EXAMPLE OF VIABILITY ANALYSIS CURRENTLY BEING PERFORMED BY A MUTUAL LIFE INSURANCE COMPANY

The following description of a planning and projection process constitutes an example of viability analysis currently being carried out by a large mutual life and health insurance company. The numbers in the illustrative reports have been scaled to conceal the identity of the company, but are representative of typical results.

At the current time this company does not prepare a formal Viability Report. The process is ongoing and communication between the product actuaries and managers that participate in this activity and the company's top management is continual throughout the year. New scenarios are run on a frequent basis to test the current and future effect of feasible risks and opportunities that have been identified.

The main focus of this effort is not to demonstrate solvency. This company is very well capitalized and projects some level of positive earnings under all feasible scenarios. The focus is on finding the growth patterns and productivity improvements required to achieve competitive levels of the company's financial performance measures. The primary measures are GAAP earnings and GAAP ROE. However, the process does produce STAT and GAAP income statements, balance sheets and Risk Based Capital amounts for each quarter of the projection period.

After many trial runs, a financial plan is adopted for a new five-year period. The actual results for each quarter are compared to the plan for each product group. The differences and the corresponding reasons are identified and communicated to the product managers and top management on a quarterly basis. As a result of this analysis the plan may be "returned" and appropriate management action taken. On a somewhat higher level, the results compared to plan and the proposed management actions are reported to the Board of Directors.

LARGE MUTUAL LIFE INSURANCE COMPANY CORPORATE PROJECTION PROCESS

I. OVERVIEW

Large Mutual provides a wide range of insurance products, which are sold through varied distribution systems. Individual health insurance products sold directly by the parent company include major medical, Medicare supplement, Long Term Care, critical illness, disability, as well as supplemental health coverage. Through its life insurance subsidiary, the company sells Individual Term, Universal Life, Variable Universal Life, Flexible Premium annuities, Single Premium annuities, and variable annuities. Individual products are sold through captive agents, brokers and direct response marketing. The companies also serve the group insurance market with medical, life, LTD, pension and other insurance products.

The Corporate Planning process at Large Mutual currently supports modeling for these varied lines of business as well as incorporating a "Corporate" line. Full SAP and GAAP income statements, as well as certain balance sheet entries, are projected over a 7 year period. Scenarios are run to examine results under various production and expense levels. Additionally, results are stress tested to examine the effects of experience changes or interest rate changes.

The results of these scenarios are then used to:

- a. Set Corporate and product line profitability goals,
- b. Examine expected cash flow for investment purposes,
- c. Set strategic goals for the future growth and viability of the business. E.g. expense/ production levels needed to grow to a 12.5% R.O.E.,
- d. Examine expected tax status of the companies(life versus P&C insurer) based on reserve test

II. PRODUCT PROFITABILITY MODELS

Product profit models are built in various areas throughout the companies, using various systems. These may include packages such as PTS or TAS for life and annuity products or Excel for group and individual major medical. All of the base models share certain characteristics.

First, a common set of interest rate assumptions is used. Second, initial runs are performed using current best estimate assumptions. These may vary from original pricing. Third, all models produce the usual income statement and balance sheet entries along with key statistics used for expense projection purposes These include in-force counts, premium, sales levels, claim counts etc. Expense units are determined for each line based on the current level of expenses or expected budgeted expenses.

In-force models are built separately from new business models for each product line. New Business models are built assuming 1 million dollars of annualized new business premium (ANBP). After the models are built and validated, cash flow as well as income statement and balance sheet entries for the in-force and new business models are passed separately to the Corporate planning area for development of the first pass corporate projection.

III. DEVELOPING THE FIRST PASS CORPORATE PROJECTION

Given an in force model and a million dollar ANBP new business model, it is a simple task to generate a projection based on a given ANBP target for the next 7 years. For example suppose the premium entries are as follows for a given line:

	Year 1	Year 2	Year 3	Year 4
In force	190M	185M	177M	165M
NB (1M ANBP)	0.65M	0.9M	0.8M	0.7M

If production is assumed to be 10M, 12M, 15M and 20M in years 1 through 4 respectively, then the total premium expected in year 4 is given as 165M + (.7M * 10) + (.8M * 12) + (.9M * 15) + (.65M * 20).

