AMERICAN ACADEMY *of* ACTUARIES

Sample PBR Actuarial Report for Life Polices Subject to a PBR Valuation

Prepared by Subgroup 1 of the Valuation Law and Manual Team

**Presented to the National Association of Insurance Commissioners'
Life and Health Actuarial Task Force (LHATF)**

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SURAK LIFE INSURANCE COMPANY

PBR ACTUARIAL REPORT ON POLICIES SUBJECT TO PBR VALUATION

As of December 31, 2011

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I. OVERVIEW

A. INTRODUCTION

This report has been prepared on the Surak Life Insurance Company in conjunction with the Actuarial Certification on the policies subject to a PBR valuation. This report details the all of the disclosure items for a PBR valuation as required by [insert applicable section] of the Valuation Manual for Surak Life for year-end 2011.

The Surak Life Insurance Company has been determining the reserves for the products listed below on a PBR basis since 2008:

    Accumulation UL with no secondary guarantees
    UL with shadow account
    20 year level term products
    Variable UL

This report covers these products. The policies and assets examined were those in-force on December 31, 2011.

This report and any conclusions contained therein have been prepared for the use of the PBR Review Actuary of Surak Life. This report has been prepared in conformity with its intended utilization by a person technically competent in the areas addressed and for the stated purpose only. Judgments as to the data contained in the report should be made only after studying the report in its entirety, as the conclusions reached by review of a section or sections on an isolated basis may be incorrect.

I will be available to explain and/or amplify any matters presented herein, and it is assumed that the user of this report will seek such explanation and/or amplification as to any matter in question.

B. PRODUCT DESCRIPTIONS OF POLICIES SUBJECT TO PBR REQUIREMENTS

Accumulation UL with No Secondary Guarantees

The Accumulation Universal Life policies are flexible premium policies. There are two death benefit options: Option 1 pays a death benefit at the Specified Amount plus the increase in the fund value since the last Anniversary Day; Option 2 has a death benefit equal to the Specified Amount plus the fund value. The fund value is accumulated as the total of: premiums plus interest credited less premium expense charges less partial surrenders less monthly deductions. The cash value equals the fund value less a fund charge. The fund charge is a percentage of fund value: 10% in the first year, grading down by 1% a year to 0 in years 11 and later. The guaranteed interest rate is 4%. Excess interest may be credited in a manner determined by the Company. Policy loans are made at the credited rate plus two percent. There are monthly deductions for the cost of insurance plus the monthly expense charge.

UL with Secondary Guarantees

The Universal Life product with Secondary Guarantees is similar to the Accumulation UL product, except that there is a shadow account guarantee. This shadow account guarantee is for the life of the policy. The shadow account guarantees that, as long as the premiums paid plus interest are greater than amounts specified in the policy, the policy will not lapse, even if the fund account were to go to zero.

20 Year Term

The 20 year term product has level premiums over the 20 year period. There is no renewal option after the 20 years. There are no cash values on this product.

Variable UL

The Variable UL product is similar to the Accumulation UL product, but there is no minimum interest rate guarantee on the cash values - investment risk on funds held in separate accounts backing variable life insurance is borne by the policyholder.

C. DESCRIPTION OF CASH FLOW MODEL USED FOR PBR CALCULATIONS

Surak Life uses the SuperPBR modeling system, a commercial software system owned by Whynot, for determining reserves. This system models both assets and liabilities. This is the same system that is being used for cash flow testing analysis at Surak Life. There were a few modifications that Surak Life made to the model in order to capture all the risks of their contracts for the PBR valuation, such as reflecting different potential premium payments for UL insurance. These changes have now also been incorporated into the asset adequacy testing model.

The cash flow model is validated each year by . . . .

D. VALUATION ASSUMPTIONS AND MARGINS

A description of the methods used to determine valuation assumptions are given in Sections III through VI, and a summary of the assumptions used are given in the appendices.

The method used to determine margins was unchanged from last year.

The PBR valuation analysis is based on a myriad of assumptions. Since future experience will not match all these assumptions, actual results will differ from those produced by modeling. However, I believe the reserves are based on reasonably conservative assumptions.

E. REINSURANCE

There were several reinsurance treaties in effect at the end of 2011 on Universal Life. These treaties were all for amounts of insurance in excess of the retention limit and are reinsured on a YRT basis. There is no financial reinsurance. The overall effect of reinsurance is to reduce the volatility of future benefit payment amounts by replacing the reinsured risk with a reinsurance premium.

The 20 year term product was 90% coinsured with VerySafe Reinsurer.

F. DERIVATIVE PROGRAMS

Derivatives are utilized by Surak Life to hedge a variety of interest rate, exchange rate, and equity risks. They are also utilized for asset replication strategies.

Derivatives that are associated with specific assets are linked with the asset for modeling purposes, recognizing the degree of effectiveness of the derivative (i.e. some hedges are less than 100% effective).

Similarly, derivatives hedging specific liabilities are linked together for modeling purposes, recognizing the degree for effectiveness of the derivative.

G. PROCESS TO MONITOR CHANGES IN EXPEREINCE

The Company uses the following metrics to monitor changes in experience.

1. actual to expected mortality experience – quarterly
2. actual to expected lapse experience – quarterly
3. credit losses – annually
4. etc.

Prudent estimate valuation assumptions are reviewed during the 3Q of each year. Prudent estimate valuation assumptions are only modified from the prior year if one or more of the following conditions exist:

1. Future anticipated experience is expected to change, based on an analysis of past trends and/or a change in company practices.
2. There is greater uncertainty in fluctuations around anticipated experience.

There were no changes in prudent estimate valuation assumptions compared to last year.

H. INTEREST RATE AND EQUITY PERFORMANCE SCENARIOS

For general account products, 1000 scenarios were generated using the methodology specified in the American Academy of Actuaries RBC C-3 Phase 1 interest rate scenario generator. The variable annuity scenarios used were those specified in the American Academy of Actuaries C-3 Phase 2 scenario generator.

I. USE OF A MODELING DATE THAT PRECEDES THE VALUATION DATE

The stochastic modeling calculations were based on 9/30 data. This information was used to calculate the Reported Reserve on 12/31 by taking the growth in the Deterministic reserve from 9/30 to 12/31, and using this growth rate to approximate the growth in the Reported Reserve from 9/30 to 12/31.

12/31 Reported Reserve
   1. Take the greater of the Deterministic Reserve and Stochastic Reserve as of 9/30.
   2. Adjust the result of step 1 to reflect changes from 9/30 to 12/31 using the ratio of the Deterministic Reserve as of 12/31 and 9/30.

J. STOCHASTIC MODELING EXCLUSION

The 20 year term product was tested using several adverse deterministic scenarios in June of 2011. There was less than a 1% difference between the reserves under these deterministic scenarios and the Deterministic Reserve for these policies. Hence, it was concluded that a stochastic modeling was not needed. This is consistent with the original pricing demonstration and the product having an insignificant amount of interest rate exposure risk.

For all the UL products, stochastic modeling was done.

