the calculation in the RBC blank. NAIC Annual Statement schedules DB and D are the primary sources of data.

- The recommendation includes draft instructions, examples and spreadsheets.

The changes proposed will recognize the reduced risk achieved by prudent asset risk hedging and will permit regulators to more accurately evaluate the degree of risk an insurer faces. Adoption of the proposal will also provide insurers with a regulatory incentive to mitigate C-1 risk, thus enhancing policyholder protection.

RISK MITIGATION FOR INSURERS: HEDGING AND RISK-BASED CAPITAL

I. Background

In 2007 the NAIC Derivative Market Study (E) Working Group of the Valuation of Securities (E) Task Force was charged with studying the derivative marketplace as a basis for recommending whether NAIC Model Regulation 282 (Derivatives) should be retained and updated or replaced.[1] As part of its study, the Working Group noted areas where regulation of the derivative activity of insurance companies could be made more effective. One of those areas concerned the mitigation of asset risk achieved by insurers through the use of derivatives and the implications of such risk reduction for risk based capital (RBC). Specifically, the Derivative Market Study (E) Working Group recommended that the Capital Adequacy (E) Task Force consider implementing an RBC credit for derivative hedges, to the extent such hedges reduce an insurer's risk exposure. The development of such a proposal was referred to the Life Risk Based Capital (E) Working Group and was included in its charges for 2009 and 2010. This ACLI report is intended to aid in addressing that charge.

II. RBC Credit for Hedging – Recommendations

Hedging strategies currently employed by insurers range from straightforward one-to-one relationships between the derivative and the hedged item to more sophisticated relationships. In order to better understand the amount of risk mitigation achieved and the implications for the current RBC framework, we organized the hedging strategies into the general categories of *basic, intermediate* and *advanced.*

In this report we make distinct recommendations for basic and intermediate categories of hedges. Advanced hedges are discussed in Appendix 3 and will be reserved for future consideration.

These recommendations only apply to hedges in effect on the statutory balance sheet date used for the RBC calculation. Any hedges that are part of a Clearly Defined Hedging Strategy (CDHS) required for C-3 cash flow testing or any other hedges which are otherwise considered in the determination of RBC are excluded from these recommendations.

A. Recommended Treatment of Basic Hedges

Basic hedges are typified by using a credit default swap on a single issuer name to hedge the credit risk of a specific bond owned by the insurer. The risk mitigation in this

[1] The Working Group determined that NAIC Model Regulation 282 should be retained and updated. It was updated in 2009.

situation is typically high, provided that the terms of the bond and the CDS are closely matched.

The use of a hedging strategy, while broadly similar to a strategy of selling risky assets and purchasing risk-free assets, introduces certain forms of risk to the insurer. Accordingly, our proposal reduces the RBC credit for these risks:

- Counterparty credit risk: At present, this risk is only partially reflected in RBC. Our analysis suggests that a haircut of 1.3% is more than sufficient to cover this risk.

- Credit spread mismatch risk: Spread risk is not currently part of the RBC framework. Nonetheless, our economic analysis supports a haircut to reflect this risk at a level of 0% (perfect matching) to 85%. This haircut applies to credit risk mitigation only.

- General business risk: This is an "everything else" provision that is intended to cover additional administrative, legal, and operational risks that result from hedging. Our analysis supports a haircut of 5%, consistent with the general level of RBC.

Combining these risks into a simple formula that uses annual statement data, we propose the following formula:

$$\text{Credit Factor} = Min\left(1, \frac{Time\ to\ Maturity\ of\ CDS}{Time\ to\ Maturity\ of\ Bond}\right) \times \left(MaxCredit - MinCredit\right) + MinCredit$$

Where:

RBC Credit = RBC C-1 Charge for the Hedged Asset x Credit Factor
Maximum Credit is recommended to be 94%
Minimum Credit is recommended to be 10%

This formula has the following characteristics:

- The RBC credit is proportionate to the extent of maturity mismatch.
- The proportionate credit protection cannot exceed 94% in the event that the CDS maturity is longer than the maturity of the bond.
- The maximum RBC credit is limited to reflect counterparty credit and general business (C-4a) risk associated with the derivative.
- Because the maturity of the bond typically exceeds that of the hedge, as the hedge approaches maturity, the amount of RBC credit declines.

In Appendix 1 we describe in detail the development of this formula and how we arrived at the recommended 94% and 10% range.

We also recommend a provision that requires that credit protection must have more than one year remaining to maturity in order to receive RBC credit unless the maturity of the hedged bond is less than one year. Although the provision for mismatch would already significantly limit the RBC credit, this additional provision is intended to further discourage insurers from purchasing short term credit protection prior to year-end simply to influence the year-end RBC calculation.

Hedging the asset risk associated with a specific common stock within an insurer's portfolio is also a basic hedge. A common stock paired with a short futures position in theory committing the insurer to sell the stock in the future serves as an effective asset hedge. Since the common stock has no maturity and the futures contracts are exchange traded we are recommending a simple fixed maximum RBC credit as an offset to the C-1 RBC charge applied to the common stock. For consistency, we recommend the same maximum credit as for credit derivatives (94%).

Examples showing how credit would be determined for basic hedges

Example 1: The insurance company owns $50 million (statement value) of a seasoned 10-year Boeing Corporation senior unsecured note (NAIC 1-rated security) with 5 years left to maturity and hedges $50 million using a five-year CDS on Boeing Corporation.

- The Credit Factor would be calculated as ((5 year CDS tenor / 5 year bond tenor) x (94% - 10%)) + 10% = 94%.
- The C-1 RBC charge is $50,000,000 x 0.4% (the NAIC 1 rate) = $200,000.
- The RBC credit would be 94% of the C-1 charge applicable to the statement value hedged or 94% x 0.4% x $50 million = $188,000.

Example 2: The insurance company owns $80 million (statement value) of 15-year AT&T Broadband senior unsecured NAIC 2 rated bonds with 10 years left to maturity and hedges $80 million using a five-year CDS on AT&T Broadband.

- The RBC credit percentage would be calculated as (5 year CDS tenor / 10 year bond tenor) x (94% - 10%) + 10% = 52%
- The C-1 RBC charge is $80 million x 1.3% (the NAIC 2 rate) = $1,040,000
- The RBC credit would be 52% of the C-1 charge applicable to the statement value hedged or 52% x 1.3% x $80 million = $540,800.

Example 3: The insurance company owns $320 million (statement value) of 15-year AT&T Broadband senior unsecured NAIC 2 rated bonds with 10 years to maturity and hedges $160 million using five-year CDS on AT&T Broadband.

- The RBC credit percentage would be calculated as (5 year CDS tenor / 10 year bond tenor) x (94%-10%) + 10% = 52%
- The C-1 RBC charge is $320 million x 1.3% (the NAIC 2 rate) = $4,160,000

- The RBC credit would be 52% of the C-1 charge applicable to the amount of the statement value hedged or 52% x 1.3% x $160 million = $1,081,600.

Example 4: The insurance company owns $30 million of Exxon Mobil common shares and decides to reduce its exposure to Exxon Mobil by purchasing short futures contracts on 50% of the portfolio ($15 million notional).

- The RBC credit percentage would be 94%.
- The C-1 RBC charge is $30 million x 30% (the NAIC rate for common stock) = $9 million.
- The RBC credit would be 94% of the C-1 charge applicable to the amount of the statement value hedged or 94% x 30% x $15 million = $4.23 million.

B. Recommended Treatment of Intermediate Hedges

This category of hedging is typified by a portfolio of insurer assets paired with a basket or index based derivative with the same or very similar components as the portfolio. Fixed income hedging can be implemented using liquid and tradable credit default swap indices (e.g. the CDX family of indices). Hedging common stock portfolios can be accomplished with futures contracts based on the S&P 500 or other common stock based indices.

For the intermediate category of hedging, we recommend that the risk mitigation and resulting RBC credit be determined as if each specific security common to both the index/basket hedge and the portfolio is a basic hedge with the entire basic hedge methodology applied to each matching name. This includes the application of the maturity mismatch formula and the maximum RBC credit of the C-1 asset charge for both fixed income and common stock hedges.

Examples showing how credit would be determined for intermediate hedges:

Example 5: This example illustrates a calculation of RBC credit when an insurance company hedges a portfolio using an index CDS. Assume the insurance company owns $255 million of bonds of various NAIC ratings.

Insurance company buys a $200 million notional portfolio CDS hedge maturing in 5 years, which consists of 20 credits of equal weight. Each credit represents a notional of $10 million.

To develop the RBC C-1 credit we apply the “basic” approach to each common holding of the portfolio and CDS to yield the analysis and RBC credits in Table 2.

Table 1: Insurer Bond Portfolio

Insurer Bond Portfolio	Years to Maturity (Tenor)	NAIC Rating	Lesser of Statutory Statement Value or Par ($millions)	RBC Factors	C-1 RBC ($millions)
Bond 1	7	1	10	0.40%	0.040
Bond 2	9	2	20	1.30%	0.260
Bond 3	3	3	10	4.60%	0.460
Bond 4	2	1	15	0.40%	0.060
Bond 5	6	1	24	0.40%	0.096
Bond 6	5	2	7	1.30%	0.091
Bond 7	11	1	23	0.40%	0.092
Bond 8	14	2	10	1.30%	0.130
Bond 9	12	3	16	4.60%	0.736
Bond 10	9	1	45	0.40%	0.180
Bond 11	9	2	23	1.30%	0.299
Bond 12	6	1	12	0.40%	0.048
Bond 13	10	3	5	4.60%	0.230
Bond 14	7	1	14	0.40%	0.056
Bond 15	10	1	21	0.40%	0.084
Total			**255.0**		**2.862**

Table 2: Calculation of RBC Credit

Credit Default Swap Portfolio or Index Hedge	NAIC Rating	CDS Notional ($millions)	Overlap with Insurer's Bond Portfolio ($millions)	RBC Factors	CDS tenor/bond tenor	RBC Credit ($millions)
Bond 1	1	10	10	0.40%	5/7	0.028
Bond 2	2	10	10	1.30%	5/9	0.074
Bond 3	3	10	10	4.60%	5/3 limit 1	0.432
Bond 4	1	10	10	0.40%	5/2 limit 1	0.038
Bond 5	1	10	10	0.40%	5/6	0.032
Bond 6	2	10	7	1.30%	5/5	0.086
Bond 7	1	10	10	0.40%	5/11	0.019
Bond 8	2	10	10	1.30%	5/14	0.052
Bond 9	3	10	10	4.60%	5/12	0.207
Bond 10	1	10	10	0.40%	5/9	0.023
Bond 11	2	10	10	1.30%	5/9	0.074
Bond 12	1	10	10	0.40%	5/6	0.032
Bond 13	3	10	5	4.60%	5/10	0.120
Bond 14	1	10	10	0.40%	5/7	0.028
Bond 15	1	10	10	0.40%	5/10	0.021
Bond 16	3	10	0	4.60%	0	0
Bond 17	1	10	0	0.40%	0	0
Bond 18	1	10	0	0.40%	0	0
Bond 19	2	10	0	1.30%	0	0
Bond 20	1	10	0	0.40%	0	0
Total		**200**	**142**			**1.264**
			71.0%			

Example 6: An insurance company owns a $1 billion equity portfolio benchmarked to the S&P 500. Due to market conditions, a reduction of 10% in the insurer's exposure to equities is needed to meet overall investment objectives. Selling a small fraction of each name of the S&P 500 is cumbersome and may not be accomplished in the time frame desired. Short S&P 500 futures contracts are purchased totaling $100 million, and this short position will be maintained until it is determined that more equity exposure is needed or the reduction is to be made permanent and the shares sold, at which point the short futures contracts will be sold. For reducing the exposure to equities, the insurance company would receive RBC credit that reflects the risk reduction applicable to the $100 million hedge.