This process is a simple programming task and is only restricted by the number of years of data provided by the respective models. Additionally, the process can be performed for each entry to provide income statement, balance sheet entries, as well as expense drivers for a given set of production scenarios across all of the various lines of business in a timely manner. As an example, projecting 65 distinct lines of business full SAP and GAAP entries takes under 5 minutes, using a visual basic program which is not focused on efficiency.

Expense units can be added to the process to also allow for changes in expense level assumptions. Included in this variation are assumptions used to take into account step-variable nature of certain expenses using a linear approximation, as well as reflecting the impact of changes in deferred expenses on resulting GAAP amortization for a given issue year.

Changes in amortization can be modeled by introducing a variable which records the base level of deferred expenses assumed in the 1 million dollar ANBP model. Should the deferred expenses increase due to ANBP growth alone, then the resulting issue year's amortization of DAC is simply the base model's amortization ratio by ANBP as described above for premium. If there is also a change in the assumed level of expenses, then amortization needs to be additionally changed to reflect the increase in deferrals over and above volume changes. If, for example, the base deferred expense level doubles, prior to volume increases then the base model needs to amortize at twice the rate. These calculations are all performed at the individual product level.

When complete, a process is in place, which allows for a quick turnaround of various ANBP and expense unit level scenarios for the entire Company, under assumed interest rate, mortality, morbidity assumptions.

If, for example, interest rate scenarios are desired, additional runs of the base models are needed. These can be defined up front, and the resulting data flows can be saved as alternate scenarios to be calculated through the same process described above.

Mortality and morbidity scenarios are typically treated as sensitivity runs to determine some what-ifs. An example is the case of what if mortality increases x%? These runs are typically

treated as another scenario to be run through the base models and entered as another scenario in the corporate planning process described above.

IV. TYPICAL SCENARIOS

Typically scenarios which are run focus on variants of the following:

- 1. Production growth/ distribution and expenses based on historical trend.
- 2. More growth in Products of type X versus type Y, with expenses at current levels.
- 3. Grading expenses to "allowable" or pricing levels over 5 years.
- 4. Production growth needed to obtain critical mass.
- 5. Increase in morbidity, mortality or lapse rates.
- 6. Changes in interest rate levels.

Following are example reports from two scenarios varying ANBP and expenses.

Baseline: ANBP distribution based on prior year results. Growth determined by Sales and Marketing. Expense levels are at current Budgeted levels by product.

Scenario 2: ANBP distribution assumes flat medical product sales and increases in individual life / annuity.

Expense assumptions assumes individual products reach allowable expenses over 7 years.