K. RESERVE RESULTS

Deterministic Reserve, 9/30:	425,000
Stochastic Reserve, 9/30:	
CTE Reserve (policies subject to stochastic modeling)	423,000
Modified Deterministic Reserve (policies not subject to stochastic modeling)	27,000
Total Stochastic Reserve, 9/30	450,000
Reported Reserve, 9/30:	450,000
Deterministic Reserve, 12/31:	437,000
Reported Reserve, 12/31: 450,000 * (437/425) =	462,705

L. SIGNATURE SECTION

I will be available to explain and/or amplify any matters presented herein, and it is assumed that the user of such report will seek such explanation and/or amplification to any matter in question.

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February 28, 2012

II. PRODUCT ASSUMPTIONS

A. MORTALITY ASSUMPTIONS

Surak Life does mortality studies yearly. One component of our expected mortality assumption is the results from the current rolling 5-year average mortality study. The current study was for the period 2004-2009. This is the basis for the experience mortality curve.

In computing the mortality, the first step was to determine the underwriting score by applying the Underwriting Criteria algorithm to our current preferred underwriting rules. Using this score ("45") we chose a published industry mortality table without margin table for scores in the range 35-50. This table (Industry Table 35-50) is used as expected mortality.

The credibility method used to blend company experience with industry experience was the Canadian Normalized Credibility methodology.

Mortality assumptions did not change since the last year.

Term Insurance

Surak Life does not have full credibility for mortality. It was assumed that 1000 deaths were needed for full credibility. For term insurance, the actual number of deaths were 123, so the Total Credibility Factor was .35 (the square root of 123 divided by 1000). Since all policies issued have essentially the same face amount, I have excluded the effect of the variance in face amount when calculating the Total Credibility Factor. Credibility was assigned to subsegments using the Normalized Credibility Methodology. A summary of the mortality for term insurance is found in Appendix A. This produced mortality factor of 1.0614 for age 45 year olds, and 1.034 for 65 year olds.

Note that, for term insurance, Surak Life had experience through 10 years. Therefore, the credibility weighted mortality curve for durations 11 through 20 was set equal to 1.04 times the Industry Table 35-50. .

In addition, a margin was added to the mortality of 9.375 deaths per 1000 divided by e_x . This is to add conservatism to reflect the possible variance in results.

Reserves computed with the credibility weighted mortality curves, including the margins, were compared to reserves using standard industry mortality table with margins. It was determined that the valuation mortality table that most resembled these results was the 2011 Table D. This table was therefore used to compute reserves.

Universal Life

All universal life products were combined in the determination of the mortality.

NOTE: Similar tables would be prepared to Appendix A for these products. After this analysis is done, the valuation table would be chosen,

The results from the computed mortality weighted curves, including the margins, were compared to the industry mortality curves. It was determined that the valuation mortality table that most resembled these results was the 2011 Table C. This table was therefore used to compute reserves.

B. PREMIUM PERSISTENCY

The UL products may continue without a premium payment each period. The results differ slightly depending on which premium assumption is used. The actual premium payment patterns are given in Appendix B, along with the baseline assumption used for this.

C. LAPSES

A lapse study is done yearly for each product. The latest lapse study and the lapse assumptions used are shown in Appendix C. There was only 10 years of credible information on lapses for most products; for the UL with shadow account there was only 5 years of data. Beyond the year credible data is available, a conservative assumption was made.

For UL, the lapse study currently does not break out the lapses by premium pattern. Therefore, an estimate was made as to the lapses by premium pattern, taking into account the fact that those paying lower premiums would likely lapse their products more than those who paid a level or single premium.

For the term products and UL with secondary guarantees, the PBR products tested show worse results with lower lapses. Therefore, for these products I determined that a 30% lower lapse factor would be used as a reasonably conservative estimate. For the Accumulation UL and Variable UL, the products were marginally worse off with higher lapses, so 30% higher than expected lapses was used as a baseline.

These assumptions did not change since last year.

D. DYNAMIC LAPSE FORMULA

For general account universal life, the excess lapses were assumed to be triggered off of the following formula: (Competitor rate-credited rate)*1.75.

There were no dynamic lapses assumed for the 20 year term business or the variable UL business.

E. COMPETITOR RATE

For testing UL excess lapses, it was assumed that the competitor rate was assumed to be equal to the 5 year Treasury rate in any given scenario less 25 basis points.

F. VARIABLE ACCOUNT ASSUMPTION

The Variable UL product does not have a fixed bucket, so there is no risk of money moving to or from a fixed account to select against the company.

G. INTEREST CREDITING

The 20 year level term product is fully guaranteed.

The Accumulation UL and the UL with a shadow account credits interest above the minimum at a rate declared by the company. The goal is to earn a spread of 180 basis points over the portfolio rate.

H. EXPENSES

Expenses were determined for each contract based on pricing assumptions, plus a 5% load.   Pricing assumptions are based on a fully allocated approach, reflecting both direct costs associated with the contracts and an allocation of indirect and overhead costs.

For the year just ended, expenses allocated to the PBR block were only 5% of total company expenses, up from 3% last year. However, there was a revision to how the company allocated expenses between per policy and per $1000 expenses. The result was an increase in the per policy expenses and a decrease in the per $1000 expenses. These new expenses were used in the reserving, which resulted in a slight increase in overall expenses for UL insurance, and a decrease in expenses for term insurance (less than $1000).

III. ASSETS

A. PORTFOLIO DESCRIPTION

The majority of invested assets backing PBR policies in Surak Life are investment grade corporate bonds, both public and private placements. The portfolio also includes a substantial holding in CMOs and other mortgage backed securities. The majority of the CMOs are government or agency backed. The portfolio is rounded out with commercial mortgages and residential mortgages. The table at the end of this section lists assets by type and by product.

In support of the Asset/Liability Management Process, Surak Life has segmented its investment portfolio. This action, along with continued refinements of the segments, should facilitate the management of investment risks associated with the various lines of business. However, it should be understood that all assets of the company back all liabilities of the company.

The assets backing the general account segments used for term insurance and UL are given below:

ASSETS BACKING PBR PRODUCTS

Long Term Bonds	Amount	% of Total
Exempt Obligations	21,705	4.6%
NAIC 1	225,000	48.6%
NAIC 2	130,000	28.1%
NAIC 3	10,000	2.2%
NAIC 4	5,000	1.1%
NAIC 5	5,000	1.1%
NAIC 6	1,000	0.2%
Total Bonds	397,705	85.9%
Commercial Mortgage Loans	20,000	4.3%
Residential Mortgage Loans	20,000	4.3%
Cash & Short Term	10,000	2.2%
Miscellaneous	5,000	1.1%
Policy Loans	10,000	2.2%
Total	**462,705**	**100%**

B. MODEL SEGMENTS AND STARTING ASSETS

The Model Segments follow the company's asset segmentation plan:

Segment 2: All term products
Segment 3: All UL products
Segment 4: All variable products

Starting assets in each model segment was based on an estimate of the PBR reserve used in the pricing model of the product. This estimated PBR reserve is:

Segment 2: Term: 50% of premium
Segment 3: UL: 102% of account value
Segment 4: VUL: 90% of total account value

This produces the following starting asset amounts:

Segment 2: 10% of total assets in asset segment 2, which equals: $25,000
Segment 3: 15% of total assets in asset segment 3, which equals: $350,000
Segment 4: Negative balance, as follows:

Account value:		SA	$98,000
		GA	2,000
		Total	100,000
Estimated PBR reserve:			90,000 (90%)
= Total Starting Assets:			90,000
less SA Starting Assets:			98,000
= GA Starting Assets:			(8,000)

The allocation of individual assets to each model segment was based on a pro-rata share of each asset from the respective asset segment, with the prorata percentage equal to the ratio of starting assets in each model segment to the total assets in the asset segment.