Since listing all issues of the S&P 500 is impractical, we will simply describe the steps needed to determine the amount of RBC credit. Much like the prior example involving bonds, each name in the index-based hedge would be compared to the statement value for that name in the portfolio. The RBC credit applicable to each common name would then be then limited to 94% of the amount of the C-1 asset charge attributable to the statement value of that common stock held in the insurer's portfolio. In the extreme, if the insurer's portfolio were matched exactly to the S&P 500 on a dollar weighted basis, the total RBC credit would be $100 million x 30% (C-1 RBC charge for common stock) x 94% = $28.2 million.

III. Implementation

We recommend that the determination and reporting of the RBC credits arising from C-1 asset risk hedging be accomplished with maximum transparency. Annual statement schedules D and DB should be the primary sources of the data needed to provide the inputs for credit computation in the RBC formula.[2]

Within the RBC formula we recommend that the RBC credits be computed in a new detailed section situated next to Replication Synthetic Asset Transactions (RSAT). The credits should be computed hedge-by-hedge with all pertinent data listed in a spreadsheet with the credits then totaled and cross-referenced to lines inserted into the applicable asset sections of the RBC formula where they will offset the RBC asset charges as appropriate.

Reflected in this new table should be the following information from its respective source:

Asset hedged – Schedule D paired with hedge from Schedule DB

Asset statement value – Schedule D

[2] See Appendix 10 for a discussion of statutory accounting and hedging.

Hedge notional amount – Scheduled DB

Maturity of hedge and bond – Schedule DB and D respectively

C-1 asset charge – RBC calculation

RBC credit – computed on new table in RBC calculation investment-by-investment

The ACLI stands ready to participate with NAIC Staff and Regulators in the implementation in whatever capacity the Life RBC Working Group determines is most helpful.

Appendix 1: Development of the Hedging Credit Formula

The effect of using derivatives to mitigate default or equity market risk should be broadly similar to a strategy of selling risky assets and purchasing risk-free assets. With each strategy, the insurer forfeits the potential up-side of collecting a risk premium and instead reduces its balance sheet risk. A correctly calibrated RBC system should show a similar RBC effect for the selling strategy and the hedging strategy.

From a holistic risk standpoint, however, the hedging strategy is "not quite" as effective as the selling strategy. Hedging in and of itself introduces some types of residual risk, and therefore our proposal includes haircuts to the C-1 hedging credit to account for these risks.

Our analysis, assisted by regulator input, has identified three categories of risk: (A) counterparty credit risk, (B) credit spread mismatch risk, and (C) general business risk.

A. Counterparty Credit Risk (i.e. "C-1o risk")

Counterparty credit risk is the risk that the hedging counterparty will be imperiled financially and be unable to meet its obligations. This risk materializes into a loss after the hedged bond defaults, the counterparty defaults, and there is a lack of collateral on deposit for some amount of the counter party obligation to the CDS holder. While the likelihood of all three events happening in combination may seem remote, the history of the recent recession serves as a reminder that remotely probable events still happen.

For hedging derivatives, the RBC formula only partially reflects counterparty credit risk. For hedging derivatives that are in the money, LR012 (Miscellaneous Assets) applies a risk charge to the statement value (net of collateral). On the other hand, RBC currently makes no provision for the potential future exposure of purchased protection, i.e. the risk that the derivative increases in value and then the counterparty defaults. In theory, we believe a provision for this risk should be made in LR015 the RBC blank (Off Balance Sheet Items).

Two courses of action exist for handling this missing risk charge. The most obvious approach would be to modify Schedule DB Part E, and in the long term, this may be the better answer. For the time being, **we propose to include a haircut of 1.3% in the hedging credit formula.** This charge is the NAIC's Class 2 corporate bond factor. Because most counterparties engaged by insurers would typically have an investment grade credit rating (the significant majority are NAIC 1, while most others are NAIC 2), our recommendation represents a conservative estimate of the creditworthiness of the typical hedging counterparty. Moreover, our approach effectively applies the risk charge to the full notional amount, ignoring the possibility of collateral and the fact that the typical recovery on defaulted bonds has historically been about 40%. It also results in double-counting the LR012 counterparty credit risk charge on "in the money" derivatives. In summary, although approximate and conservative, we think the 1.3% haircut represents a reasonable provision for counterparty credit risk.

B. Credit Spread Mismatch Risk (currently not in RBC)

Due to market dynamics, the liquidity and availability of longer dated CDS that match 10, 20 or 30 year bonds is scarce or non-existent. As a result, a mismatch commonly exists between the tenor (maturity) of a bond and the tenor of the hedging derivative. For instance, a five year CDS may be used to hedge a 30 year bond.

The situation can be analogized to term life insurance. As long as the default (death) occurs while the CDS (insurance) coverage is in place, the buyer of protection is compensated for the loss. Coverage is complete, but temporary. Therefore a risk remains that the CDS would be insufficient to make the insurer whole in the event of a long-term deterioration in credit quality. This risk is commonly known as spread risk.

Spread risk is not currently part of the RBC formula. In an attempt to quantify an appropriate haircut, we used economic risk concepts employed by the Solvency II framework. We then made some simplifying adjustments and approximations to fit the results within the RBC system.

Table A1.1 shows the ratio of spread durations for a model bond and credit default swap. Spread durations are analogous to interest rate durations. Interest rate duration is the percentage price change resulting from a change in interest rates. Similarly, spread duration is the percentage price change resulting from a change in credit spreads. Table A1.1 tells us that, for example, a 5 year CDS would hedge 75% of the economic credit spread risk of a 7 year bond.

Table A1.1: <u>Economic Hedging Efficiency with Mismatched Maturities</u>

		Years to Maturity of Bond							
		1	**3**	**5**	**7**	**10**	**15**	**20**	**30**
Years to Maturity of CDS	**Duration of CDS**	**Duration of Bond**							
		1	**2.9**	**4.7**	**6.3**	**8.3**	**11**	**13**	**15.5**
1	**1**	100%	34%	21%	16%	12%	9%	8%	6%
2	**2**		69%	43%	32%	24%	18%	15%	13%
3	**2.9**		100%	62%	46%	35%	26%	22%	19%
4	**3.8**			81%	60%	46%	35%	29%	25%
5	**4.7**			**100%**	**75%**	**57%**	**43%**	**36%**	**30%**

Although table A1.1 is close to a theoretically correct answer, it presents some practical difficulties. First, durations are not currently reported in statutory annual statements.

Second, because it is a table it is subject to discrete jumps as bonds or hedges move from one maturity bucket to the next.

To address these difficulties, we have developed a formula which relies on the maturity of the hedged item and the hedging instrument:

$$\text{Hedging Efficiency} = 1 - Min\left(1, \frac{Time\ to\ Maturity\ of\ CDS}{Time\ to\ Maturity\ of\ Bond}\right) \times (Max\% - Min\%) + Min\%$$

We used a least-squares analysis to evaluate what values of Max% and Min% provide the best "fit" to Table A1.1. Because the vast majority of the CDS market trades on the five year, we heavily weighted our "fit" analysis to the five year CDS (bottom row). Table A1.2 shows the results of our analysis: 100% is the "best fit" maximum credit (i.e. no mismatch risk), and 15% is the "best fit" minimum credit.

Table A1.2: <u>Hedging Efficiency provided by Formula with Parameters Chosen to Minimize Average Differences (focus on 5 year CDS)</u>

Max%	100%
Min%	15%

Years to Maturity of CDS	**Years to Maturity of Bond**							
	1	**3**	**5**	**7**	**10**	**15**	**20**	**30**
1	100%	43%	32%	27%	24%	21%	19%	18%
2		72%	49%	39%	32%	26%	24%	21%
3		100%	66%	51%	41%	32%	28%	24%
4			83%	64%	49%	38%	32%	26%
5			**100%**	**76%**	**58%**	**43%**	**36%**	**29%**

Thus our analysis would support a credit spread risk *haircut* ranging from 0% (perfectly matched) to 85%.

The inclusion of credit spread risk into this project creates some difficulties within the RBC system. We think the economic approach described above represents the best approach for evaluating credit spread risk, but the RBC framework is not an economic framework. By including a credit spread risk haircut, an incentive will exist for insurers to match hedges to "well matched" bonds in a manner that maximizes the hedging credit and minimizes RBC. In organizations that have multiple statutory legal entities, incentives could exist to pile hedges into one entity, leaving another unprotected. From a purely economic standpoint, the insurer should be indifferent to the precise bonds to which the hedge is matched.

We do not believe that a perfect solution exists. Arguably, the approach most consistent with the RBC framework would be not to make any mismatch haircut at all. Addressing the incentives via additional rules about assigning hedges to bonds would introduce significant complication and would most likely leave unresolved issues. Accordingly, we think that it is best to keep the framework simple and transparent while recognizing the limitations of the RBC system.

For C-1 equity hedges, because there is no maturity, there would be no mismatch adjustment.

C. General Business Risk (i.e. "C-4a risk")

Like other business management activities, hedging is subject to the risk that it may be adversely affected by events which cannot be anticipated. The RBC formula includes a provision, general business risk, or C-4a risk, for such risks faced by insurers. The NAIC's 1994 publication on the RBC system, *Raising the Safety Net*, noted that "all business firms are exposed to some risks, such as litigation, that are not contemplated in the C-1, C-2 and C-3 sections of the RBC formula. However, the derivation of appropriate risk factors for most of these risks is not possible."

Most solvency systems would not increase general business risk charges due solely to the introduction of a program of derivatives risk mitigation. These systems would assume that the existing provisions cover hedging activities. However, an argument can be made that, relative to the strategy of selling risky assets, the hedging program involves some amount of additional C-4a risk (e.g. litigation and administration). It is our understanding that the Life RBC Working Group would prefer to include a provision for such "all other" risk as a haircut to the hedging credit.

As the NAIC itself acknowledged, C-4a risk is very difficult to quantify. In light of that fact, we believe that it would be appropriate to use an amount that is consistent with the overall RBC framework. We used NAIC data to assess the relative level of industry C-4a risk relative to total risk charges, i.e. the sum of C-0…C-4 before covariance, on an industry-wide basis. In Table A1.3 we show the level of C-4a risk charges for life insurance companies since 2001.