Run	STATUTORY FINANCIAL REPORT	ING					Scenario 2	ANBP SHIFT	to Life/Annuit	y	Appendix A 2
99	9		0	1				Indiv. Produc	t Expenses to	allowable	
		0.0005									
			<u>PROJ98</u>	PROJ99	PROJ00	<u>PROJ01</u>	PROJ02	PROJ03	PROJ04	PROJ05	TERM LIFE AGENCY
	ANBP		774	895	1,133	1,364	1,492	1,632	1,787	1,956	TRAD LIFE AGENCY
											INTEREST-SENS LIFE AGENCY
	Premium		1,881	1,960	2,353	2,610	2,831	3,079	3,351	3,651	VUL AGENCY
	Inv. Income		311	316	327	345	368	396	428	462	
	Other Income	-	35	44	55	68	72	76	82	87	TRAD LIFE DRM
	lotal		2,227	2,320	2,735	3,023	3,271	3,551	3,860	4,200	IERM LIFE BROKER
											INTEREST-SENS LIFE BROKER
			4 5 40	4 504	4.040	4 0 0 0	0.440	0.000	0.470	0.005	VUL BROKER
	Benefits/Claims		1,549	1,531	1,840	1,966	2,110	2,292	2,478	2,695	DEFER FIXED ANN-AGENCY
	Resv Increase		101	87	114	1/1	210	247	295	333	DEFER FIXED ANN-COPELAND
			99	112	131	156	171	186	202	221	DEFER FIXED ANN-BANK
	Agent Fin		4	4	5	5	5	6	6	(IMMEDIATE FIXED ANNULLY AG
	Expense s		341	353	374	401	428	450	470	494	
	Other Expenses/Ptaxes		20	20	21	23	25	27	30	32	STRUCTURED SETTLEMENTS
	Incr in Loading		2	2	2	2	2	4	5	5	VARIABLE ANNULTY - AGENCY
	I ransfer to sept. Acct		59	131	158	195	202	198	203	214	
	Iotal		2,173	2,240	2,644	2,918	3,154	3,410	3,690	4,000	
											MED SUPP - AGENCY
	Dre Tex Operating Cain		E 4	04	01	405	447	4.4.4	470	200	HUSPITAL MEDICAL - AGENCY
	Pre-Tax Operating Gain		54	61	91	105	117	141	170	200	
	Before Expenses/Taxes/Ag Fin		/18	458	101	534	575	625	677	733	
	Before Expenses/Taxes/Ag Tim		410	-50	401	004	575	025	011	100	
	Before Expenses/Taxes		111	153	486	520	570	619	670	726	
	Before Expenses/Taxes			-00	400	525	570	013	070	720	
											DISABILITY INC - DRM
	Expense / Premium		18 10%	17 99%	15 89%	15 37%	15 11%	14 62%	14 04%	13 53%	ACCIDENT ONLY - DRM
	Commiss/ Premium		5 48%	5 92%	5 78%	6 17%	6.24%	6 24%	6 23%	6 23%	LONG TERM CARE - DRM
			0.1070	0.0270	0.1070	0.1170	0.2170	0.2170	0.2070	0.2070	SUPPLEMENTAL HEALTH - DRM
	Loss Ratio (w/ Chog in resv)		87 68%	82 56%	83 02%	81 85%	81 95%	82 47%	82 77%	82 94%	PPO-INDEMNITY-ACOUIS
			01.0070	02.0070	00.0270	01.0070	01.007	02.1170	02.1170	02.0170	MED SUPP - ACQUIS
	Stat Resy+Sep Accts		5,199	5,418	5,668	5,996	6.519	6.982	7.570	8,223	HOSPITAL MED - ACQUIS
	Stat Target Surplus		383	394	414	442	473	508	548	594	DISABILITY INCOME - ACQUIS
			000	001				000	010	001	ACCIDENT ONLY - ACQUIS
	Stat TS/RBC Factor										LONG TERM CARE - ACQUIS
	Projected RBC		232	239	251	268	287	308	332	360	SUPPLEMENTAL HEALTH - ACQ
	.,										PPO-INDEMNITY-BROKER
											ACCIDENT ONLY-BROKER
											MED SUPP - BROKERS
											MED SUPP - MANUFACT
											SPECIAL RISK
	4/24/00 3	:24 PM	Х	:\CMODEL\Lan	ce\[Scenario_	_reporterO.xls	s]reports				DISABILITY INCOME - BROKER
						-	-				

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POSSIBLE APPROACH TO VIABILITY STUDY

THE ATTACHED NUMBERS HAVE BEEN CAMOUFLAGED SOMEWHAT, BUT STILL REPRESENT ONE SMALL COMPANY'S APPROACH.

EACH YEAR, GAAP AND STATUTORY EARNINGS ARE PROJECTED FOR THE NEXT TWO YEARS. THE PRESIDENT, EXECUTIVE VICE PRESIDENT AND CHIEF ACTUARY, AND SENIOR VICE PRESIDENT AND CONTROLLER MEET TO DISCUSS THESE PROJECTIONS. THESE ARE THE THREE TOP COMPANY OFFICERS AND MEMBERS OF THE BOARD OF DIRECTORS. THEIR MEETING AGENDA INVOLVES ASKING QUESTIONS OF EACH OTHER OF A DEVIL'S ADVOCATE SORT, TO MAKE SURE THE PROJECTIONS STAND UP.

OUTSIDE DIRECTORS MAY ASK QUESTIONS ABOUT THE PROJECTIONS, BUT RELY HEAVILY ON OUR MANAGEMENT.