C. INVESTMENT ASSUMPTIONS

It is assumed that all cash will be invested in 10 year non-call bonds, 66% NAIC 1, 34% NAIC 2.

D. DISINVESTMENT ASSUMPTION

For disinvestment, it is assumed that the company can borrow up to $1 million at the 90 day Treasury rate plus 2%. Additional disinvestment would be on a pro-rata slice of the remaining assets.

E. ASSET VALUATION BASIS

The valuation bases for the assets included in this memorandum are listed below. They have been valued in accordance with NAIC asset violation bases and procedures.

Bonds	Amortized Cost, Scientific Method
CMOs	Amortized Cost, Interest Method
Mortgages	Aggregate Unpaid Balance
Policy Loans	Aggregate Unpaid Balance

F. DESCRIPTION OF ASSETS

The bond category consists of publicly traded bonds and private placements. The default rate was assigned to each asset depended on the NAIC rating. The model reflects each asset on a seriatim basis. The model includes actual coupons and payment frequencies. Put and call options are reflected in the model.

As of December 31, 2011, Surak Life had only 3 bonds below NAIC designation 3. The NAIC 1 category of assets used in cash flow testing included agency backed CMOs. The CMOs are primarily PACs and ADs (accretion directed). Although the current practice at Surak Life is to avoid highly volatile tranches of CMOs, a number of older accrual (Z) tranches remain in the portfolio. These were generally modeled using the CMO INTEX model (a commercial software modeling system). The information on most of these assets was checked against the NYMayor database. The modeled prepayments on these assets were spot checked using market consensus forecasts as listed in NYMayor.

The mortgage category includes commercial and residential mortgages. These were modeled on a seriatim basis assuming defaults at the level of NAIC grade 3 bonds for commercial mortgages, NAIC grade 2 for residential mortgages.

Policy Loans are almost exclusively associated with the traditional life and universal life lines of business. The level of loans outstanding can be responsive to changes in interest rates. This presents a risk in the policies with fixed guaranteed policy loan interest rates. Policy loans were included in the traditional life and universal life models.

G. DEFAULT ASSUMPTION

For modeling, the corporate bond default assumption was based on the Moody's Special Report on Corporate Bond Defaults - 2011 Default Rates. For mortgages, the rate was consistent with the Risk-Based Capital factor for Surak Life. These are given below:

Bonds:	NAIC Grade	Default Rate
	1	0.001
	2	0.002
	3	0.0179
	4	0.0831
	5	0.1
	6	0.1

Mortgage Defaults (not agency backed)   0.0179

Mortgage Defaults (agency backed)   0.000

All assets assume a default residual of 25%

It was assumed that total default costs are equivalent to the default charges for each year of the model.

H. PREPAYMENTS

For in-force CMO assets, the prepayments for MBSs backing the CMOs were developed using the OUTEX model's prepayment rates based on the Office of Thrift Supervision model. These were spot-checked using the formula below, based on market consensus PSA (Public Security Association Standard Prepayment Model) rate, as obtained from the NYMayor model. The spot checks showed reasonably consistent results.

Additional prepayments are assumed when the coupon rate that would be used for newly issued mortgages in a particular economic environment was lower than the rate on in-force mortgages. For residential mortgages which were not on the OUTEX data base and for assumed new purchases, the following assumptions were used: The prepayment function is a prepayment factor multiplied by the PSA rates, where the prepayment function is calculated using the following function:

$$P(r) = min + (max-min)[1-e^{-a(Parameter-MPV)*B}], \text{ where}$$

> Parameter = mortgage rate - market rate
> MPV = Maximum Parameter Value, above which the PSA factor values monotonically increase as the Prepayment Parameter value increases (e.g. -.01)
> min = minimum prepayment factor to be used (e.g. .75)
> max = maximum prepayment factor to be used (e.g. 10)
> a = a calculated value, based on the MPV value and the user specified value at which prepayments equal (min PSA + max PSA)/2 (e.g. min+max PSA/2 = .03)
> B = The curvature of the prepayment factor curve (e.g. 2)

Mortgages were modeled with different factors. These factors were chosen to approximate the actual prepayments where applicable.

An example of how the above calculation would work is as follows: given a 30 year MBS issued in 1996, with an 8% coupon rate, the 100% PSA would equal 6%. This is the prepayment rate that would be expected in a level interest rate environment. Using the values given above as example, the calculated value of a would be 433.217. If interest rates were to fall 3%, the above formula would be: $.75 + 9.25 \times [1 - e^{-433.217x(.03--.01)*2}]$, or a factor of 5.375 x PSA, or 32% prepayments expected if rates drop 3%.

I. CALLS

Call schedules and call premiums were entered on a seriatim basis for all bonds noted as callable.

Calls are determined by using "call input parameters" and a hypothetical parameter equal to ratio of the theoretical market value to the call price. The first call input parameter is the maximum value of the call protected value/balance ratio where the call rate is assumed to be zero. The assumption used for modeling was 1.02. The second call input parameter is the minimum market value/call value ratio where the call rate is assumed to be one. This assumption is 1.06. The call rate is linearly interpolated between these two values. Therefore, if the market price of the bond rises 10% or more, 100% is assumed to be called.

J. PUTS

Surak Life owns a number of putable bonds which hedge the deferred annuity segment against rising interest rates. These are generally European Options and are assumed to be exercised if they are in the money when the option window is open.

K. UL VARIABLE ACCOUNT

There are three variable account choices for UL: an indexed S&P 500 fund, a bond fund, and an international fund.

