NAIC RISK BASED CAPITAL EFFORTS IN 1990-91

ABSTRACT

This paper describes the history and current status of the NAIC efforts in developing a risk-based capital requirement.

The final schedule has not been developed by the NAIC. At the May, 1992, CAS meeting we will provide an update to this material.

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NAIC RISK BASED CAPITAL EFFORTS IN 1990-91

When we volunteered to prepare this paper we intended to describe the basis for the Property/Casualty (PC) Risk-Based Capital (RBC) calculations approved by the NAIC at the December, 1991 NAIC meeting. However, the development of RBC calculations proceeded more slowly than the deadline for preparation of this paper. Therefore, the paper describes the status of the Risk-Based Capital NAIC project as of November 30, 1991. At the May, 1992, CAS meeting we will supplement this paper with more current information.

The paper covers the following areas:

1. History
2. General RBC issues
3. Preliminary PC RBC calculations (RBC Draft)
4. Considerations for modifications to the RBC Draft calculations

HISTORY

Both the Federal government and state regulators have focused their attention on the solvency of insurance entities. Recent activities in both those arenas are described below.

FEDERAL GOVERNMENT ACTIVITIES

In September of 1989, the GAO reported to the House Energy and Commerce Committee on "Problems in the State Regulation of Property/Casualty Insurer Solvency." The GAO study evaluated the adequacy of available resources and methods used by the states in monitoring insurer solvency and communication among states in dealing with problem insurers operating on an interstate basis.

The report criticized the timeliness of the annual statement review process and the scheduling of financial examinations. The GAO noted that most states did not require an independent CPA audit of financial statements nor an actuarial certification of loss and loss adjustment expense (LAE) reserves. The report found that most insurance departments were understaffed, underfunded and in need of additional

actuarial expertise. The GAO questioned the effectiveness of the NAIC, noting an apparent lack of participation by the states in NAIC committees and multi-state field exams and an inability to disseminate information where domiciliary states were reluctant to share information on troubled companies.

In February, 1990, the Oversight and Investigation Sub-Committee of the House Energy and Commerce Committee, released its widely publicized report "Failed Promises." This report described the failure of insurance regulation to detect, mitigate or prevent four large insurance insolvencies. The report drew comparisons between the insurance environment an d events leading up to the failures of Savings and Loan institutions.

The report claimed that, in the absence of corrective measures, the insurance industry would follow in the steps of the banking industry. The committee identified insufficient regulation as one of several key weaknesses in the present system, noting that (1) most states have inadequate resources to perform their regulatory function, (2) examinations are too infrequent, and (3) most data available for analyses

was unreliable. In addition, most directly related to RBC, the report stated,

> *Broad licenses to write P/C business are often granted to seriously undercapitalized companies. There is a shocking reluctance in some states to deny granting or to withdraw an insurance license unless a person has a legally proven record of criminal fraud.*

Many have made broad comparisons between banks, life insurers and PC insurers. While these institutions are similar in that they have financial obligations to their customers, there are important differences in the financial structures of these entities and the risks they undertake. A few differences are the following:

1. PC insurers have a higher capital to asset ratio than the other two types of institutions - 25% for PC insurers compared to 6% for life insurers, at December 31, 1989.

2. PC insurers have a different mix of assets from life insurers and banks. At December 31, 1989, PC

insurers held 59% of their assets in bonds (with 98% of these being investment grade), 16% in stocks and 1% in mortgages and real estate. Life insurers held 49% of their assets in bonds (including "junk bonds"), 5% in stocks and 21% in mortgages and real estate.

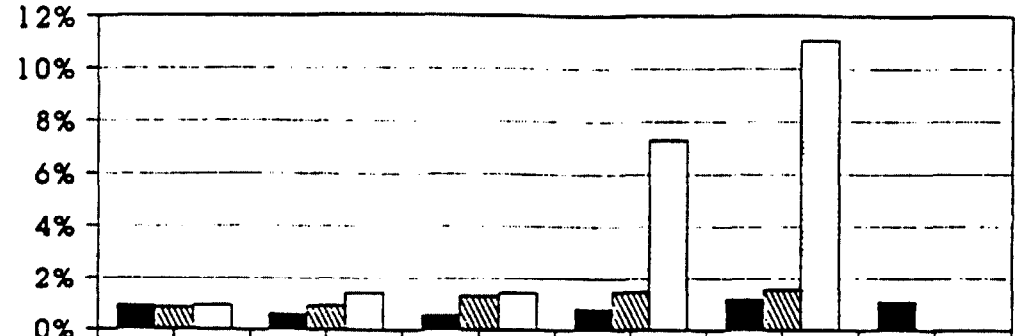
3. Until recently, the existing PC premium-to-surplus ratios, as imprecise as they are, provided more guidance than benchmarks available for banks, S&L's or life insurers.

4. PC companies assume liabilities which are less predictable than the life insurer liabilities. Life insurer risk is more closely related to asset values and interest rates.

5. The rate of insurance company failures (including both life and PC insurers) over the recent past is lower than the rate for banks and far below the rate for S&L's. Exhibit 1 displays a comparisons of these statistics for the years 1985-1989.