QUESTIONS INCLUDE:

- 1. CAN THE INDIVIDUAL MARKETING DEPARTMENT ACHIEVE NEW PREMIUM GOALS? THESE INCLUDE GROWTH IN LONG-TERM CARE, WORKSITE UNIVERSAL LIFE, AND TERM LIFE WITH MULTIPLE UNDERWRITING CLASSES.
- 2. CAN PRODUCTION INCREASES COME FROM NEW GENERAL AGENCY DISTRIBUTION OUTLETS IN HAWAII, ARIZONA, NEVADA, TEXAS, AND GEORGIA?
- 3. CAN OUR BRANCH OFFICE AGENTS SELL THE COMPETITIVE TERM WE HAVE DESIGNED?
- 4. IS OUR LONG-TERM CARE REINSURANCE FOR LONG NURSING HOME STAYS IN PLACE? IS OUR REINSURER SATISFIED?
- 5. WILL THIS NEW PRODUCTION LEAVE OUR RISK BASED CAPITAL RATIOS STILL VERY HIGH?
- 6. CAN OUR TWO INVESTMENT ADVISERS MEET THEIR INTEREST GOALS AND KEEP OUR ASSETS EVEN BETTER MATCHED WITH LIABILITIES THAN CURRENTLY?
- 7. CAN WE CONTINUE TO AVOID PAYING SHAREHOLDER DIVIDENDS? IF WE PAY, HOW MUCH INVESTMENT INCOME WILL BE LOST?

- 8. CAN SIGNIFICANT NEW LIFE PRODUCTION COME FROM EMPLOYER-SPONSORED SOLICITATIONS OF EMPLOYEES AT LOCAL TEXTILE FIRMS?
- 9. CAN GROUP LIFE AND SHORT-TERM DISABILITY PREMIUMS CONTINUE TO GROW DESPITE COMPETITIVE PRESSURES?
- 10. CAN ASO FEES CONTINUE TO GROW WITH OUR NEW SYSTEM? ARE WE STILL PROVIDING UNIQUE CASE MANAGEMENT SERVICES?
- 11. CAN OUR INDIVIDUAL CONVERSION TO A REAL TIME ADMINISTRATIVE SYSTEM PRODUCE THE EXPENSE SAVINGS PROJECTED? WILL THIS ALLOW OTHER EXPENSES TO CONTINUE TO REDUCE?
- 12. WILL OUR RATE INCREASES ON ASSUMED BLOCKS OF HEALTH INSURANCE PROVIDE THE DESIRED REDUCTIONS IN LOSS RATIOS?
- 13. ARE SALARY LEVELS STILL COMPETITIVE WITH THE ATLANTA-CHARLOTTE CORRIDOR?

SMALL COMPANY PROJECTED STATUTORY NET INCOME 2000 (000's) Appe

Appendix B 2

	Health <=99	Health 2000	Total Health	Life <=99	Life 2000	Total Life	Health Assumed	Life Assumed	Credit OB	Group/ ASO	ANN	Corporate	Expense	Total
Premiums Fees	12,697	3,412	16,109 0	30,193	15,362	45,555 0	8,966 700	5,886	600	10,988 14,334		384		88,104 15,418
Inv Income	2,081	(14)	2,067	7,894	242	8,136	2,001	7,215			1,389	5,587		26,395
Subtotal	14,778	3,398	18,176	38,087	15,604	53,691	11,667	13,101	600	25,322	1,389	5,971	0	129,917
Benefits Surrenders Oth Benefits	5,574	505	6,079 0 0	16,239 3,536 1 480	6,717 9 3	22,956 3,545 1 483	7,020	7,575	700	9,756	1,289	90		54,176 4,834 1 483
Oth Acquisition Oth Maintenance	1,412	1,451	1,451 1,412	4,300	1,666	1,666 4,300								3,117 5,712
Commissions Exp Taxes	1,065 1,977	1,996 1,205	3,061 3,182	3,740 2,041	6,906 1,611	10,646 3,652	8 1,011	6,336 515	100	(2,353) 16,919		520		17,698 25,899
Res Increase Net Amort Reduced Exps	1,530	299	1,829 0 0	3,611	1,100	4,711 0 0	(3,608)	(4,342)					(2,000)	(1,410) 0 (2,000)
Subtotal	11,558	5,456	17,014	34,947	18,012	52,959	4,431	10,084	800	24,322	1,289	610	(2,000)	109,509
Net Income	3,220	(2,058)	1,162	3,140	(2,408)	732	7,236	3,017	(200)	1,000	100	5,361	2,000	20,408

Note: Total Exps 32,728

SMALL COMPANY PROJECTED STATUTORY NET INCOME 2001 (000's)