These amounts average out to 4.99%. **Accordingly, we believe that a 5.00% haircut for general business risk would be appropriate.**

Table A1.3

Year	C-4a / Σ (C-0…C-4)
2009	5.39%
2008	5.49%
2007	4.50%
2006	4.87%
2005	4.85%
2004	4.85%
2003	4.98%
2002	5.07%
2001	4.96%

D. Putting it all together

In the above analysis, we have identified three different risk "charges" that could be made to partially counter the proposed C-1 hedging credit:

- A counterparty credit risk charge (C-1o) of 1.3%
- A credit spread mismatch risk charge ranging between 0% and 85%
- A general business risk charge (C-4a) of 5.0%

In combining these risk charges into a single range of haircuts, we believe it would be useful to employ the RBC's own covariance calculation to the extent possible. The RBC covariance formula is:

$$\text{Required capital} = \text{C-0} + \text{C-4a} + [(\text{C-1o} + \text{C-3a})^2 + (\text{C-1cs} + \text{C-3c})^2 + \text{C-2}^2 + \text{C-3b}^2 + \text{C-4b}^2]^{(1/2)}$$

If we assume that the credit spread risk (not part of RBC) is uncorrelated with counterparty credit risk and that both risks are 100% correlated with general business risk (consistent with RBC), we would have the following:

- Minimum haircut = $5\% + [1.3\%^2 + 0\%^2]^{(1/2)} = 6\%$. *Thus the maximum hedging credit would be 94%.*
- Maximum haircut = $5\% + [1.3\%^2 + 85\%^2)]^{(1/2)} = 90\%$. *Thus the minimum hedging credit would be 10%.*

E. Conclusion

For risk-reducing credit default swaps, we recommend the following formula:

RBC C-1 Hedging Credit = RBC C-1 Asset Charge
X Percentage of Asset Hedged
X Credit Factor, where:

$$\text{Credit Factor} = Min\left(1, \frac{Time\ to\ Maturity\ of\ CDS}{Time\ to\ Maturity\ of\ Bond}\right) \times \left(MaxCredit - MinCredit\right) + MinCredit$$

and:

- "Time to Maturity of CDS" is measured in years and is the time from statement date to maturity of the CDS hedge.
- "Time to Maturity of Bond" is measured in years and is the time from statement date to the legal maturity of the hedged instrument.
- "MaxCredit" represents the Maximum RBC credit that a hedge could receive even if all terms match. Our analysis supports a MaxCredit of 94%.
- "MinCredit" represents a floor, or minimum credit. Our analysis supports a MinCredit of 10%.

For equity hedges, which lack mismatch considerations, our analysis supports a 94% credit.

Our recommendation satisfies the following properties:

- For CDS, it differentiates between a complete and partial hedge. The greater the maturity mismatch, the lower the credit provided;
- It avoids a sudden "pop up" in RBC as a CDS hedge matures. As the time to maturity of a CDS gets smaller, the amount of hedging credit gets smaller;
- It is reasonably simple to understand;
- It can be implemented using information already available in the statutory statement;
- It captures risks not captured elsewhere within RBC;
- It encourages prudent and efficient risk management; and
- It fosters auditability and transparency.

Appendix 2: Intermediate Hedges

Intermediate hedges are hedges in which a portfolio of assets is paired with a basket or indexed-based derivative. For such hedges, ACLI proposes that RBC C-1 credit be determined by dividing the index/basket into individual components and then granting credit in the same manner as individual hedges. Therefore the considerations that are involved with intermediate hedges are generally the same as the considerations involved with basic hedges. Two new issues arise with intermediate hedges, however:

A. Should regulators require a minimum overlap between the insurer's holdings and the holdings of the index to receive any RBC credit? If so, how much overlap should be required?
B. How should the overlap be determined?

A. Should a minimum overlap be required? If so, how much?

An insurer may choose to purchase an index hedge because an index can be more cost-effective than purchasing individual hedges. It is rare, however, that an insurer would hold each and every security covered by the index. Therefore, by purchasing an index hedge, the insurer is effectively purchasing some amount of credit protection that is excessive, although it is possible that partial mitigation could exist on the excess (e.g. risk could be positively correlated within an industry, and the insurer could hold securities in the same industry as the names in the index).

The excess protection is somewhat akin to buying unneeded insurance. The insurer's downside risk is limited to the "premium" paid, and it is possible that the insurer could profit from credit events on securities that it does not hold. Nonetheless, the existence of this excess protection creates a small amount of additional risk to the insurer.

Insurers are required to file a Derivatives Use Plan (DUP) with their state insurance departments. In a DUP, the insurer details its derivative strategies and controls. The strategic class to which this proposal relates is "Hedging," and this generally requires that the derivative be "net risk reducing." An insurer might employ a derivative strategy that is net risk reductive due to correlation with other components of their portfolio. The reflection of such a strategy in RBC might eventually be incorporated in the advanced phase of our proposal, but it is not a part of the intermediate section. Intermediate hedging requires a clear and unambiguous relationship between the hedge and the insurer's holdings.

We think a case could be made not to include a minimum overlap provision. If an intermediate hedge is deemed by regulators to be a valid hedging program following review of the insurer's DUP, it is not unreasonable to reflect such a program in regulatory capital calculations no matter how small the name overlap is. Under our proposal for intermediate hedges, there is no risk of providing too much credit as no credit is provided for the non-overlapping portion of the trade.

Our recommendation, however, is that **a minimum overlap of 50% be required in order to receive any RBC credit via an indexed hedge**. We believe that this would provide an additional level of assurance that the index is net risk reductive from a regulatory standpoint.

Although the 50% level is somewhat arbitrary, we believe that it is justifiable and reasonable for two reasons:

1. A 50% level is the minimum level at which the hedge can be assumed to be net risk reductive. Because the downside risk is limited on purchased protection, the actual level of holdings needed to be net risk reductive may be significantly lower.

2. A higher floor is more likely to disadvantage smaller insurers. To demonstrate this, we took a sample of 2009 Statutory Statements to compare how much overlap their corporate portfolio would have to the most recent US Investment Grade Index (CDX.NA.IG.14), the most actively traded credit index currently available. The companies chosen were selected to represent a sampling of large, intermediate and small companies as representative of the larger population. The results are shown in table A2.1

Table A2.1: Overlap Between Insurer Holdings and the IG14 Index

	Assets Under Management ($billions)	**Percentage of cash bond holdings of various insurance companies relative to names in the IG14 index**
Large Company Average (5 companies)	$458 (range from $150-800)	80% (range from 75-89%)
Medium Company Average (6 companies)	$95 (range from $35-150)	73% (range from 59%-84%)
Small Company Average (5 companies)	$21 (less than $35)	59% (range from 37%-70%)

This data set demonstrates that the overlap percentage is positively correlated with the size of the insurer. Although all but one of the smallest companies would meet the 50% threshold, several of the smaller companies would be close and would likely be excluded if the threshold were raised. No company in the sample had 100% overlap to the index, highlighting the need for some flexibility.

We conclude that minimum floors tend to disadvantage smaller insurers, and a floor greater than 50% is likely to increase the imbalance. Accordingly, 50% seems to represent a reasonable compromise: it offers increased protection from a regulatory standpoint while minimizing the playing field concerns of smaller insurers.

B. How should the overlap be determined?

If a minimum overlap is deemed to be desirable, another question emerges: Should the overlap be based on names or dollars? In other words, should the insurer be required to have at least half of the names in the index, or should it hold names of at least half of the dollar exposures in the index?

We believe that using dollars is more consistent with the economics of the risk. For example, a basket with five names may be created where one of the names has 80% of the exposure. If the insurer holds bonds for each of the four remaining names, it would still have only 20% overlap relative to the total risk.

Standard indices are equal name weighted, and therefore this will not be an issue for many index derivatives. It would be possible, however, to create a basket that is weighted by market capitalization, an insurer's actual portfolio weightings, or some other factor. In such situations, we believe that an evaluation by dollars of exposure is the preferable answer.

Appendix 3: Advanced Hedging

At times, insurers may determine that the cost of using basic or intermediate hedges is prohibitive relative to the risk they want to protect against. When this occurs, more structured derivatives including CDS Index Tranches and CDS Index Options can be used. These instruments typically have a non-linear relationship with the hedged asset which makes assessing the appropriate C-1 risk capital offset particularly challenging. While advanced hedges provide economic risk reduction when used appropriately, we are not proposing a RBC solution at this time.

In the case of an insurance company wishing to hedge against an unexpected decline in a stock's price, but wishing to benefit from anticipated price increases, a put option on that particular stock could be used. The relationship between the value of the option and the value of the stock is not linear. The price sensitivity of the option in relation to the underlying stock, known as Delta, is an indicator of how effective the option is as a hedge. This is not unlike using a short futures position to protect the insurer from future declines in value. The risk reduction is in proportion to the amount that the current stock value is protected; which would be the current market value of the stock position times the applicable RBC factor, then adjusted for Delta.

Appendix 4: Indexed Credit Default Swap Hedges

A. What are indexed credit default swap hedges?

Indexed credit default swap hedges are portfolios of single name credit default swaps. By buying protection based on an index, an insurer is protected against specific credit events in the underlying portfolio. This type of hedge can be executed using standardized liquid indices or a customized portfolio.

Standardized credit derivative indices were launched in the corporate credit markets in 2002. Today, standardized credit derivative indices cover corporate bonds, municipal bonds, emerging market securities, European sovereign debt, and structured finance. These liquid standardized indices are administered and managed by Markit (www.markit.com). The CDX Index is currently the single most liquid instrument traded in the U.S. Credit markets today. For large institutions, the CDX Index frequently provides the single most efficient way to hedge credit risk.

B. How do indexed hedges work in the event of default?

When an underlying single name in an index defaults, it is removed from the index and settled separately, and then the notional amount of the index is adjusted to reflect the defaulted security.

An example: Suppose an insurer buys protection on CDX.NA.IG.13, which has 125 equally weighted corporate names. If one of the underlying names were to default, the protection seller would pay losses (typically in cash) incurred on $1/125^{th}$ of the notional amount. The loss amount would be determined by an auction facilitated by the International Swaps and Derivatives Association (ISDA). The insurer would therefore be returned the full principal on the defaulted bond by virtue of the hedge and the recovery of the underlying bond or loan. The notional of the remaining CDS index hedge would be reduced to 124/125ths of the original notional, and the insurer would pay 124/125ths of the original premium.

Appendix 5: How Insurers Use Derivatives

In recent years the hedging tools available to insurers have become more varied and, when properly used, represent an opportunity to improve risk management practices.

A. Objectives of derivative usage

In the normal course of business insurers enter into derivative transactions in order to:

- Hedge or mitigate the risk to their assets, liabilities and surplus from fluctuations in interest rates, credit quality, foreign currency exchange rates and equity market valuation;

- Replicate an asset by pairing a cash market instrument with a derivative to create an otherwise permissible investment;

- Generate and manage the timing of income when the cash market alternatives are less available or flexible.

B. Common examples of derivative usage

Derivatives can facilitate efficient portfolio management in a manner that is not always possible in the cash markets. Consider the following examples:

Example 1: An insurance company holds several of various maturities bonds from an issuer in a number of portfolios. The bonds may have durations and other factors that fit the underlying liabilities. If credit concerns require reducing the aggregate exposure to that issuer, the company could consider either selling fractional parts of each issue held, or selling from one portfolio, leaving an inequitable exposure to the remaining portfolios. Alternately, the company could reduce its exposure by a purchasing credit default swap on the issuer and allocating it across all of the portfolios, effectively achieving risk reduction at both the portfolio and enterprise level.