IV. OTHER DISCLOSURE ITEMS

A. IMPACT OF ASSUMPTION MARGINS

1. Aggregate Impact of margins

	Total	Seg 2	Seg 3	Seg 4
Deterministic Reserve	437,000	25,000	322,000	90,000
Reserve with no margins	375,000	20,000	295,000	60,000
Aggregate Margin	**62,000**	**5,000**	**27,000**	**30,000**

While not required, the company expressed the aggregate margin in terms of a margin ratio, which takes the ratio of the aggregate margin to the PV of future RBC requirements. For the following products, the values of the Margin Ratios are as follows:

20 Year Term Insurance

At issue	45.7%
After 10 years	44.4%

Accumulation UL
At issue	9.9%
After 10 years	9.5%

UL With Shadow Account
At issue	12.9%
After 10 years	12.5%

VUL
At issue	7.9%
After 10 years	7.5%

2. Impact of each margin

a. Mortality

	Total	Seg 2	Seg 3	Seg 4
Deterministic Reserve	437,000	25,000	322,000	90,000
Reserve with no mortality margin	420,000	20,000	315,000	85,000
Mortality Margin	**17,000**	**5,000**	**7,000**	**5,000**

b. Policyholder Behavior

	Total	Seg 2	Seg 3	Seg 4
Deterministic Reserve	437,000	25,000	322,000	90,000
Reserve with no PHB margin	412,000	25,000	305,000	82,000
PHB Margin	**25,000**	**0**	**17,000**	**8,000**

c. Asset return

	Total	Seg 2	Seg 3	Seg 4
Deterministic Reserve	437,000	25,000	322,000	90,000
Reserve with no asset margin	407,000	25,000	312,000	70,000
Asset Margin	**30,000**	**0**	**10,000**	**20,000**

d. Expenses

	Total	Seg 2	Seg 3	Seg 4
Deterministic Reserve	437,000	25,000	322,000	90,000
Reserve with no expense margin	431,500	24,500	320,000	87,000
Asset Margin	**5,500**	**500**	**2,000**	**3,000**

B. MATERIAL RISKS NOT INCLUDED IN CASH FLOW MODEL NEEDING ADJUSTMENT

None

C. IMPACT OF AGGREGATION

The analysis of the impact of aggregation was performed on 6/30.   The Reported Reserve was calculated for the policies in each asset segment on a standalone basis, and then summed and compared to the total Reported Reserve with full aggregation. Here is the result:

Segment 2 standalone reserve	$ 25,000
Segment 3 standalone reserve	350,000
Segment 4 standalone reserve	125,000
Total	500,000
Total reserve with aggregation	450,000
Impact of aggregation	$ 50,000

D.   EMBEDDED SPREAD ON STARTING ASSETS

	Seg 2	Seg 3	Seg 4
1. Market value of assets	$24,000	$360,000	$105,000
2. Statutory value of assets	$ 25,000	$350,000	$90,000
3. Gross option-adjusted spread	150 bp	165 bp	185 bp
4. Average annual default costs	40	45	60
5. Net option-adjusted spread	110	120	125
6. Aggregate weighted average life	6.5	8.2	7.3

E.   TEST OF CONSISTENCY OF DISCOUNT RATES

Segment 3 used for this test, under scenario #456.

a. Starting assets for test = Scenario reserve for scenario #456:	365,000
b. Accumulated assets at GPVAD point (year 25):	10,000
c. Discounted value of (b) at time zero	2,500

Conclusion: value in (c) is close enough to zero to confirm consistency of discount rates.

V. RESULTS

A. BASIC RESULTS

The 20 year term was tested on a deterministic basis only. See Section I.(K).

The Scenario Reserves for the UL products are given in the tables below.

B. SENSITIVITY TESTS

The sensitivity of the UL to different premium patterns is also given below.

1. Minimum premium scenario
2. No further premium payment scenario
3. Pre-payment of premiums – Single premium scenario
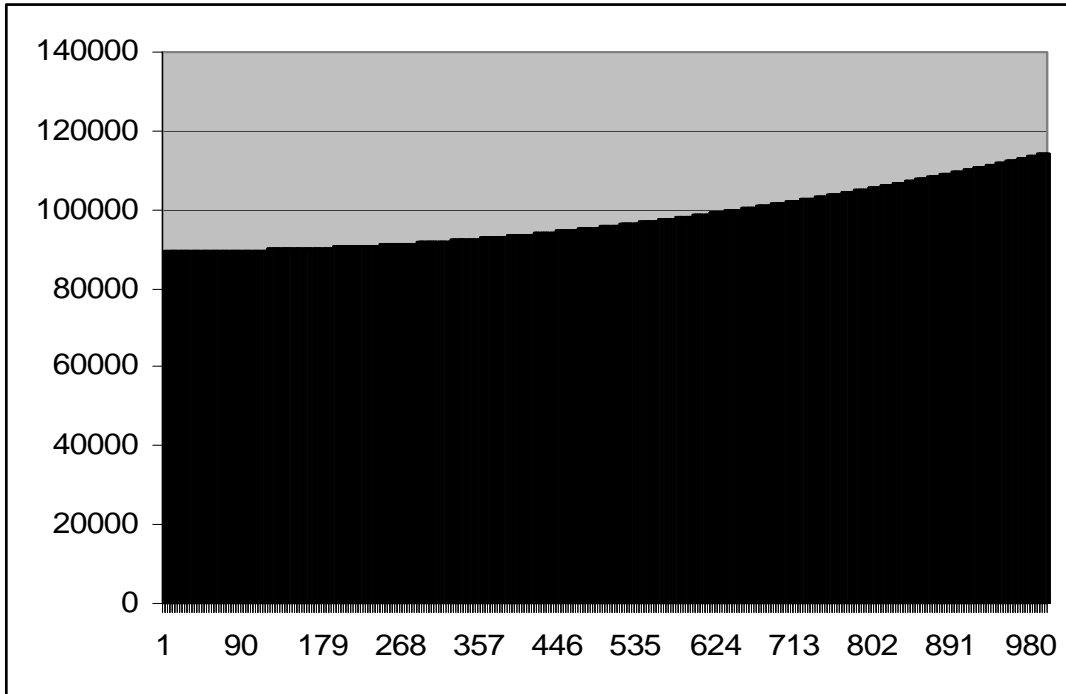4. Pre-payment of premiums – Level premium scenario.