EXHIBIT 1

FINANCIAL INSTITUTION FAILURES
AS A PERCENT OF TOTAL COMPANIES
1985-1990



	1985	1986	1987	1988	1989	1990
INSURANCE	0.94%	0.63%	0.59%	0.81%	1.22%	1.09%
BANKS	0.84%	0.93%	1.29%	1.47%	1.56%	
S&L'S	0.92%	1.41%	1.41%	7.31%	11.05%	

INSURANCE BANKS S&L'S

Sources: NAIC, A.M. Best, ACLI, FDIC.
National Data Book & Guide to Sources

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Financial Institution Failures as a Percent of Total Companies - 1985-90

NAIC ACTIVITIES

In November, 1989, Earl Pomeroy, Commissioner of North Dakota and President-Elect of the NAIC, announced the "NAIC Solvency Policing Agenda for 1990." The Agenda, adopted by the NAIC in December of 1989, identified the following areas where the NAIC would focus its attention in 1990:

(1) **Financial Regulation Standards**

The NAIC's Financial Regulation Standards, adopted in September, 1989, defined minimum requirements for effective state solvency regulation in the areas of laws, regulations, regulatory procedures, and organizational and personnel practices. To encourage state adoption of these standards, the NAIC implemented the Accreditation program whereby each state insurance department is audited for compliance. The NAIC indicated that beginning in 1994, accredited states will not accept reports on examination of non-accredited states.

The minimum required laws and regulations currently include the following: (a) the

requirement for an opinion on loss and LAE reserves by a qualified actuary, (b) the requirement for independent CPA audits of financial statements, (c) requirements relating to the diversification of insurer investment portfolios, and (d) Model Laws governing the activities of Managing General Agents, Reinsurance Intermediaries, Credit for Reinsurance and Holding Company Transactions.

(2) **Uniform Reinsurance Evaluation**

The NAIC would assess the uniformity among states in the financial treatment of reinsurance contracts and state efforts to evaluate the solvency of non-U.S. reinsurers. In addition, the NAIC would assist states in interpreting reinsurance contracts and evaluating reinsurance company solvency.

(3) **Examination Process Assessment**

To assess the scope and timeliness of financial examinations, the NAIC would obtain input from the states and consider the recommendations from various studies on solvency regulation.

(4) **Enhance NAIC Solvency Analysis Support To States**

The NAIC would increase its financial analyst staffing, evaluate the use of financial ratios to supplement the IRIS analysis, and increase its computer capabilities.

(5) **Review Adequacy Of Annual Statement Disclosures, Reserving Requirements, and Capitalization Requirements**

This item included a number of areas. Most significantly from the perspective of this paper, the NAIC decided to "evaluate the need for a model law which would provide for a variable capital and surplus requirement based on the nature and volatility of business underwritten and other factors."

In February, 1990, the Examination Oversight (EX4) Task Force established a working group consisting of regulators and industry representatives to determine the feasibility of developing statutory RBC requirements for both PC and Life/Health insurers. It was recognized that RBC was not a new concept and that the working group could draw on the experiences of banks, S&L's and methodologies of those states which

already use RBC concepts in regulating insurer solvency.

Currently most state statutes identify minimum amounts of capital and surplus which an insurer must maintain to stay in operation. In several states the minimums have not been revised in many years. These fixed dollar minimums do not reflect the size of the company or the risk characteristics inherent in the company's operations.

Another important drawback to the current system is the inability, or in some instances reluctance, of state regulators to intervene in the affairs of insurers until the statutory minimum is penetrated. One intent of the RBC process is to increase regulatory effectiveness by providing explicit statutory permission (or a requirement) for intervention at capital levels higher than the minimum capital levels currently prescribed in state statutes.

In September, 1990, the working group reported that RBC requirements were feasible and recommended that the Examination Oversight Task Force amend the Working

Group's charge to include the development and implementation of these requirements.

It was the consensus of the Working Group that the RBC amount should be calculated and displayed in an Annual Statement schedule in order to ensure uniformity among the states and immediate implementation. The group also recommended that a NAIC Model Act be adopted which would establish the appropriate regulatory response with respect to insurers that have impaired the RBC, but which would allow the home state commissioner a considerable amount of discretion in the actions to be taken.

OBJECTIVES

If the RBC process and the other elements of the solvency policing agenda are successful then they will enhance the ability of state regulators to detect companies in poor financial condition, to take corrective actions to cure a problem situation and to limit the exposure of the state guaranty funds. Even the best insurance regulatory systems will not prevent all insurer insolvencies and this is not a goal of the Solvency Policing Agenda or the RBC process.

A summary of possible goals for the RBC system includes the following:

1. Establish meaningful standards for capital, related to company risk, and improve minimum capital requirements.
2. Create uniform capital standards among states.
3. Enhance regulatory ability to identify troubled companies.
4. Authorize earlier regulatory action.
5. Increase impetus for regulatory action.
6. Reduce the real (or perceived) need for federal involvement in solvency regulation of insurance.
7. Increase public credibility (since the public can more easily discriminate among companies and/or because public confidence in regulation will increase).