Example 2: An insurance company may invest in some asset categories (bank loans, private placements, revolver credit lines) which have a limited secondary market for sales. The insurer is compensated by excess spread for being able to purchase and hold this type of asset and will lose that excess spread if it is forced to find a buyer. Purchasing credit default protection may allow for effective credit risk management when disposition of the underlying asset would be costly or impractical.

Example 3: An insurer holds a bond in a company that is undergoing stresses that are believed to be short term. In order to protect against the near-term risk, the insurer may purchase a five-year CDS. If default should occur, the portfolio would be protected by

the swap counterparty, however, if default was avoided, the bond would remain in the portfolio at the original purchase yield.

Example 4: Sometimes purchasing CDS protection is materially more economical than selling a risky bond in the cash market. Sometimes the credit spread of a corporate bond is wider than the spread required on a CDS (called the Basis). This differential might be driven by bank balance sheet funding costs or illiquid bond issues. By choosing to hold the bond and protect the credit risk with a credit default swap, the insurance company can express the same credit view at a better price, maximizing policyholder value.

C. Types of derivatives

Hedging techniques can be as diverse as the potential risks to be hedged. The following is a summary of the major types of derivatives used by insurers (both those encompassed by this proposal and elsewhere).

1. Derivatives encompassed by this proposal

Credit default swaps (CDS) are used to manage credit risk. In a CDS contract, the buyer of protection makes a periodic payment and in return, receives a payment of par less the recovery value of bonds if a credit event occurs. Unlike an interest rate swap, one side of the CDS (the protection side), is a contingent payment. Bankruptcy and failure to make required payments are the most common credit events, though others (such as restructuring of obligations) can also be included. Single-name CDS are written at the issuer and bond seniority (senior or subordinated) level. Single-name CDS are also bundled through standardized transactions called CDS Indices. The most liquid of these indices is the CDX, which consists of 125 investment-grade single-name CDS. The construction of the CDX is meant to precisely replicate the economics of doing 125 individual single name CDS trades.

Equity index futures are used to mitigate market risk for investments in portfolios of common stock. Equity index futures obligate the company to pay to or receive from a counterparty an amount based on a specified equity market index as of a future date applied to the notional amount of the contract. A company that holds common stock can sell equity index futures to reduce market value exposure to the price. Futures provide a symmetric hedge, so the company limits both upside and downside price changes. Equity futures are exchange traded derivatives and therefore contain highly standardized terms and minimal counterparty exposure.

2. Other types of derivatives (not encompassed by this proposal)

Total return swaps are used to mitigate market risk for investment in portfolios of common stocks or other securities. Total return swaps obligate the company and a counterparty to exchange amounts based on the difference between a variable return and a specified fixed rate applied to the notional amount of the contract. Total return swaps provide a similar structure to exchange traded futures; however they are over-the-counter derivatives which can be tailored by maturity, underlying securities, or other features that might not be available in the exchange traded futures market.

Purchased put options are used to mitigate credit and market risk for investments in debt and equity securities issued by specific entities. Purchased put options provide the company an option to sell a specific security to a counterparty at a specified price at a future date. A company can purchase a put to protect against a downward move in stock value while retaining potential upside performance.

Equity collars are used to mitigate both upside and downside market risk for investments in specific common stocks or other equity securities. Equity collars consist of both a purchased put option and a written call option on a specific equity security owned by the company. The company retains the price risk between the strike levels, but is protected from moves outside the collar range.

Fixed income futures are used to mitigate interest rate risk for investment in portfolios of fixed income securities. Short fixed income futures obligate the company to sell a specified bond at a specified price to a counterparty at a future date. Futures are exchange traded and therefore have very specific structures and minimal counterparty risk.

Interest rate swaps are used to mitigate interest rate risk for investments in variable interest rate and fixed interest rate bonds. Interest rate swaps obligate the Company and a counterparty to exchange amounts based on the difference between a variable interest rate index and a specified fixed rate of interest applied to the notional amount of the contract. They can be used to convert fixed rate bonds to floating, or floating rate bonds into fixed rate depending on the portfolio needs and the availability of assets. Interest rate swaps are over-the-counter transactions that can hedge similar risks as futures, but can also be customized to specific needs.

Interest rate floors and receiver swaptions are used to mitigate the risk of a significant and sustained decrease in interest rates. Interest rate floors entitle the company to receive payments from a counterparty if market interest rates decline below a specified level. Receiver swaptions provide a company an option to enter into a receive fixed swap with an above market coupon if rates decline. These products can be used to hedge reinvestment risk or minimum rate guarantees.

Interest rate caps or payer swaptions are used to mitigate the risk of a significant and sustained increase in interest rates. Interest rate caps entitle the company to receive

payments from a counterparty if market interest rates increase above a specified level. Payer swaptions provide a company an option to enter into a pay fixed swap with an above market coupon if rates increase. These products can help mitigate disintermediation risk or hedge extension of an MBS portfolio.

Foreign currency swaps are used to mitigate the foreign exchange risk for investments denominated in foreign currencies. Foreign currency swaps obligate the company and a counterparty to exchange the currencies of two different countries at a specified exchange rate. They can be used to effectively convert the payments of a bond from a foreign currency into the local currency of the company.

Foreign currency forwards and futures are used to mitigate the foreign exchange risk for investments in bonds denominated in foreign currencies or common stock or other equity investments in companies operating in foreign countries. Foreign currency forwards obligate the company to exchange with a counterparty a specified amount of a foreign currency for a specified amount of local currency at a future date.

Appendix 6: Recent Changes in the Derivatives Market

Over the last few years, the credit derivatives market has been going through a number of transformational changes. The efforts so far have focused on addressing three primary goals: (1) reducing the counterparty risk; (2) improving operational efficiency; and (3) increasing transparency. Additionally, the Dodd-Frank Act (the Act) was recently signed into law and will potentially have a substantial impact on the processing of credit derivatives trades. The Act requires eligible CDS to be cleared through a central clearing house. Cleared CDS must be traded on an exchange or swap execution facility. Finally, the Act mandates some CDS to be pushed out of the institutions that receive federal assistance (e.g. deposit taking institutions). The Act grants exclusive regulatory jurisdiction over the derivatives to either CFTC (Commodity Futures Trading Commission) or SEC (Securities and Exchange Commission) depending on the type of derivative. Significant rulemaking to implement the provisions of the Act is currently underway.

A. Establishment of a central clearing platform for CDS contracts

The clearing of eligible credit derivatives contracts through a well-capitalized clearinghouse can reduce counterparty and operational risks. While a few competing platforms were launched in the United States, it appears that ICE's clearing platform, ICE Trust, is at the forefront. ICE Trust clearinghouse is a limited purpose bank that is regulated by the Federal Reserve. It launched in March 2009 and has since cleared trillions of dollars in notional. Per the Act, clearinghouses are to submit lists of proposed categories of clearable swaps for review to the relevant regulator. Derivatives that are cleared currently are already considered to be submitted for review. As of the publication of this document in July 2010, at least 35 different CDX indices and over 70 single name CDS contracts have been cleared or are eligible for clearing. ISDA (International Swaps and Derivatives Association) expects the approved list (eligible to clear) to grow to 200 credits. Note that when an index or a single name CDS is cleared, typically multiple tenors are eligible for clearing. The Act also requires the relevant regulator to set initial and variation margin requirements for non-cleared derivatives. For cleared trades, initial margin minimums will be set by each clearinghouse.

A central clearing platform for CDS will allow:

- The buyers and sellers of protection to face the clearinghouse, as opposed to each other.
- Multilateral netting among various counterparties thereby reducing net notional outstanding.
- Collateralization of open positions with all counterparties.
- Independent daily mark-to-market valuations and posting of variation margins.
- Operational efficiency and potential for straight-through processing.

The Act promotes more mandatory clearing and related reporting transparency for eligible derivatives, particularly eligible CDS.

B. Standardization of CDS contracts

Standardization of CDS contracts is key to being able to clear CDS on the central clearing platform. It allows ease of netting (portfolio compression) that lowers outstanding notional. Two specific features of the CDS standardization have been implemented in both the US and Europe:

(1) Trading CDS with fixed coupon, with accrual and a full first coupon. This brings CDS trading closer to the way bonds trade. This standardization makes CDS fungible between counterparties.
(2) The "Big Bang" and "Small Bang" protocols which formalized ad-hoc processes used in the past. This involved:
    (i) Creation of Determination Committee (DC) with participations from both dealer and buy-side investors. The DC is responsible for making all the legal determinations concerning credit derivatives. These include the determination of credit events, the universe of deliverable obligations for a given credit, and the timing of a credit auction. The establishment of the DC was a key step in mitigating the potential legal risk surrounding credit derivatives. As part of the Big Bang, all participants agreed to adhere to DC determinations (as an arbiter).
    (ii) Hardwiring of the auction mechanism into the CDS contracts which eliminated the inefficient process of having counterparties sign up for an auction protocol for each credit event separately.
    (iii) Fixed rolling look-back periods for credit and succession events, which bring certainty to risk periods.
    (iv) Standardized deal coupons (to 100bp and 500bp) which facilitates the unwinding of transactions, and in turn helps to mitigate outstanding notional and counterparty credit risk.

It should be noted that the auction settlement process, first established in mid 2005 (although ad-hoc prior to the "Big Bang" protocol) has functioned relatively smoothly even prior to these changes.

In summary, these CDS market changes are expected to reduce systemic risk and improve liquidity for eligible CDS.

Appendix 7: Derivative Use Management Including Counterparty Risk

The NAIC model investment laws and regulations have specific constraints on the use of derivatives. There are two versions of the NAIC Model Investment Laws: the defined limits version and the defined standards version. The latter follows modern portfolio theory and measures an investment's validity within the overall portfolio. This version was designed for well capitalized, seasoned insurers. The former version (defined limits version) regulates investments on an item-by-item basis, and was designed for less seasoned, less well capitalized companies. Additionally, Derivative Model Regulation 282 was recently updated to include a requirement that before derivatives can be used by an insurer a use plan must be approved by the domiciliary state.

Governance of derivative use starts with approved and documented authorities from the Board of Directors to management. These authorities are coordinated with and enhanced by limits established by the insurer's domiciliary state and, where applicable, the State of New York. Counterparty exposure limits and collateralization requirements are a critical component of any well managed derivative use plan.

The standing authorities for derivatives and the overall investment standing authorities should be monitored on a frequent basis by personnel in a position to understand the importance of such work. The internal detailed authorities should be monitored using systems that compare asset limits to actual activity and balances. In the event of any overage, compliance personnel should immediately notify the investment manager and pursue corrective action. The insurer's domiciliary state and New York limits (if applicable) should be monitored periodically along with the company's internal limits.

Counterparty requirements must be set to assure the performance of all counterparties including the prompt and accurate posting of collateral and monitoring of credit lines in all required instances. Requirements should be dynamic to reflect changes in counterparty credit ratings, and a minimum credit rating for counterparties should be established and observed. Credit support agreements should be established and monitored to promote prompt compliance.

In 2009 the RBC treatment of derivative balances and associated collateral was updated by the WG. The calculation takes the derivative amount from the statutory balance sheet and segregates it into exchange traded and over-the-counter. The exchange traded balance is charged the NAIC 1 C-1 rate as is all derivative collateral since it must meet the definition of "acceptable collateral" which means cash, cash equivalents, securities issued or guaranteed by the United States or Canadian governments or their government–sponsored enterprises, publicly traded obligations rated 1 by the SVO, government money market mutual funds, and such other items as may be defined as acceptable collateral in the *Purposes and Procedures Manual of the NAIC Securities Valuation Office*.