Results for Accumulation UL
Scenario Reserves

Results for Accumulation UL
Scenario Reserves
Various Premium Payment Patterns

Results for UL with Shadow Account
Scenario Reserves

Results for UL with Shadow Account

Scenario Reserves
Various Premium Payment Patterns

Shadow UL - min prem

Shadow UL- No more prem
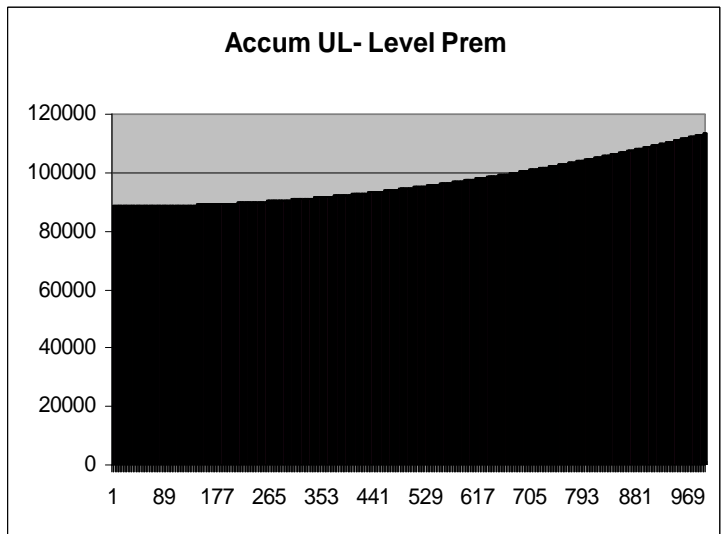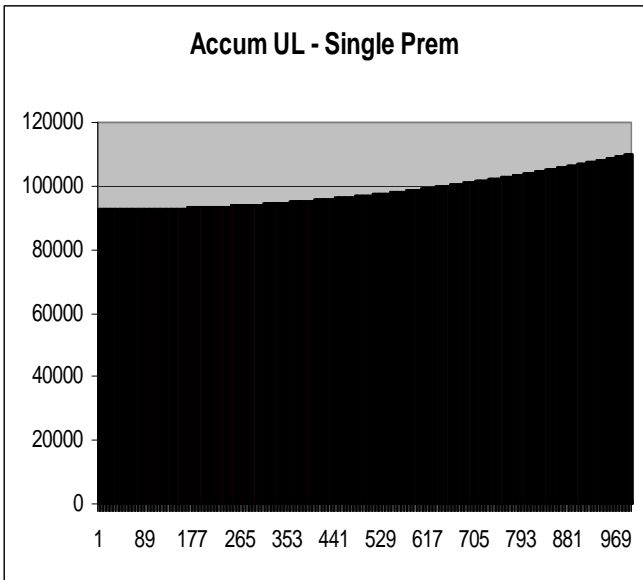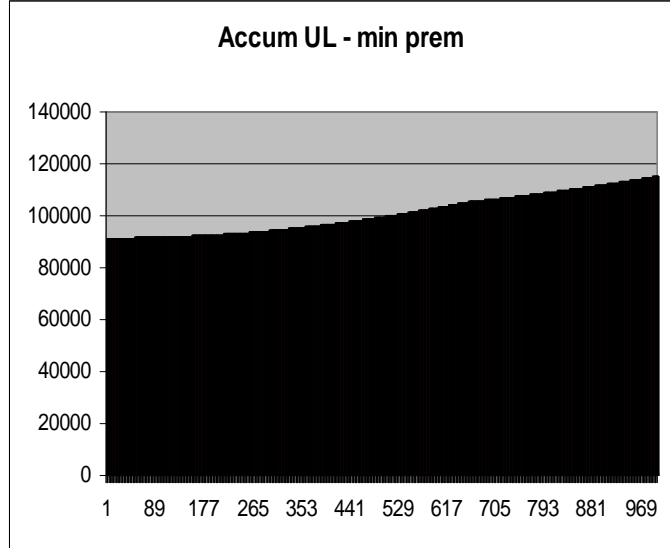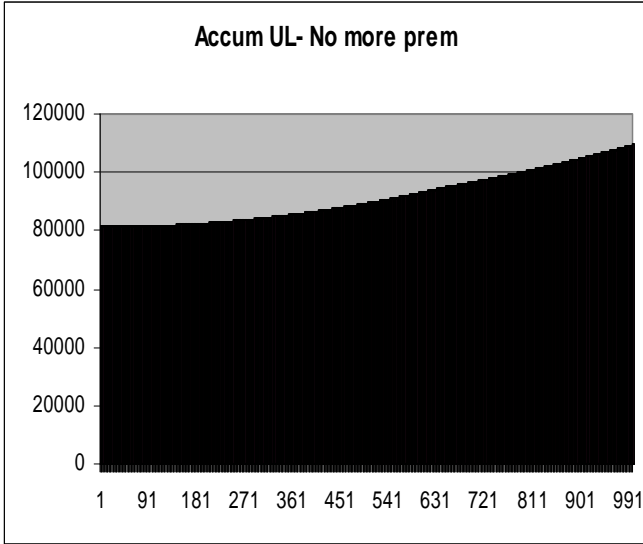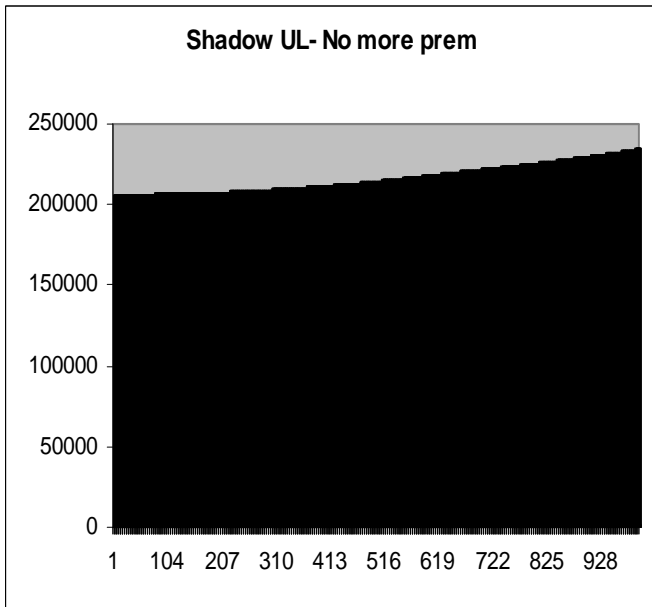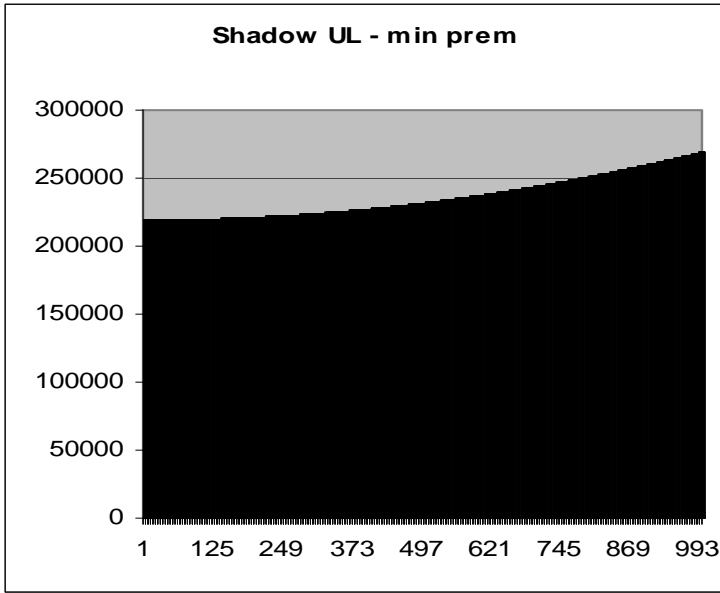
Results for UL for Shadow Account