	Health <=99	Health 2000	Total Health	Life <=99	Life 2000	Total Life	Health Assumed	Life Assumed	Credit OB	Group/ ASO	ANN	Corporate	Expense	Total
- Premiums Fees	11,239	6,333	17,572 0	26,549	29,290	55,839 0	7,621 400	5,395		11,988 15.334		384		98,415 16.118
Inv Income	2,017	8	2,025	8,057	720	8,777	1,728	6,905		-,	1,489	6,629		27,553
Subtotal	13,256	6,341	19,597	34,606	30,010	64,616	9,749	12,300	0	27,322	1,489	7,013	0	142,086
Benefits	5,716	1,017	6,733	15,024	13,174	28,198	6,925	7,263		10,256		90		59,465
Surrenders			0	3,557	57	3,614					1,289			4,903
Oth Benefits			0	1,536	12	1,548								1,548
Oth Acquisition		1,089	1,089		1,249	1,249								2,338
Oth Maintenance	1,059		1,059	3,225		3,225								4,284
Commissions	872	3,044	3,916	3,068	11,102	14,170	4	6,057		(1,853)				22,294
Exp Taxes	1,805	1,904	3,709	1,785	2,796	4,581	907	469		16,919		520		27,105
Res Increase	582	913	1,495	2,726	3,686	6,412	(1,869)	(3,785)						2,253
Net Amort			0			0								0
Reduced Exps			0			0							(3,500)	(3,500)
Subtotal	10,034	7,967	18,001	30,921	32,076	62,997	5,967	10,004	0	25,322	1,289	610	(3,500)	120,690
Net Income	3,222	(1,626)	1,596	3,685	(2,066)	1,619	3,782	2,296	0	2,000	200	6,403	3,500	21,396

Note: Total Exps 30,227

SMALL COMPANY PROJECTED GAAP NET INCOME 2000 (000's)

	Health <=99	Health 2000	Total Health	Life <=99	Life 2000	Total Life	Health Assumed	Life Assumed	Credit OB	Group/ ASO	ANN	Corporate	Expense	Total
Premiums Fees	12,697	3,412		30,193	15,362	45,555 0	8,966 700	5,886	600	10,988 14,334		384		88,104 15,418
Inv Income	1,342	(73)	1,269	6,229	129	6,358	2,001	7,215			1,389	8,163		26,395
Subtotal	14,039	3,339	17,378	36,422	15,491	51,913	11,667	13,101	600	25,322	1,389	8,547	0	129,917
Benefits	5,574	505	6,079	16,239	6,717	22,956	7,020	7,575	700	9,756	4 000	90		54,176
Oth Benefits			0	3,536 1,480	3	3,545 1,483					1,289			4,834
Oth Acquisition Oth Maintenance	1,412	1,451	1,451 1,412	4,300	1,666	1,666 4,300								3,117 5,712
Commissions Exp Taxes	1,065 1,977	1,996 1,205	3,061 3,182	3,740 2,041	6,906 1,611	10,646 3,652	8 1.011	6,336 515	100	(2,353) 16,919		520		17,698 25,899
Res Increase	876	1,157	2,033	2,063	3,732	5,795	(3,608)	(4,342)				010		(122)
Reduced Exps	1,400	(3,230)	(1,000)	2,400	(3,908)	(3,508) 0	1,472	1,095					(2,000)	(2,000)
Subtotal	12,304	3,064	15,368	35,859	14,676	50,535	5,903	11,777	800	24,322	1,289	610	(2,000)	108,604
Net Income	1,735	275	2,010	563	815	1,378	5,764	1,324	(200)	1,000	100	7,937	2,000	21,313

Note: Total Exps 32,728

SMALL COMPANY PROJECTED GAAP NET INCOME 2001 (000's)