The over-the-counter uncollateralized derivative balances are charged the NAIC 1-6 RBC rates based on the rating of the applicable counterparty.

Additionally, in LR015 of the RBC blank, there is a further charge for “Off-Balance Sheet” derivatives counterparty exposure. This charge is based on notional, maturity and trade types of the contracts and is determined at the counterparty level. RBC is assessed based on the NAIC rating of the underlying counterparty and is based on a formula meant to capture how a derivative contract could move against the insurance company in the future.

With the exception of the counterparty risk charge on purchased CDS, which we intend to address as part of this project, we feel the approach to counterparty risk currently in place is reasonable.

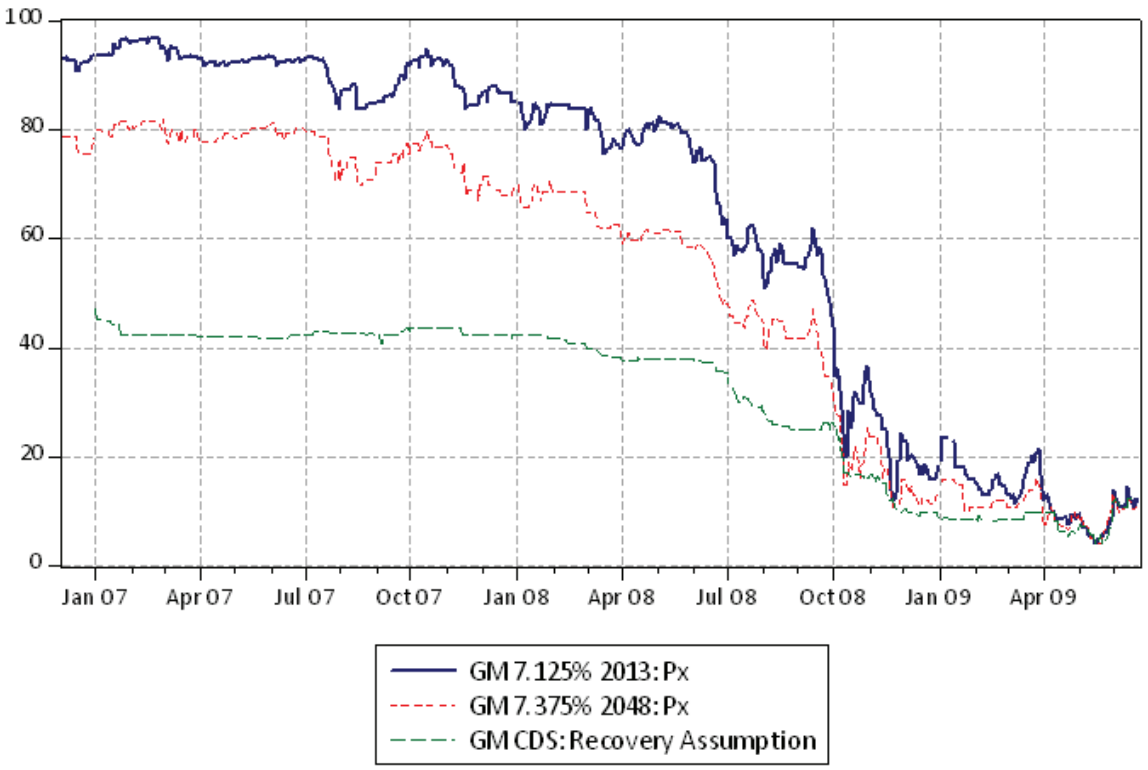
Appendix 8: The Relationship between Bond and CDS Market Values

Fluctuations in the fair value of bonds arise from changes in the creditworthiness of the issuer and from general changes in market interest rates.

A CDS is an instrument that provides protection against a default event. It does not, however, provide a *total return hedge*, a hedge that protects against fluctuations in value from interest rates, liquidity, and other non-credit circumstances that may impact the bond. For a total return hedge one would need to enter into a total return swap. Thus, under normal circumstances (that is, a non-distressed situation), the fair value of CDS may not correlate closely with the fair value of the bond being hedged regardless of how closely the maturities of the CDS and bond are matched. However, in a distress situation or when the market perceives a credit event to be highly probable and imminent, the CDS becomes a near perfect hedge of bonds irrespective of the maturity.

This can be best illustrated via an example. The chart below shows prices of a 5 year and 40 year General Motors bond along with the implied recovery rate for GM CDS.

Figure A8.1

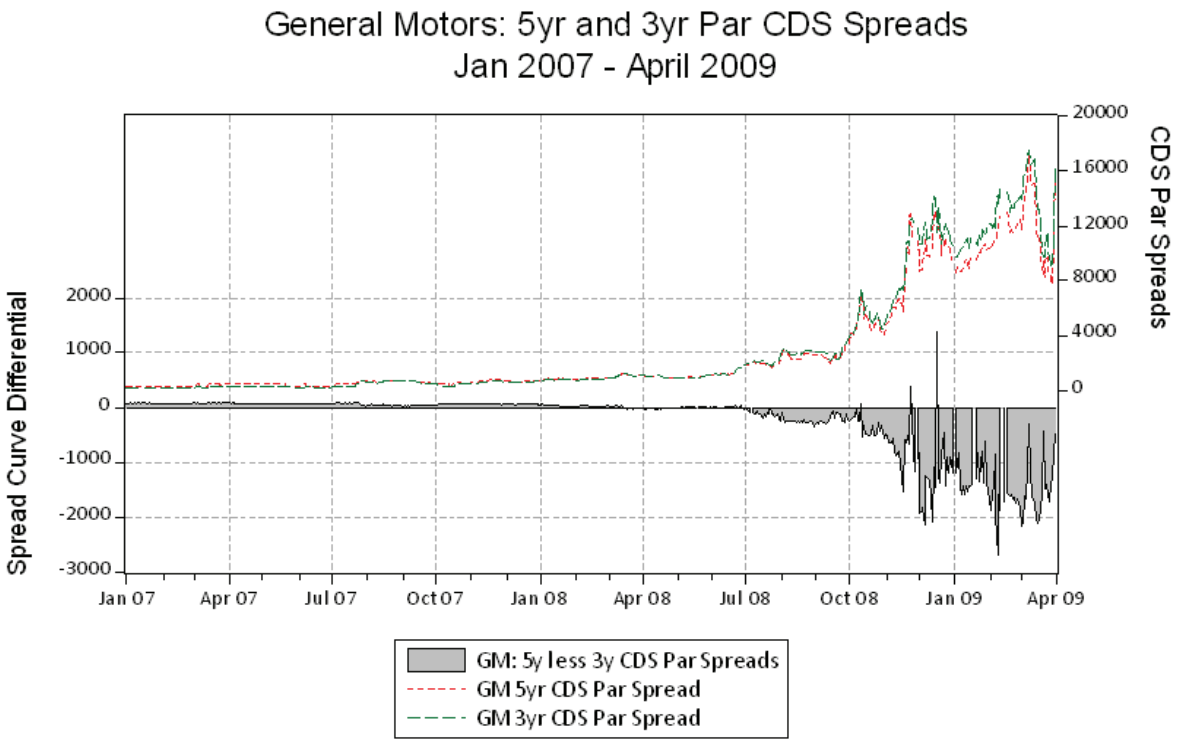


In October 2008, the markets viewed GM's default as a highly probable event. The long and short bonds converged in price and very closely tracked the recovery expectation of the CDS. Prior to this period, the bonds traded on spread, rather than "jump to default" and the expected disconnect in market value sensitivity is apparent. The CDS traded

around a 40% assumed recovery and regressions of market value change on the CDS would have tracked poorly vs. the long dated bond. But as default approached, that effectiveness clearly increased and by April 2009 was near 100%.

Below is a graph showing the CDS Par Spreads for GM in the months preceding their default. Before the credit deteriorated, the 5 year CDS protection traded a few basis points wider than the 3 year protection. As the condition of the company deteriorated and the probability of default increased, the 3 year CDS spread widened faster than the 5 year CDS. Eventually, when default was perceived to be certain, the actual cost of the protection became identical irrespective of the CDS maturity because the prices were driven by the recovery at that point. But from a spread perspective, points of upfront cost equate to a higher spread on short dated contracts than they will for long dated contracts.

Figure A8.2



Appendix 9: Industry Impact

The intent of ACLI's Derivatives Risk Mitigation Proposal is to improve the RBC calculation and encourage appropriate risk mitigation. When adopted, the actual change in RBC will not likely be large but may offer a sufficient incentive for companies to increase effective use of this strategy.

Using annual statement data, this appendix estimates the number of companies that will be immediately and directly affected by this regulatory change. Specifically, we provide data on: (1) the number of life insurers that hold derivatives for hedging purposes; (2) the size of companies that hold derivatives for hedging purposes; and (3) the percentage of bond assets covered by credit default swaps (CDS). An analysis of the effect of this proposal on the RBC requirements of the impacted insurers was not performed.

Table A9.1 considers companies which used derivatives for hedging purposes in reporting year 2009. Specifically, companies were ranked in descending order by total assets, then grouped into the top 5, 10, 25, 50, and 100 companies. The entire industry was also considered. Table A9.1 reports the number of hedging companies in each cohort, as well as percent of the cohort. It is important to note that table A9.1 does not consider the *amount* of assets hedged, simply whether or not a company uses this tool. Understandably, hedging is very strongly correlated with company size. At least to some extent, all of the top 5 companies used this strategy in 2009; 90 percent of the top 10; 76 percent of the top 25; 76 percent of the top 50; and 65 percent of the top 100. However, if all US life insurers are considered, only 11.6 percent use derivatives for hedging. The likely reason smaller companies are less inclined to use hedging is because their portfolios are simpler and may not require more sophisticated investment techniques. Additionally, smaller companies may be less comfortable with hedging.

Credit default swaps (CDS) are the most common and perhaps best known form of hedging. In 2009, 22 life insurance companies (representing 31 percent of industry general account assets) held CDS for hedging purposes. In order to examine the extent of CDS use, four variables were considered for each company: (1) CDS hedging coverage of public corporate bonds; (2) CDS hedging coverage of public corporate bonds, excluding ABS and MBS; (3) average bond rating; and (4) RBC ratio. From the sample of 22 companies, the maximum, minimum and mean are reported in table A9.2.

Though one company reported hedging coverage of its public corporate bond holdings at 5.15 percent, mean coverage was only 1.98 percent, and median coverage slightly less at 1.53 percent. If asset-backed securities (ABS) and mortgage-backed securities (MBS) are excluded from the analysis, the maximum reported coverage is 9.20 percent, the mean is 3.26 percent, and the median 2.29 percent. Additionally, when ABS and MBS are excluded, the minimum coverage increases from 0.04 to 0.06 percent. The fact that the mean is greater than the median by approximately half a percentage point in the first case and almost a full percentage point in the second suggests that in both

Table A9.1: Companies Using Derivatives for Hedging Purposes, 2009*

	Number of Companies that Hedge	Percent of Cohort
Top 5 companies**	5	100
Top 10 companies	9	90
Top 25 companies	19	76
Top 50 companies	38	76
Top 100 companies	65	65
Total* **	**108**	**11.6**

*National Association of Insurance Commissioners (NAIC) data, 2009 reporting year. Schedule DB, various parts.
**By total assets.
***The total number of companies is 935, including fraternal benefit societies.

scenarios the companies (or company) reporting the maximum value are (is) skewing the results somewhat.