Scenario Reserves
Various Premium Payment Patterns - continued

Shadow UL - Single Prem

Shadow UL- Level Prem
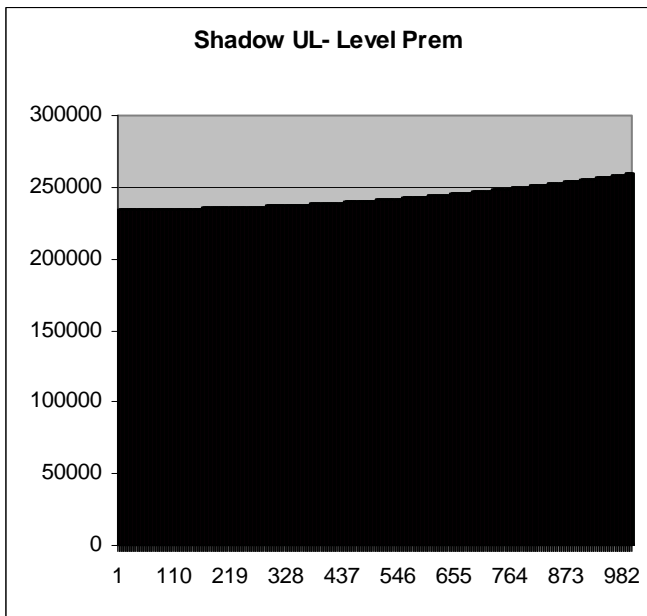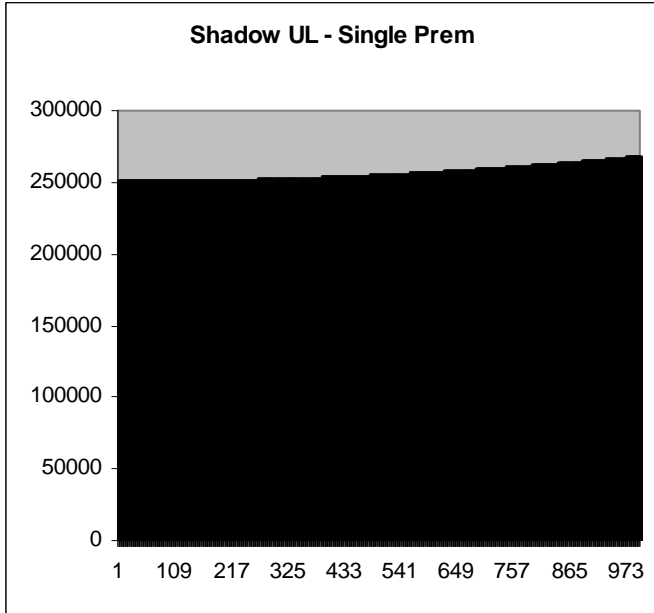
Variable UL Results

Scenario Reserves
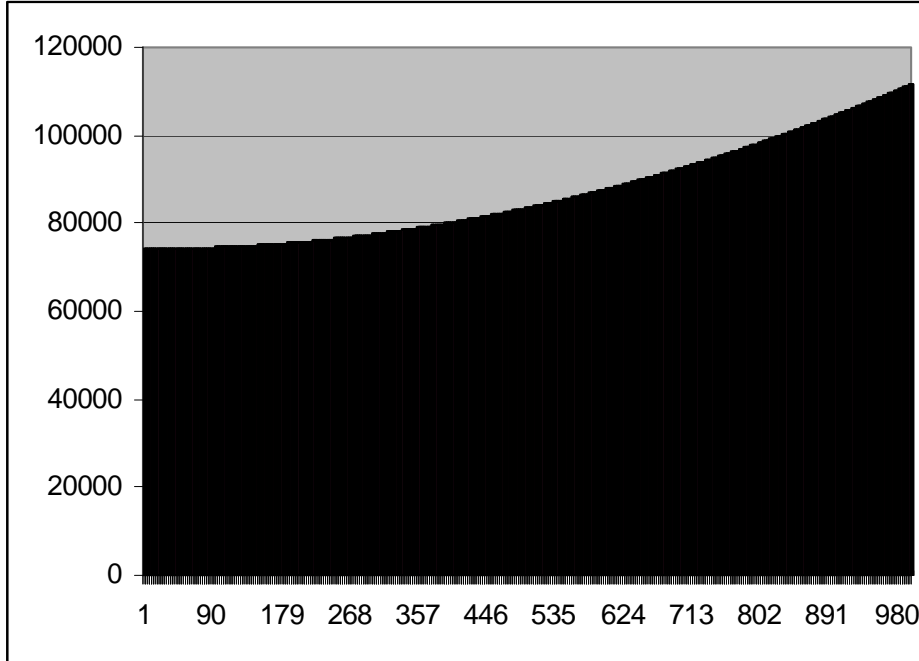
Results for Variable UL

Scenario Reserves
Various Premium Payment Patterns

VUL- No more prem

VUL - min prem
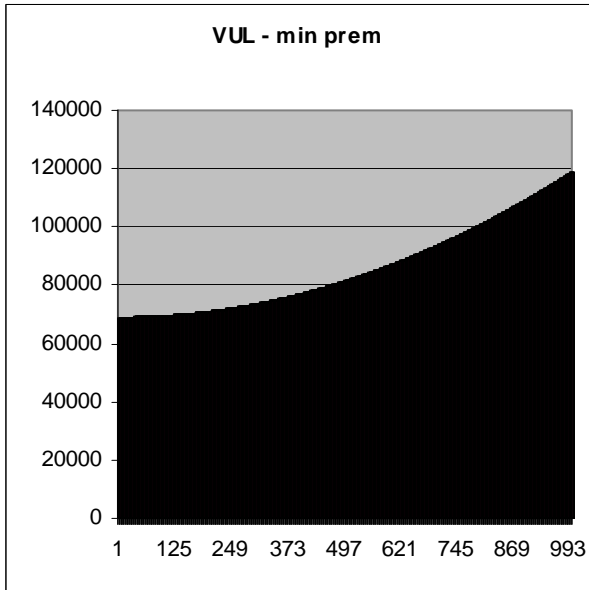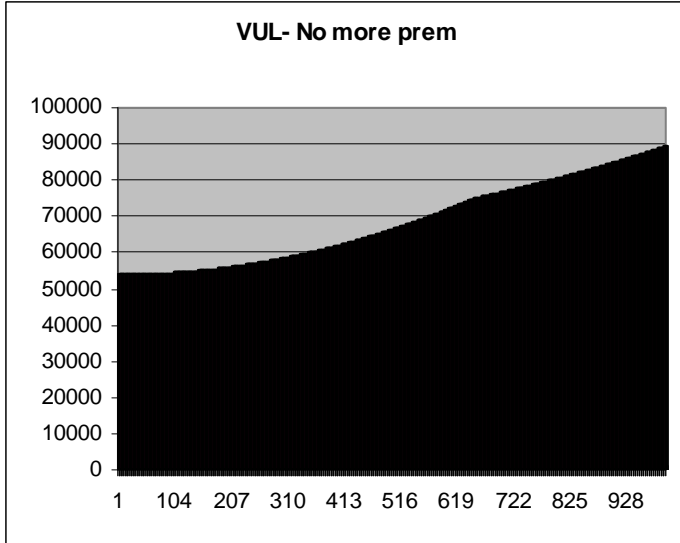
Results for Variable UL