	Health <=99	Health 2000	Total Health	Life <=99	Life 2000	Total Life	Health Assumed	Life Assumed	Credit OB	Group/ ASO	ANN	Corporate	Expense	Total
- Premiums Fees	11,239	6,333	17,572 0	26,549	29,290	55,839 0	7,621 400	5,395		11,988 15.334		384		98,415 16.118
Inv Income	1,364	(145)	1,219	6,504	426	6,930	1,728	6,905		- ,	1,489	9,282		27,553
Subtotal	12,603	6,188	18,791	33,053	29,716	62,769	9,749	12,300	0	27,322	1,489	9,666	0	142,086
Benefits	5,716	1,017	6,733	15,024	13,174	28,198	6,925	7,263		10,256		90		59,465
Surrenders			0	3,557	57	3,614					1,289			4,903
Oth Benefits			0	1,536	12	1,548								1,548
Oth Acquisition		1,089	1,089		1,249	1,249								2,338
Oth Maintenance	1,059		1,059	3,225		3,225								4,284
Commissions	872	3,044	3,916	3,068	11,102	14,170	4	6,057		(1,853)				22,294
Exp Taxes	1,805	1,904	3,709	1,785	2,796	4,581	907	469		16,919		520		27,105
Res Increase	7	2,088	2,095	1,385	6,947	8,332	(1,869)	(3,785)						4,773
Net Amort	1,258	(3,512)	(2,254)	2,344	(7,256)	(4,912)	1,212	1,454						(4,500)
Reduced Exps			0			0							(3,500)	(3,500)
Subtotal	10,717	5,630	16,347	31,924	28,081	60,005	7,179	11,458	0	25,322	1,289	610	(3,500)	118,710
Net Income	1,886	558	2,444	1,129	1,635	2,764	2,570	842	0	2,000	200	9,056	3,500	23,376

Note: Total Exps 30,227

Appendix C

VIABILITY ANALYSIS Fraternal Organization

OVERVIEW

Objective

To assure that the company will have sufficient surplus, now and into the future, to deliver on contractual obligations, to provide reasonable protection from risk, and to provide working capital to enable continued growth of the organization.

Scope

Viability analysis will cover the entire enterprise, including the fraternal benefit society and all of its subsidiaries and affiliates. The organization's approach to financial management is to view the organization as a single business enterprise comprised of many legal entities. We comply with legal and business requirements entity by entity, but we focus on performance of the enterprise as a whole. We view capital as being fully mobile across the enterprise, except as may be limited by legal requirements applicable to specific entities.

Responsibility

The Appointed Actuary will have primary responsibility and accountability for viability analysis. Significant support and assistance will be required from others, including product actuaries, investment personnel, and financial managers of subsidiaries.

Uses

- Understand the association's risk profile and risk appetite. Results should demonstrate the ability and resiliency to withstand a broad range of potential variances, through sufficiency of available surplus, ability to alter strategy, and/or adoption of hedging strategies. Accomplished through a comprehensive annual viability study and report which includes stress tests of all assumptions significant to success of the business plan.
- 2. Support decision-making and development of the association's business plan. Accomplished by incorporating proposed plans, initiatives, and decisions into a selected subset of scenarios from the annual study.
- **3.** Understanding the financial impact of disruption of basic components of the business plan.

4. OUTLINE OF VIABILITY ANALYSIS REPORT

Executive Summary

A brief summary of key findings and conclusions, plus recommendations as may be appropriate.

Business Plan

A summary of key elements of the association's business plan, focussing on business decisions that directly affect viability results.

- Development or expansion of a marketing channel
- Marketing initiatives
- Start-up of a new subsidiary
- Introduction of new benefits
- Withdrawal from existing products
- New initiatives

Business Assumptions

Identification of assumptions that are controlled by management and are embedded in the projections supporting the viability analysis. Some of these may be singular assumptions; others may be a range of assumptions to be tested via multiple scenarios.

- Productivity of distribution channels
- Hiring & retention of career agents
- Product pricing profitability targets (or margins, spreads, etc.)
- Commissions and compensation
- Expense assumptions

Environmental/Economic Assumptions

Identification of assumptions that cannot be controlled by management. These are generally incorporated into the analysis via stochastic simulation; sensitivity testing via multiple scenarios may also be used.

- Interest rates
- Equity market changes
- Mortality and morbidity rates

Business Continuity Assumptions

Identification of basic components of business operations implicit in the going business assumption of the business plan. These are incorporated into the analysis on a momentum basis; with accompanying analyses of impact of disruption from the momentum assumption.

- Tax status of benefit structures
- Lutheran structure
- Failure of organization brand value
- Longevity of life span

Results

A summarized display of numerical and graphical results from the projections comprising the analysis. This section will include results for several key financial measures, such as the following:

- 1. Surplus (GAAP, Statutory Accounting) and economic value added. This is the most important indicator, as it relates to financial strength and to capacity for future growth. Total surplus to be identified as:
 - Surplus committed to existing business
 - Surplus committed to business plan initiatives
 - Uncommitted available surplus
- 2. Annual income (GAAP and Statutory Accounting). This is important as it relates to continuity of operations and to external perceptions.
- 3. Margins available for indirect and overhead expenses. Important as it relates to management of the company infrastructure.
- 4. Total annual revenue by source. An indicator of growth.
- 5. Total assets under management. An indicator of growth.