Table A9.2 further reports that, as expected, the mean and median average bond rating are both high at 1.52, with a range from 1.71 to 1.37. However, there does appear to be some variance in the RBC ratio, which ranges from 279 to 745, with a mean and median of 443 and 442, respectively, suggesting that the RBC ratio is evenly distributed among the 22 companies.

Table A9.2: Life Insurers' Use of CDS for Hedging, 2009*

	Maximum	Minimum	Mean	Median
Hedging Coverage of Public Corporate Bonds	5.15%	0.04%	1.98%	1.53%
Hedging Coverage Public Corporate Bonds (without ABS or MBS)	9.20%	0.06%	3.26%	2.29%
Average Bond Ratings	1.37	1.71	1.52	1.52
RBC Ratio	745	279	443	442
Number of Companies: 22				
Percent of Industry General Account Assets: 31%				

*National Association of Insurance Commissioners (NAIC) data, 2009 reporting year. Public corporate bonds include groups 6, 7, and 9 in Schedule D, Part 1A, Section 1. Public bonds excluding MBS and ABS are from Schedule D, Part 1A, Section 2 (lines 6.1, 7.1, and 9.1).

Appendix 10: Statutory Accounting and Hedges

How does the statutory accounting model operate when there is a decline in the value of a cash instrument and a corresponding increase in the value of a hedging instrument?

For cash market instruments carried at amortized cost, such as bonds (SSAP 26), the decline in the value of the bond due to credit deterioration causes a periodic write down as impairments are assessed on a quarterly or more frequent basis. The write downs are recorded as realized losses which reduce net income, AVR and surplus. The credit deterioration increases the value of the hedging instrument but the changes in value of a bond and its hedge are not highly correlated unless default becomes imminent. If hedge accounting is being used (SSAP 86), the hedging instrument is accounted for using the same accounting method as the associated cash instrument (in this case amortized cost). The increase in the value of the hedge would be realized when the hedging instrument matures or is sold. If hedge accounting is not used (SSAP 86 requirements are not met) then the hedging instrument is marked to market with any change in value reflected in unrealized gain or loss, AVR and surplus.

In or near default, the NAIC rating for the bond becomes 6 and the bond is marked-to-market for life companies. For property-casualty companies, the bond is marked-to-market when its credit standing deteriorates to NAIC 3. At this point the bond and its hedge are both marked-to-market for statutory accounting purposes. Upon default, the bondholder makes the bond available for auction through the clearinghouse. The holder then can decide whether to sell the bond at auction and realize the remaining loss or continue to hold it at market value. If the bond is held, the next impairment review will require its write down to fair value which simply converts the unrealized loss arising from the mark-to-market treatment to a realized loss, as if it had been sold. Since marking the bond to market impacts surplus, there would be no further surplus impact at this time. The hedge counter party pays to the bondholder the difference between par and the auction price with the proceeds recorded as a realized gain.

For cash market instruments carried at fair value, such as common stocks (SSAP 30), both the cash market instrument and the hedging instrument are marked to market with any change in value reflected in unrealized gain or loss, AVR and surplus.

Appendix 11: Glossary

CDS:	A credit default swap (CDS) is a financial contract in which one counterparty (the protection buyer) pays a periodic fee to the other counterparty (the protection seller), typically expressed in basis points on the notional amount. If a credit default occurs, the protection buyer is made whole by the protection seller.
CDX:	Like the S&P 500 and other market benchmarks, the credit default swap indices reflect the performance of a basket of assets, namely, a basket of single-name credit default swaps (credit default swaps on individual credits). Unlike a perpetual index, such as the S&P 500, CDS indices have a fixed composition and fixed maturities. A new series of indices is established approximately every six months with a new underlying portfolio and maturity date, to reflect changes in the credit market and to help investors maintain a relatively constant duration if they wish. Equal weight is given to each underlying credit in the CDX and iTraxx portfolios. If there is a credit event in an underlying CDS, the credit is effectively removed from the indices in which it is included.
Coverage:	The proportion of the total risk inherent in the hedged item that is nominally addressed by the hedging instrument. For example, in the case of a $20 million Boeing bond portfolio holding – a CDS purchased in a $10 million notional amount on Boeing bonds intended to reduce default risk equates to 50% coverage.
Default correlation:	Default correlation represents the likelihood of two (or more) credits defaulting together over a given time period.
Delta:	The price sensitivity of an option in relation to the underlying stock.
Derivative:	A contract whose value is based on the performance of an underlying financial asset, index, or other investment.
Duration:	Commonly used to describe the weighted average term-to-maturity of a bond or portfolio of bonds' cash flows. When an insurer's duration of assets and liabilities are equivalent the insurer is protected from the adverse effects of interest rate changes.
Effectiveness:	In the context of hedging, this term is used to describe how well the hedging instrument reduces a particular risk inherent in the hedged item. Default and market value volatility are examples of risk that can be hedged.

MBS portfolio:	A group of mortgage backed securities.
Nth to default:	A credit derivative in which the payout is linked to one in a series of defaults (such as first-, second- or third-to-default), with the contract terminating at that point.
Purchase yield:	The expected total return on a fixed income instrument at the time of acquisition that will be earned if held to maturity.
RSAT:	Replication of (Synthetic Asset) Transaction. RSAT means a derivative transaction entered into in conjunction with other investments in order to reproduce the investment characteristics of otherwise permissible investments.
Spread:	For fixed income securities it is the difference in yields on securities of the same quality but different maturities or the difference between yields on securities of the same maturity but different quality.
Strike price/level:	The amount at which a security or commodity underlying a call or put option can be purchased or sold over a period stipulated in the option contract.
Tranche:	A tranche provides a hedge to risk slices by allocating the payouts on a pool of assets to a collection of investors. Each investor will be exposed to losses at different levels of subordination and will therefore receive different levels of compensation for this risk. Just as a CDS contract provides exposure to the credit risk of a reference company, and a CDS index provides exposure to the risk of a portfolio of credits, a tranche CDX provides exposure to the risk of a particular amount of loss on a portfolio of companies. As such, a tranche references a portfolio of companies and defines the amount of portfolio loss against which to sell or buy protection. Similar to a CDS contract, the cost of tranche protection is paid as a coupon measured in spread, upfront fee or a combination of the two.

Appendix 12: ACLI Team

Primary contributors to this proposal:

- Walter Givler, (Chair-Subgroup), Northwestern Mutual
- Deborah Hayes, Lincoln
- Christopher Johnson, MetLife
- William Schwegler, Aegon
- Mark Anderson, MetLife
- Niraj Patel, Genworth
- Steven Lee, Thrivent
- John Mathews, Allstate
- Andrew Melnyk, ACLI

BONDS

Company Name Cocode: 00000

BONDS

	SVO Bond Rating Category	Annual Statement Source	(1) Book / Adjusted Carrying Value		Factor		(2) RBC Requirement
	Long Term Bonds						
(1)	Exempt Obligations	AVR Default Component Column 1 Line 1	$0	X	0.000	=	$0
(2)	Asset Class 1	AVR Default Component Column 1 Line 2	$0	X	0.004	=	$0
(3)	Asset Class 2	AVR Default Component Column 1 Line 3	$0	X	0.013	=	$0
(4)	Asset Class 3	AVR Default Component Column 1 Line 4	$0	X	0.046	=	$0
(5)	Asset Class 4	AVR Default Component Column 1 Line 5	$0	X	0.100	=	$0
(6)	Asset Class 5	AVR Default Component Column 1 Line 6	$0	X	0.230	=	$0
(7)	Asset Class 6	AVR Default Component Column 1 Line 7	$0	X	0.300	=	$0
(8)	Total Long-Term Bonds (Column (1) should equal Page 2 Column 3 Line 1)	Sum of Lines (1) through (7)	$0				$0
	Short Term Bonds						
(9)	Exempt Obligations	AVR Default Component Column 1 Line 18	$0	X	0.000	=	$0
(10)	Asset Class 1	AVR Default Component Column 1 Line 19	$0	X	0.004	=	$0
(11)	Asset Class 2	AVR Default Component Column 1 Line 20	$0	X	0.013	=	$0
(12)	Asset Class 3	AVR Default Component Column 1 Line 21	$0	X	0.046	=	$0
(13)	Asset Class 4	AVR Default Component Column 1 Line 22	$0	X	0.100	=	$0
(14)	Asset Class 5	AVR Default Component Column 1 Line 23	$0	X	0.230	=	$0
(15)	Asset Class 6	AVR Default Component Column 1 Line 24	$0	X	0.300	=	$0
(16)	Total Short-Term Bonds (Column (1) should equal Schedule DA Part 1 Column 7 Lines 6099999+7999999+8099999+ LR012 Miscellaneous Assets Column (1) Line (2.2))	Sum of Lines (9) through (15)	$0				$0
(17)	Total Long-Term and Short-Term Bonds (pre-MODCO/Funds Withheld)	Line (8) + (16)	$0				$0
(18)	Credit for Hedging	Hedged Asset Bonds Schedule Column 13 Line 0199999					$0
(19)	Reduction in RBC for MODCO/Funds Withheld Reinsurance Ceded Agreements	LR040 Modco or Funds Withheld Reinsurance Ceded - Bonds C-1o Column (4) Line (9999999)					$0
(20)	Increase in RBC for MODCO/Funds Withheld Reinsurance Assumed Agreements	LR041 Modco or Funds Withheld Reinsurance Assumed - Bonds C-1o Column (4) Line (9999999)					$0
(21)	Total Long-Term and Short-Term Bonds (including MODCO/Funds Withheld and Credit for Hedging adjustments.)	Lines (17) - (18) - (19) + (20)	$0				$0
(22)	Non-exempt Asset Class 1 U.S. Government Agency Bonds	Schedule D Part 1 Class 1 Bonds and Schedule DA Part 1 Class 1 Bonds, in part†	$0	X	0.004	=	$0
(23)	Bonds Subject to Size Factor	Line (21) - Line (1) - Line (9) - Line (22)	$0				$0
(24)	Number of Issuers	Company Records	0				
(25)	Size Factor for Bonds						2.500
(26)	Bonds Subject to Size Factor after the Size Factor is Applied	Line (23) x Line (25)					$0
(27)	Total Bonds	Line (22) + Line (26)					$0

† Only investments in asset Class 1 U.S. Government agency bonds previously reported in Lines (2) and (10), net of those included on Line (19), plus the portion of Line (20) attributable to ceding companies' Lines (2) and (10) should be included on Line (22). No other class 1 bonds should be included on this line. Exempt U.S. Government bonds shown on Lines (1) and (9) should not be included on Line (22). Refer to the bond section of the risk-based capital instructions for more clarification.