Scenario Reserves
Various Premium Payment Patterns – continued
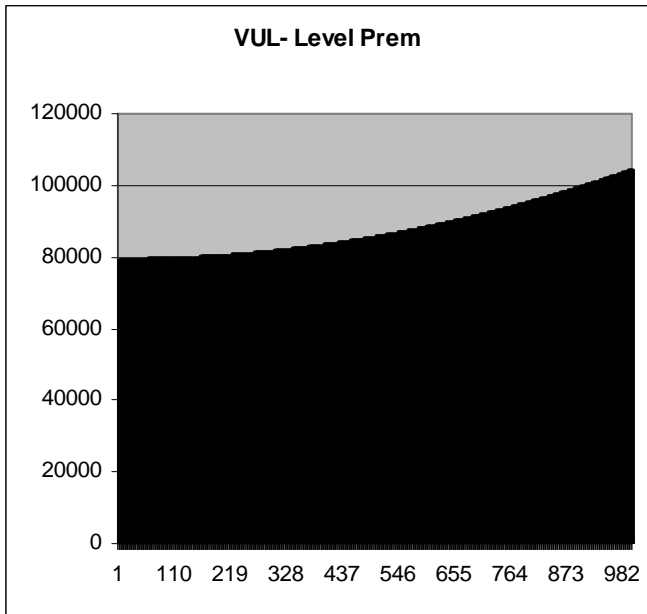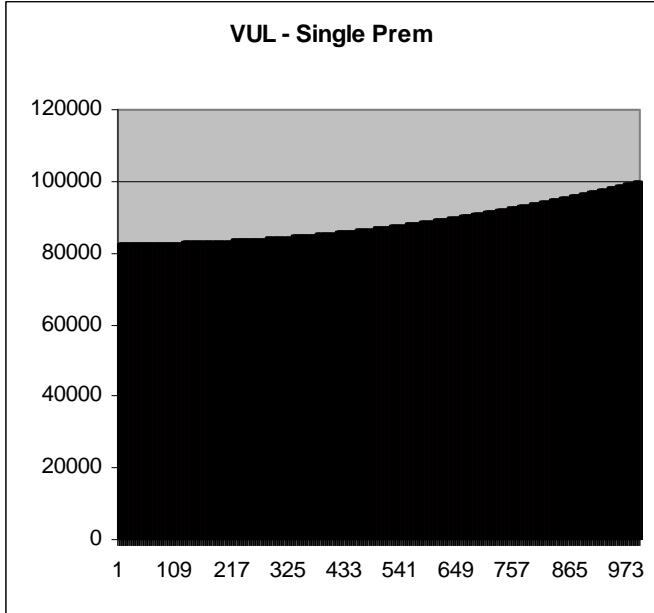
C. MARGINS

20 Year Term Insurance

For 20 year term insurance, the margins are as follows:

Discount Rate Margin	Deterministic
Mortality Margin	0.009375/ex
Lapse Rate Margin	30%
Expense Margin	5%

Accumulation UL

Discount Rate Margin	Stochastic
Mortality Margin	0.009375/ex
Lapse Rate Margin	30%
Expense Margin	5%

UL With Shadow Account

Discount Rate Margin	Stochastic
Mortality Margin	0.009375/ex
Lapse Rate Margin	30%
Expense Margin	5%

VUL

Discount Rate Margin	Stochastic
Mortality Margin	0.009375/ex
Lapse Rate Margin	30%
Expense Margin	5%

APPENDIX A-1
MORTALITY FACTORS

20 Year Term

Dur	Live Exp	Actual Death	Expected Q/1000	Expect Deaths	A/E	Dur	Lives Expos	Actual Deaths	Expect Q/1000	Expected Deaths	A/E
			ISSUE AGE - 45						ISSUE AGE - 65		
0	15000	4	0.2224	3.336	1.1990	0	7000	7	0.8931	6.2517	1.1197
1	9000	4	0.3183	2.8647	1.3963	1	4000	8	1.6102	6.4408	1.2421
2	8000	5	0.3674	2.9392	1.7011	2	3000	7	2.1218	6.3654	1.0997
3	7000	3	0.4562	3.1934	0.9394	3	2500	8	2.8646	7.1615	1.1171
4	3000	4	0.5678	1.7034	2.3482	4	2000	7	3.6908	7.3816	0.9483
5	3000	3	0.7687	2.3061	1.3009	5	2000	11	4.9557	9.9114	1.1098
6	2000	2	0.9496	1.8992	1.0531	6	2000	13	5.8992	11.7984	1.1018
7	2000	2	1.1477	2.2954	0.8713	7	2000	13	6.8946	13.7892	0.9428
8	1000	1	1.3592	1.3592	0.7357	8	1000	9	7.9868	7.9868	1.1269
9	1000	2	1.58	1.58	1.2658	9	1000	10	9.8066	9.8066	1.0197
	51000	30		23.4766	1.2779		26500	93		86.8934	1.0703
Total	77500	123		110.37	1.1144						

LRWG Credibility Methodology- 9/ 2006

Subcategory	Full Credibility	Z	1000	(1-Z)	Blended Experience Mortality Ratio	Expected Claims		Normalized Blended Mortality Ratio	Total Deaths Normalized Blended Mortality Ratio
1	1.2779	0.17320508	1	0.8268	1.0481	24.6065	vii.	1.1372	26.6985
2	1.0703	0.30495901	1	0.6950	1.0214	88.7557	vii.	1.1083	96.3015
						vi. 113.362			123

Canadian Education Note Normalized Credibility

Total Credibility Factor (total number of claims)		0.3507		**Normalized**	**Normalized Cred. Adj.**
Credibility Adjusted total number of expected claims		114.7995		**Cred. ADJ A/E ratios**	**Exp. Deaths**
Normalized Expected Number of Deaths					
Subcateg	1	24.918	**Subcategory**	1	1.06142	24.9185
	2	89.881		2	1.03438	89.8810
						114.7995

APPENDIX A-2

20 Year Term – age 45

	Table w/o Margin	Expose Lives	Actual Deaths	Experience Mortality Curve	A/E Ratio	Normalized Blended Mortality Ratio	Credibility Weighted Mortality Curve	Extra Mort Margin 9.375/e_x	Mort With Margin
45	0.2224	15000	4	0.2667	1.1990	1.0614	0.2361	0.2825	0.5186
46	0.3183	9000	4	0.4444	1.3963	1.0614	0.3378	0.2913	0.6291
47	0.3674	8000	5	0.6250	1.7011	1.0614	0.3900	0.3005	0.6905
48	0.4562	7000	3	0.4286	0.9394	1.0614	0.4842	0.3103	0.7945
49	0.5678	3000	4	1.3333	2.3482	1.0614	0.6027	0.3208	0.9235
50	0.7687	3000	3	1.0000	1.3009	1.0614	0.8159	0.3320	1.1479
51	0.9496	2000	2	1.0000	1.0531	1.0614	1.0079	0.3440	1.3519
52	1.1477	2000	2	1.0000	0.8713	1.0614	1.2182	0.3568	1.5750
53	1.3592	1000	1	1.0000	0.7357	1.0614	1.4427	0.3706	1.8133
54	1.58	1000	2	2.0000	1.2658	1.0614	1.6770	0.3855	2.0625
55	1.8197					1.04	1.8925	0.4016	2.2941
56	2.1744					1.04	2.2614	0.4190	2.6804
57	2.4917					1.04	2.5914	0.4380	3.0294
58	2.7872					1.04	2.8987	0.4586	3.3573
59	3.1829					1.04	3.3102	0.4812	3.7914
60	3.8114					1.04	3.9639	0.5061	4.4700
61	4.4188					1.04	4.5956	0.5336	5.1292
62	5.092					1.04	5.2957	0.5642	5.8599
63	5.8117					1.04	6.0442	0.5938	6.6425
64	6.5463					1.04	6.8082	0.5983	7.4450