"S-curve" displays will be used to display variations due to stochastic variables. Individual scenarios with extreme or adverse results will be reviewed to identify causes of such results. Line or bar graphs will be used to illustrate dispersion of results caused by variations of other variables.

A compilation of low frequency exposures and the impact of adverse experience, especially high risk exposures.

Conclusions

This section will contain conclusions from the analysis, together with rationale for arriving at the conclusions. Conclusions will address:

- 1. With respect to the business plan assumptions:
 - Overall assessment of viability of the business plan
 - Identification of threats to viability, including assessment of likelihood and recommendations, if appropriate
 - Assessment of business plan alternatives (if any)
- 2. With respect to business plan components and the long-term going business assumption:
 - Analysis of effect of disruptions in plan components
 - Impact of low frequency environmental exposures

Appendix D

Top Ten Risk Management Areas of Concern

For Financial Services

1. Capital Management

Definition of and Corporate Constraints on Capital

- Internal
- Rating Agencies
- Allocation of Capital by Line of Business
- Relationship of Capital to Risk
- Measurement of Capital
- Measurement of Risk
 - Experience Studies decrements, expense
 - DFA
 - Growth Expectations
 - Definition of Risk

Value - of business/corporation

2. Credit Risk Management

Credit Quality of Portfolio(s)

- Current
- Prospective

- Spread Management for Spread-Gain Products Development of a Company/Portfolio Investment Policy Internal Controls on - who is investing, how they are investing, investment activity Default Experience Forecasting

3. Foreign Exchange Risk Management

Comparison of Assets and Liabilities by Currency – Absolute Amounts Incidence of Anticipated Cash Flows Hedging Regulations on Capital Flows in Foreign Countries Repatriation of Foreign Investments

4. Securities Portfolio Management

Monitoring and financial review of all counterparties Variation of strategies by type of portfolio – separate vs general accounts Review of market strategies in light of current conditions Comparison of portfolio performance against relevant benchmarks Comparison of portfolio management against investment policy guidelines Accounting controls

5. Real Estate Appraisal

Maintenance of an up-to-date assessment of real estate values of holdings Review of administrative and accounting procedures in light of financial performance Liquidity risk assessment

6. Product Design and Pricing Management

Monitor product competitiveness

- features compared to those of selected relevant competitors
- prices/rates/guarantees compared to those of relevant competitors

Documentation of actual pricing and re-pricing testing and procedures

- Does pricing/re-pricing meet corporate RoE/NOI goals
- Use of DFA techniques

Prepare a business plan based on pricing to be the expected basis against which to compare experience items

Risks to products posed by regulatory or market action Examine effect of extremes on results

7. Underwriting and Liability Management

Training in new compliance/underwriting/claims regulations and procedures Related items such as complaints, fraud, agent negligence Audit and review of retention levels Audit results by claim examiner and underwriter Review any special underwriting Review claims for trends and pricing implications Reinsurance policy - implications on pricing

- implications on capital requirements
- implications on risk exposure

8. Interest Rate Risk Management

Review of target durations/key rate durations/convexity for underlying liability elements and capital Similar review re assets by portfolio Hedging strategies - residual risk after hedging, relative to corporate capital and surplus levels

Use of derivatives to offset product risks

9. Liquidity Management

Projection of future benefit flows for current book – DFA approaches Cash flow testing – DFA approaches Project policyholder obligations, expenses, and capital requirements over several selected future periods Prepare a 1-3 year projection of expected asset and liability flows by month, and compare Prepare a Strategic Plan over a longer horizon Assessment of run-on-the-bank scenarios

- How much of the portfolio is considered liquid potential losses if liquidation of assets required quickly
 For investment products, any surrender an important deterrent to early surrender, but not in extreme cases under extreme run-on-the-bank scenarios
- 10. Internal Control

Personnel, hiring/termination Compensation/benefits Auditing policies and procedures Organization – responsibilities, authorities Licensing and appointment - operations, field, security dealing Market conduct Due Diligence - merger, acquisition, JV