Company Name

Cocode: 00000

UNAFFILIATED PREFERRED AND COMMON STOCK

		Annual Statement Source	(1) Book / Adjusted Carrying Value	(2) Less Affiliated Preferred Stock Without AVR	(3) RBC Subtotal		(4) Factor		(5) RBC Requirement
	Unaffiliated Preferred Stock								
(1)	Preferred Stock (excluding Hybrids) Asset Class 1	AVR Default Component Column 1 Line 10, in part	$0	$0	$0	X	0.004	=	$0
(2)	Preferred Stock (excluding Hybrids) Asset Class 2	AVR Default Component Column 1 Line 11, in part	$0	$0	$0	X	0.013	=	$0
(3)	Preferred Stock (excluding Hybrids) Asset Class 3	AVR Default Component Column 1 Line 12, in part	$0	$0	$0	X	0.046	=	$0
(4)	Preferred Stock (excluding Hybrids) Asset Class 4	AVR Default Component Column 1 Line 13, in part	$0	$0	$0	X	0.100	=	$0
(5)	Preferred Stock (excluding Hybrids) Asset Class 5	AVR Default Component Column 1 Line 14, in part	$0	$0	$0	X	0.230	=	$0
(6)	Preferred Stock (excluding Hybrids) Asset Class 6	AVR Default Component Column 1 Line 15, in part	$0	$0	$0	X	0.300	=	$0
(7)	Hybrids Reported as Preferred Stock Asset Class 1	AVR Default Component Column 1 Line 10, in part	$0	$0	$0	X	0.004	=	$0
(8)	Hybrids Reported as Preferred Stock Asset Class 2	AVR Default Component Column 1 Line 11, in part	$0	$0	$0	X	0.013	=	$0
(9)	Hybrids Reported as Preferred Stock Asset Class 3	AVR Default Component Column 1 Line 12, in part	$0	$0	$0	X	0.046	=	$0
(10)	Hybrids Reported as Preferred Stock Asset Class 4	AVR Default Component Column 1 Line 13, in part	$0	$0	$0	X	0.100	=	$0
(11)	Hybrids Reported as Preferred Stock Asset Class 5	AVR Default Component Column 1 Line 14, in part	$0	$0	$0	X	0.230	=	$0
(12)	Hybrids Reported as Preferred Stock Asset Class 6	AVR Default Component Column 1 Line 15, in part	$0	$0	$0	X	0.300	=	$0
(13)	Total Unaffiliated Preferred Stock Including Hybrids (pre-MODCO/Funds Withheld)	Sum of Lines (1) through (12)	$0	$0	$0				$0
	(Column (1) should equal Page 2 Column 3 Line 2.1 less Asset Valuation Reserve Default Component Column 1 Line 16.)								
	(Column (2) should equal Schedule D Summary Column 1 Line 39 less Asset Valuation Reserve Default Component Column 1 Line 16.)								
(14)	Reduction in RBC for MODCO/Funds Withheld Reinsurance Ceded Agreements	Company Records (enter a pre-tax amount)							$0
(15)	Increase in RBC for MODCO/Funds Withheld Reinsurance Assumed Agreements	Company Records (enter a pre-tax amount)							$0
(16)	Total Unaffiliated Preferred Stock (including MODCO/Funds Withheld.)	Lines (13) - (14) + (15)							$0
	Unaffiliated Common Stock								
(17)	Total Common Stock	Schedule D Summary Column 1 Line 54	$0						
(18)	Less Affiliated Common Stock	Schedule D Summary Column 1 Line 53	$0						
(19)	Less Non-Admitted Unaffiliated Common Stock included in Line (17)	Company Records	$0						
(20)	Less Money Market Mutual Funds	Schedule D Part 2 Section 2 Column 6 Line 7199999	$0		$0	X	0.004	=	$0
(21)	Less Federal Home Loan Bank Common Stock	AVR Equity Component Column 1 Line 3	$0		$0	X	0.011	=	$0
(22)	Less Unaffiliated Private Common Stock	AVR Equity Component Column 1 Line 2	$0		$0	X	0.300	=	$0
(23)	Net Other Unaffiliated Public Common Stock	Lines (17) - (18) - (19) - (20) - (21) - (22)	$0		$0	X	0.450 †	=	$0
(24)	Total Admitted Unaffiliated Common Stock (pre-MODCO/Funds Withheld)	Lines (20) + (21) + (22) + (23)	$0		$0				$0
	(Column 1 should equal Schedule D Summary by Country Column 1 Line 54 less Line 53 less Line (19))								
(25)	Credit for Hedging	Hedged Asset Common Stock Schedule Column 10 Line 0299999							$0
(26)	Reduction in RBC for MODCO/Funds Withheld Reinsurance Ceded Agreements	Company Records (enter a pre-tax amount)							$0
(27)	Increase in RBC for MODCO/Funds Withheld Reinsurance Assumed Agreements	Company Records (enter a pre-tax amount)							$0
(28)	Total Admitted Unaffiliated Common Stock (including MODCO/Funds Withheld and Credit for Hedging.)	Lines (24) - (25) - (26) + (27)							$0

As of 12/31/2009

Company Name

HEDGING

Columns are derived from Investment schedules.
Column is a calculation
Column is based on a table

			(1)	(2)	(3)	(4)		(5)
	Type of Hedged Asset		**Hedging Instruments**					
			Description	Notional Amount	Relationship Type of the Hedging Instrument and Hedged Asset	Maturity Date		Description
	Bonds							
Example #1	(0000001)		Credit Default Swap - Rec 0.0000 [PAY 1.0000]	50,000,000	Basic	12/31/14		Boeing Corporation Senior Unsecured
Example #2	(0000002)		Credit Default Swap - Rec 0.0000 [PAY 1.0000]	80,000,000	Basic	12/31/14		AT&T Broadband
Example #3	(0000003)		Credit Default Swap - Rec 0.0000 [PAY 1.0000]	160,000,000	Basic	12/31/14		AT&T Broadband
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 1
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 2
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 3
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 4
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 5
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 6
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 7
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 8
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 9
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 10
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 11
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 12
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 13
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 14
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 15
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 16
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 17
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 18
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 19
Example #5	(0000004)		Credit Default Swap - Rec 0.0000 [PAY 1.2500]	10,000,000	Intermediate	12/31/14		Bond 20
Example #5	(0000004)		Subtotal for (0000004)	200,000,000	Intermediate			
Example #5	(0000004)		Percentage of Overlap with Insurer's Bond Portfolio for (0000004)					
	(0199999)		Total	490,000,000				xxxxx

Note: For the intermediate category of hedging, we recommend that the risk mitigation and resulting RBC credit be determined as if each specific security common to both the index/basket hedge and the portfolio is a basic hedge with the entire basic hedge methodology applied to each matching name. This includes the application of the maturity mismatch formula and the maximum RBC credit of 94% of the C-1 asset charge for fixed income hedges.

(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)	(14)
	Hedged Asset - Bonds							**RBC Credit**	
CUSIP Identification	Book Adjusted Carrying Value	Overlap with Insurer's Bond Portfolio	Maturity Date	NAIC Designation	RBC Factor		Gross RBC Charge	RBC Credit for Hedging Instruments	Net RBC Charge
cusip	$50,000,000	$50,000,000	12/31/14	1FE	0.004		$200,000	$188,000	$12,000
cusip	$80,000,000	$80,000,000	12/31/19	2FE	0.013		$1,040,000	$540,800	$499,200
cusip	$320,000,000	$160,000,000	12/31/19	2FE	0.013		$4,160,000	$1,081,600	$3,078,400
cusip	$10,000,000	$10,000,000	12/31/16	1FE	0.004		$40,000	$27,994	$12,006
cusip	$20,000,000	$10,000,000	12/31/18	2FE	0.013		$260,000	$73,663	$186,337
cusip	$10,000,000	$10,000,000	12/31/12	3FE	0.046		$460,000	$432,400	$27,600
cusip	$15,000,000	$10,000,000	12/31/11	1FE	0.004		$60,000	$37,600	$22,400
cusip	$24,000,000	$10,000,000	12/31/15	1FE	0.004		$96,000	$32,003	$63,997
cusip	$7,000,000	$7,000,000	12/31/14	2FE	0.013		$91,000	$85,540	$5,460
cusip	$23,000,000	$10,000,000	12/31/20	1FE	0.004		$92,000	$19,270	$72,730
cusip	$10,000,000	$10,000,000	12/31/23	2FE	0.013		$130,000	$51,998	$78,002
cusip	$16,000,000	$10,000,000	12/31/21	3FE	0.046		$736,000	$206,978	$529,022
cusip	$45,000,000	$10,000,000	12/31/18	1FE	0.004		$180,000	$22,666	$157,334
cusip	$23,000,000	$10,000,000	12/31/18	2FE	0.013		$299,000	$73,663	$225,337
cusip	$12,000,000	$10,000,000	12/31/15	1FE	0.004		$48,000	$32,003	$15,997
cusip	$5,000,000	$5,000,000	12/31/19	3FE	0.046		$230,000	$119,600	$110,400
cusip	$14,000,000	$10,000,000	12/31/16	1FE	0.004		$56,000	$27,994	$28,006
cusip	$21,000,000	$10,000,000	12/31/19	1FE	0.004		$84,000	$20,800	$63,200
cusip	$0	$0	12/31/14	3FE	0.046		$0	$0	$0
cusip	$0	$0	12/31/14	1FE	0.004		$0	$0	$0
cusip	$0	$0	12/31/14	1FE	0.004		$0	$0	$0
cusip	$0	$0	12/31/14	2FE	0.013		$0	$0	$0
cusip	$0	$0	12/31/14	1FE	0.004		$0	$0	$0
	$255,000,000	$142,000,000					$2,862,000	$1,264,171	$1,597,829
		71.0%							
Total	$705,000,000	$432,000,000			xxxxx		$8,262,000	$3,074,571	$5,187,429

As of 12/31/2009

Company Name

HEDGING

	Columns are derived from Investment schedules.
	Column is a calculation
	Column is based on a table

			(1)	(2)	(3)	(4)	(5)
			Hedging Instruments			**Hedged Asset -**	
			Description	Notional Amount	Relationship Type of the Hedging Instrument and Hedged Asset	Description	CUSIP Identification
	Common Stock						
Example #4	(0000001)		Short Exxon Mobil Futures	15,000,000	Basic	Exxon Mobil Common Shares	cusip
Example #6	(0000002)		Short S&P 500 Futures	100,000,000	Intermediate	Common Shares benchmarked to S&P 500	cusip
Example #6	(0000002)		Subtotal for (0000002)	100,000,000	Intermediate		
	(0299999)		Total	115,000,000		xxxxx	Total

Note1: For Example #6, all 500 stocks in the S&P should be included in the schedule. For presentation purposes of this example it would be impractical to list all issues in the S&P 500, therefore we summarized the 500 lines into one line above.

Note2: For the intermediate category of hedging, we recommend that the risk mitigation and resulting RBC credit be determined as if each specific security common to both the index/basket hedge and the portfolio is a basic hedge with the entire basic hedge methodology applied to each matching name. This includes the application of the maximum RBC credit of 94% of the C-1 asset charge for common stock hedges.