APPENDIX A-3

20 Year Term Age 65

	Table w/o Margin	Expose Lives	Actual Deaths	Company Mortality Curve	A/E Ratio	Normaliz Blended Mortality Ratio	Credibility Weighted Mortality Curve	Extra Mort Margin 9.375/e	Mort With Margin
65	0.8931	7000	7	1	1.1197	1.034	0.9235	0.6803	1.6038
66	1.6102	4000	8	2	1.2421	1.034	1.6649	0.7159	2.3808
67	2.1218	3000	7	2.3333	1.0997	1.034	2.1939	0.7544	2.9483
68	2.8646	2500	8	3.2	1.1171	1.034	2.962	0.7962	3.7582
69	3.6908	2000	7	3.5	0.9483	1.034	3.8163	0.8416	4.6579
70	4.9557	2000	11	5.5	1.1098	1.034	5.1242	0.8912	6.0154
71	5.8992	2000	13	6.5	1.1018	1.034	6.0998	0.9455	7.0453
72	6.8946	2000	13	6.5	0.9428	1.034	7.129	1.0042	8.1332
73	7.9868	1000	9	9	1.1269	1.034	8.2584	1.0690	9.3274
74	9.8066	1000	10	10	1.0197	1.034	10.14	1.1398	11.2798
75	11.6696					1.04	12.1364	1.2171	13.3535
76	14.2336					1.04	14.8029	1.3020	16.1049
77	17.3517					1.04	18.0458	1.3956	19.4414
78	21.152					1.04	21.9981	1.5002	23.4983
79	25.6968					1.04	26.7247	1.6187	28.3434
80	31.0263					1.04	32.2674	1.7551	34.0225
81	35.4571					1.04	36.8754	1.9001	38.7755
82	40.2823					1.04	41.8936	2.0502	43.9438
83	46.1584					1.04	48.0047	2.2136	50.2183
84	53.2092					1.04	55.3376	2.3929	57.7305

APPENDIX B
PREMIUM PATTERN

Surak Life 2011 Premium Pattern

	Accum UL	VUL	UL with Shadow Acct
No further premiums paid	5.3%	5.1%	2.0%
Minimum Premium	19.5%	8.5%	9.6%
Pre-payment of premiums- Single Prem	10.0%	22.1%	35.7%
Pre-payment of premiums- Level Prem	65.2%	64.3%	52.7%
	100.0%	100.0%	100.0%

Assumption

	Accum UL	VUL	UL with Shadow Acct
No further premiums paid	5.0%	5.0%	2.0%
Minimum Premium	20.0%	10.0%	10.0%
Pre-payment of premiums- Single Prem	10.0%	20.0%	35.0%
Pre-payment of premiums- Level Prem	65.0%	65.0%	53.0%
	100.0%	100.0%	100.0%

APPENDIX C

Surak Life 2011 Lapse Study

20 Year Term

	ACTUAL LAPSES		Assumed Baseline Lapses		Lapses 30% Lower	
Dur	Age 45	Age 65	Age 45	Age 65		
1	10.6%	8.1%	10.0%	8.0%	7.0%	5.6%
2	5.5%	4.3%	5.0%	4.0%	3.5%	2.8%
3	3.2%	2.5%	4.0%	3.0%	2.8%	2.1%
4	4.6%	3.2%	3.0%	3.0%	2.1%	2.1%
5	2.0%	2.0%	2.0%	2.0%	1.4%	1.4%
6	1.0%	1.0%	2.0%	1.0%	1.4%	0.7%
7	4.0%	1.1%	2.0%	1.0%	1.4%	0.7%
8	2.5%	1.0%	2.0%	1.0%	1.4%	0.7%
9	3.0%	1.2%	2.0%	1.0%	1.4%	0.7%
10	2.0%	1.0%	2.0%	1.0%	1.4%	0.7%
11+			2.0%	1.0%	1.4%	0.7%
20			100%	100%	100%	100%

Accum. UL and Var UL			Assumed Baseline Lapses		**ASSUMED LAPSES** Level Prem Lapses 30% Higher		No prem Lapses 30% Higher		Min prem Lapses 30% Higher		Single Pay Lapses 30% Higher	
Dur	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65
1	8.5%	6.5%	9.0%	7.0%	11.7%	9.1%	30.0%	25.0%	10.0%	10.0%	3.0%	2.0%
2	9.5%	6.8%	9.0%	7.0%	11.7%	9.1%	35.0%	35.0%	15.0%	15.0%	2.0%	1.0%
3	3.5%	5.2%	5.0%	5.0%	6.5%	6.5%	50.0%	50.0%	20.0%	15.0%	2.0%	1.0%
4	6.3%	4.3%	5.0%	5.0%	6.5%	6.5%	100.0%	100.0%	20.0%	15.0%	2.0%	1.0%
5	6.6%	5.6%	5.0%	5.0%	6.5%	6.5%			25.0%	20.0%	1.0%	1.0%
6	4.3%	3.9%	5.0%	4.0%	6.5%	5.2%			25.0%	20.0%	1.0%	1.0%
7	5.6%	3.8%	5.0%	4.0%	6.5%	5.2%			25.0%	20.0%	1.0%	1.0%
8	1.2%	4.2%	4.0%	4.0%	5.2%	5.2%			25.0%	20.0%	1.0%	1.0%
9	2.8%	3.2%	4.0%	4.0%	5.2%	5.2%			25.0%	20.0%	1.0%	1.0%
10	5.3%	4.8%	4.0%	4.0%	5.2%	5.2%			25.0%	20.0%	1.0%	1.0%
11+			4.0%	4.0%	5.2%	5.2%			25.0%	20.0%	1.0%	1.0%

UL With Shadow Account			Assumed Baseline Lapses		**ASSUMED LAPSES** Level Prem		No prem Lapses 30% Lower		Min prem Lapses 30% Lower		Single Pay Lapses 30% Lower	
Dur	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65	Age 45	Age 65
1	7.3%	5.4%	5.0%	3.0%	3.5%	2.1%	25.0%	25.0%	5.0%	3.0%	2.0%	2.0%
2	4.5%	3.7%	3.0%	2.0%	2.1%	1.4%	30.0%	30.0%	4.0%	2.0%	1.0%	1.0%
3	3.0%	1.8%	3.0%	2.0%	2.1%	1.4%	40.0%	35.0%	3.0%	2.0%	1.0%	1.0%
4	2.5%	1.2%	2.0%	1.0%	1.4%	0.7%	40.0%	40.0%	3.0%	1.0%	1.0%	1.0%
5	1.8%	1.0%	1.0%	1.0%	0.7%	0.7%	60.0%	50.0%	3.0%	1.0%	1.0%	1.0%
6+			1.0%	1.0%	0.7%	0.7%	100.0%	100.0%	2.0%	1.0%	1.0%	1.0%