11. Uncontrolled

Politics – state/national/international Public concerns - trends in issues in which public is interested Regulation/legislation - in effect and proposed

Three T's of Risk Management For Financial Institutions

A. TERMS

- Risk definition, measurement, corporate/business tolerance, correlations, volatility and ruin, EPD/VaR/CER
- **Capital** definition, relationship to risk, profitability measurement, relationship to ratings, allocation by business, optimization, operational/credit/market(/insurance)
- Value definition, corporate/business, relationship to capital, purpose

B. TOOLS

- **ALM** cash flow, duration, key rate duration, convexity
- **DFA** cash flow testing, projection, UVS, risk
- **Audit** regular, pricing/procedures analysis
- Experience Analysis decrements, default, expense, investment benchmarks
- Analysis of selected scenarios run-on-the-bank, extreme loss, stress testing
- **Optimization techniques** risks/capital
- Volatility analysis by business, ruin
- Identification and analysis of correlations may have to be estimated ie incomplete data
- *Risk adjusted return on capital techniques* primarily in banking
- Distribution and parameter estimation may have to be estimated ie incomplete data

C. TACTICS

- *Matching* cash flow, duration/key rate durations, convexity
- Volatility goals corporate/business, ruin probilities
- *Hedging* derivatives, caps/floors, currency, etc
- Investment policy by portfolio purpose credit quality, liquidity, composition, turnover
- Claim/underwriting review distributions, A/E experience
- *Monitoring of competition* pricing, product, performance
- On-going review of new legislation/regulation investment, product, market conduct, employment, tax
- Corporate goals risk tolerance, RoE, NOI, sales, etc
- Product design/pricing review
- **Planning** long and short term
- Procedures and controls all areas
- Reinsurance reinsurance, coinsurance, mod-co, co-mod-co, etc; effect on risk/profitability
- Sales strategy/markets changes to meet goals, sources of profitability
- **Ratings** comparison with market to derive capital requirement

Credit Risk

- A. What is the credit risk?
 - 1. probability of default of the assets;
 - 2. probability of downgrades by rating agencies
 - **3.** probability of widening spreads
- B. How to measure the credit risk?
 - 1. RBC factors (C1) and RBC ratios
 - 2. historical default rates: industry studies and company's own experience
 - 3. how is your company's asset portfolio classified : (a) hold to maturity; (b) available for sale; (c) trading account;
- C. How to manage the credit risk?
 - 1. define asset allocation by quality and maturity;
 - 2. monitor the relative performance of each asset class poor performance of high yield bonds could imply economic slow down or recession;
 - $\mathbf{3.}$ establish a stochastic model to calculate the VAR with respect to credit risk only
- D. Example of Executive Life (1990):
 - 1. about 50% of their asset portfolio was in high yield bonds, and the market collapsed at the beginning of the recession;
 - 2. the company surplus fell below the statutory minimum and the State of California took over
 - 3. the company assets were liquidated at depressed prices to pay for all the claims and policies, although the junk bond market rebounded sharply in 1991 and 1992.

Interest rate risk

- A. What is the interest rate risk?
 - 1. mismatch of asset/liability cash flows, market values and duration/convexity
 - 2. the prepayment of interest rate sensitive assets (CMOs and mortgages)
 - **3.** the capital losses/gains from the unexpected liquidation of assets
- B. How to measure the interest rate risk?
 - **1.** RBC factors (C3) and RBC ratios
 - 2. for cash flow testing, use dynamic models for the interest rate sensitive parameters, such as lapse rates for annuities and UL
 - 3. in addition to the NY7 scenarios, generate multiple stochastic economic scenarios to stress test the outcomes
- C. How to manage the interest rate risk?
 - 1. define the investment strategies when designing new products (life, LTC, annuities)
 - 2. for the interest rate sensitive products, such as GICs and fixed annuities, calculate the key rate durations for both assets and liabilities, and define the risk tolerance for the differences between the key rate duration.
 - 3. use interest rate derivatives (such as caps) to hedge some of the interest rate risk.
- D. Examples:
 - 1. in Japan during 1990's, the guaranteed minimal interest rates on policies are often higher than the interest rates on the domestic corporate bonds
 - 2. in U.S. before 1970's, the interest rates for policy loans were often fixed around 5%, and the policy loans skyrocketed around 1980 when the prime rate reached 20%.