(6)	(7)	(8)	(9)	(10)	(11)
Common Stock				**RBC Credit**	
Book Adjusted Carrying Value	Overlap with Insurer's Stock Portfolio	RBC Factor	Gross RBC Charge	RBC Credit for Hedging Instruments	Net RBC Charge
$30,000,000	$15,000,000	0.300	$9,000,000	$4,230,000	$4,770,000
$1,000,000,000	$100,000,000	0.300	$300,000,000	$28,200,000	$271,800,000
1,000,000,000	$100,000,000		$300,000,000	$28,200,000	$271,800,000
$1,030,000,000	$115,000,000		$309,000,000	$32,430,000	$276,570,000

Factors Table
As determined by the NAIC

NAIC Designation	Internal Designation	Factor
		0.0000
1	1	0.0040
2	2	0.0130
3	3	0.0460
4	4	0.1000
5	5	0.2300
6	6	0.3000

1	RP1UFE	0.0040
1	RP1LFE	0.0040
1	P1U	0.0040
2	RP2LFE	0.0130
2	RP2UFE	0.0130
2	P2UFE	0.0130

		0.0000
1	1FE	0.0040
2	2FE	0.0130
3	3FE	0.0460
4	4FE	0.1000
5	5FE	0.2300
6	6FE	0.3000

		0.0000
1	1*	0.0040
2	2*	0.0130
3	3*	0.0460
4	4*	0.1000
5	5*	0.2300
6	6*	0.3000

August 2, 2010 LRBC Draft

Risk Mitigation through Hedging

LR0XX (adjacent to Replication Synthetic Asset Transactions (RSAT))

(Instructions related to intermediate hedges are in italics.)

Hedging

The concept of hedging credit, equity and other risks is widely accepted and understood among insurers and their regulators. In order for regulators to distinguish between insurers that have effectively reduced their risks from those insurers that have not, the risk based capital computation should be sensitive to such differences. Increasing or decreasing exposure to different asset classes in relation to a benchmark asset allocation tailored to meet the long term obligations to policy owners is critical to successfully managing an insurance company. Hedging is the process of using derivative instruments to most efficiently limit risk associated with a particular asset in a manner consistent with the insurer's long term objectives. The relative advantage of using cash market transactions versus derivative market transactions depends upon market conditions.

The NAIC model investment laws and regulations establish specific constraints on the use of derivatives. Governance of derivative use starts with approved and documented authorities from the insurer's Board of Directors to management. These authorities are coordinated with and enhanced by limits established by the insurer's domiciliary state.

Hedging strategies currently employed by insurers range from straightforward relationships between the hedged asset and the derivative instrument (the hedge) to more complex relationships. The purpose of this section of the RBC calculation is to measure and reflect in RBC the risk reduction achieved by an insurer's use of the most straightforward types of hedges involving credit default and equity C-1 risks.

To avoid the possible double counting of RBC credits, excluded from this section are any RBC credits arising from hedges that are part of the Clearly Defined Hedging Strategy (CDHS) required for C-3 cash flow testing or other risk mitigation techniques (e.g. reinsurance) which produce reduced levels of RBC by operation of other parts of the RBC formula.

RBC and Measuring the Risk Reduced by Hedging

To measure the risks reduced by hedging and reflect the effects in RBC it is important to understand the characteristics and purpose of the hedge. A portfolio manager seeking to hedge a particular asset or portfolio risk must determine if the derivative instruments available will do a suitable job of risk mitigation.

Default risk - A portfolio manager may determine that the default risk of a particular debt security which matures in 8 years needs to be hedged because of a near term credit concern which may resolve before the debt matures. A credit default swap (CDS) would be the most effective hedging instrument. In some circumstances the manager may purchase a CDS with 8 years to maturity which fully mitigates the default risk and shall result in an RBC credit which fully offsets the C-1 default risk charge on the debt security. However, seeking the most liquid and cost efficient market for the purchase of such an instrument may lead to the purchase of a 5 year CDS which the manager plans to renew (roll) as the credit circumstances evolve in the coming years. In this case there is a 3 year maturity mismatch between the debt security and the hedging instrument. To account for the difference between insurers that have hedged the debt security to full maturity versus those with a mismatched position, the determination of the

RBC credit shall be made in accordance with the following formula which limits the results to a fraction of the C-1 charge for the hedged asset.

.

This accounts for mismatched maturities and provides a regulatory margin of safety within a range of 94%-10% of the C-1 asset charge.

$$\text{RBC Credit As \% of C1 Asset Charge} = Min\left(1, \frac{\textit{Time to Maturity of CDS}}{\textit{Time to Maturity of Bond}}\right) \times (94\% - 10\%) + 10\%$$

There may also be circumstances where default risk is reduced by hedging specific portfolios using a basket or index based derivative (e.g. CDX family of derivatives) with the same or very similar components as the portfolio. For these hedges the risk reduction shall be measured based on the number of issuers common to the both the insurer's portfolio and the index/basket CDS. A minimum of 50% overlap of the derivative instrument notional amount and the book adjusted carrying value of the hedged bonds shall be required to qualify for any RBC credit. Additionally, if the Insurer hedges an index, each bond must be listed (e. g. if the insurer acquires a CDX that hedges 125 names equally, then the insurer must list all 125 names on the schedule), regardless if the insurer owns all the bonds in the index.

As RBC is currently measured and reported annually and to an extent provides a regulator with an indicator of capital sufficiency for the near term future; default risk protection as provided by CDS (based on a specific security or an index of securities) shall have more than 1 year remaining to maturity in order to receive any RBC credit, provided that the remaining maturity of the hedged debt security or average maturity of the hedged portfolio is greater than 1 year. When both the default risk protection and the hedged debt security have less than one year to maturity, full RBC credit shall be allowed provided that the maturity of the protection is later than the maturity of the debt security; otherwise no RBC credit is allowed.

Equity market risk - A portfolio manager may determine that the market risk of holding a particular common stock needs to be reduced. Because an outright sale at that point in time might be disadvantageous to the insurer and/or policy owners, a short futures contract may be purchased to eliminate the current market risk by establishing a sale price in the future. The C-1 RBC equity risk credit shall be limited to 94%.

There may also be circumstances where equity market risk is reduced by hedging equity portfolios using derivatives based on equity market indices (e.g. S&P 500 futures contracts). Unless the equity portfolio is exactly matched to the index, the hedge will not provide precise one-to-one protection from fluctuations in value. The insurer must list all positions in the equity index individually (e. g. all 500 common stocks that are part of the S&P 500), regardless if the insurer owns all the stocks in the index.

<u>Definitions and Instructions for the Spreadsheet Computation of Risk Reduction</u>

(Numeric references represent spreadsheet columns)

Bonds

(1) Description - Reported on Schedule DB.

(2) Notional Amount - Amount reported on Schedule DB.

(3) Relationship Type of the Hedging Instrument and Hedged Asset. There are two categories; Basic and Intermediate relationships. Basic relationship = Single issuer credit default swap on a single issuer name to hedge the credit risk of a specific hedged asset. *Intermediate relationship = A portfolio of insurer assets paired with a basket or index based hedging instrument with the same or very similar components as the portfolio. For intermediate relationships, a minimum of 50% overlap of the derivative instrument notional amount and the book adjusted carrying value of the hedged bonds shall be required to qualify for any RBC credit.*

(4) Maturity Date - Date reported on Schedule DB.

(5) Description - Bond description found in Schedule D. *For intermediate relationships, each bond must be listed (e. g. if the insurer acquires a credit default index that hedges 125 names equally, then the insurer must list all 125 names on the schedule.*

(6) CUSIP Identification - Bond unique identifier found in Schedule D.

(7) Book Adjusted Carrying Value - Value found on Schedule D.

(8) Overlap with Insurer's Bond Portfolio – The portion of Column (2) Notional Amount of the Hedging Instrument that hedges Column (7) Book Adjusted Carrying Value. This amount cannot exceed Column (7) Book Adjusted Carrying Value.

(9) Maturity Date - The date is found in Schedule D.

(10) NAIC Designation - Designation found in Schedule D. Necessary to determine correct RBC Factor for the Bonds.

(11) RBC Factor - Factor based on Column (10) NAIC Designation and NAIC C-1 RBC factors table.

(12) Gross RBC Charge – This is the C-1 RBC charge based on holdings at the end of the year. Calculation: Columns (7) Book Adjusted Carrying Value multiplied by (11) RBC Factor.

(13) RBC Credit for Hedging Instruments – If Column (8) Overlap with Insurer's Bond Portfolio is zero; the RBC Credit would also be zero. The Hedging Instrument must have more than 1 year remaining to maturity in order to receive any RBC credit provided that the remaining time to maturity of the Hedged Asset - Bonds is greater than 1 year. If both the Hedging Instrument and the Hedged Asset - Bonds maturity dates are in less than 1 year, the maximum RBC credit determined using the formula below shall be allowed provided that the maturity of the hedging instrument is equal to or later than the maturity of the bond. Calculation is Column (8) Overlap with Insurer's Bond Portfolio multiplied by RBC Credit as % of C-1 Asset Charge formula (formula listed below) multiplied by (11) RBC Factor.

$$\text{RBC Credit as \% of C1 Asset Charge} = Min\left(1, \frac{Time\ to\ Maturity\ of\ \ Hedging\ \ Instrument}{Time\ to\ Maturity\ of\ \ Bond}\right) \times \left(94\% - 10\%\right) + 10\%$$

Time to Maturity of Hedging Instrument divided by Time to Maturity of Bond cannot exceed 1.

(14) Net RBC Charge – Column (12) Gross RBC Charge minus (13) RBC Credit for Hedging Instruments.

Common Stocks

(1) Description - Reported on Schedule DB.

(2) Notional Amount - Amount reported on Schedule DB.

(3) Relationship Type of the Hedging Instrument and Hedged Asset. There are two categories; Basic relationships or Intermediate relationships. Basic relationship = Single name equity Hedging Instrument paired with a specific common stock. *Intermediate relationship = A portfolio of common stocks paired with a basket or index based Hedging Instrument with the same or very similar components as the portfolio. For intermediate relationships, a minimum of 50% overlap of the derivative instrument notional amount and the book adjusted carrying value of the hedged common stocks shall be required to qualify for any RBC credit.*

(4) Description - Common Stock description found in Schedule D Part 2 Section 2. *For intermediate relationships, each common stock must be listed (e. g. if the insurer acquires a short futures contract that hedges the S&P 500, then the insurer must list all 500 stocks on the schedule).*

(5) CUSIP Identification - Common Stock unique identifier found in Schedule D Part 2 Section 2.

(6) Book Adjusted Carrying Value - Value found on Schedule D Part 2 Section 2.

(7) Overlap with Insurer's Stock Portfolio – The portion of Column (2) Notional Amount of the Hedging Instrument that hedges Column (6) Book Adjusted Carrying Value. This amount cannot exceed the Column (6) Book Adjusted Carrying Value.

(8) RBC Factor - Factor based on NAIC C-1 RBC factors table.

(9) Gross RBC Charge - The C-1 RBC charge based on holdings at the end of the year. Calculation: Columns (6) Book Adjusted Carrying Value multiplied by (8) RBC Factor.

(10) RBC Credit for Hedging Instruments - RBC credit for equity market risk reduction is limited to 94% of the C-1 Asset charge. Calculation: Column (7) Overlap with Insurer's Stock Portfolio multiplied by (8) RBC Factor multiplied by 94%.

(11) Net RBC Charge - Column (9) Gross RBC Charge minus (10) RBC Credit for Hedging Instruments.