GENERAL RBC ISSUES

There are a number of decisions involved in designing a RBC system. Some of the most important are the following:

1. The risks to consider.
2. Risk measurement and use of financial statement information.
3. The risk standard (e.g. A^+ or C^-).
4. Principles of a workable system.
5. Application to individual companies or to company groups.
6. Extent to which individual company characteristics should be reflected.

RISKS TO CONSIDER

The risks faced by PC companies can be generally described as the chance that assets or liabilities will mature with values that differ from the amounts recorded in the financial statement or that new business will be unprofitable. The major risks faced by PC companies might be categorized as follows:

1. Loss and LAE reserve risk--The chance of under-valuation of liabilities.
2. Pricing risk--The chance that business will be unprofitable because of inadequate prices, catastrophes (hurricanes, earthquakes) or other factors. This risk relates to the adequacy of the unearned premium reserve and future written premium.
3. Credit risk--The potential for defaults on amounts due or disputes regarding the amounts due. This risk relates to reinsurance recoverables, agents balances receivable, and deferred premiums including premiums on retrospectively rated policies (retros).
4. Investment risk--The risk of default on assets, the risk of a decrease in the market value of securities, the risk that mismatch between asset and liability durations will necessitate the sale of assets at less than statutory values, and the risk that assets will not have sufficient liquidity to be useable to pay claims when necessary.
5. Catastrophes--Natural disasters like hurricanes and earthquakes and "man-made" disasters like pollution and asbestos, to the extent that these

risks are not already considered in the pricing or reserving risk.

Certain company characteristics can be viewed as increasing or decreasing these risk areas. These characteristics include the following:

1. Rapid growth--Increased pricing and reserve risk. Historical data shows that rapid growth is related to company failures.
2. Small size--Increased fluctuation, and therefore risk, in reserves and pricing accuracy.
3. New company--Historical data shows that new companies fail more frequently than mature companies.
4. Asset/liability mismatch--Company is vulnerable to changes in interest rates.
5. Concentration/diversification--Increased (decreased) exposure to natural catastrophes (earthquake, hurricane, tornado, etc.), pricing errors, regulatory or court decisions, etc.
6. Net retention--Higher retentions increase risk due to catastrophes or large claims.

In addition to the PC specific risks, there are general risks faced by all types of businesses, including PC companies. These risks are numerous, hard to quantify and variable from company to company. These risks include the following:

1. Suits (EEOC, bad faith, etc.) will be initiated against the company.
2. Lease obligations will exceed future needs.
3. Pension or other post-retirement obligations will cost more than anticipated.
4. Legislative actions, court decisions or regulatory rulings will alter markets and/or competitive abilities.
5. Mismanagement or fraud will damage the company.
6. Taxes and other governmental levies will rise.
7. The value of miscellaneous assets and/or the cost of miscellaneous liabilities will differ from current estimates.
8. Economic and/or social conditions will change in a manner detrimental to the company.

RISK MEASUREMENT AND USE OF FINANCIAL STATEMENT VALUES

In measuring each of these risks we need to consider (1) the degree of random fluctuation around the expected values, and (2) the degree to which there are systematic biases from the expected values. A RBC system might consider random fluctuations only or both random fluctuations and systematic biases.

One important bias arises from the fact that insurer financial statement reserves tend to understate the ultimate claim payout on an undiscounted basis. A second important bias arises from the underwriting cycle. During the "soft" part of the cycle, loss experience becomes unprofitable, even on a fully discounted basis, and loss and LAE reserve adequacy tends to deteriorate.

One view of the RBC system is to consider the current balance sheet of each company and the near-term underwriting cycle effects. From this perspective, the emphasis should be on the adequacy of the current loss and LAE reserves and the likely profitability in the next year or two. This RBC system might include a company specific reserve recalculation with the

deficiency, if any, recorded as a component of the RBC. RBC might also provide for random fluctuations.

Alternatively, the RBC system can take a longer-term view. From this perspective, the adequacy of the current loss and LAE reserve will be corrected based on company actions, actuarial opinions, CPA audits and regulatory financial examinations. Nevertheless, this view of RBC requires that a company have sufficient capital to survive operating losses and reserve deficiencies from the next "soft" portion of the underwriting cycle, whenever that arrives. Thus, the RBC requirement would include provisions for systematic and random factors that might affect any company, but would not include a provision based on the adequacy or inadequacy of specific balance sheet items for the company.

Regulators are generally looking to the RBC system from the long-term perspective. The other regulatory tools are intended to deal with the accuracy of a company's current balance sheet.

STANDARDS

The calculation of a RBC requirement implies that by meeting the requirement a company satisfies some standard of capital adequacy. There is a range of possible standards. These standards might be characterized as follows:

Minimum--Minimally acceptable level such that the company should be placed under regulatory supervision if capital falls below this level.

Prudent Margin--Company can reasonably operate at or near this level, but should not remain below this level for long periods of time. A plan for improvement might be required if the company continues below this level for a period of years.

Triple A--Able to withstand all reasonable worst-case scenarios.

To prevent confusion in its application and to help in developing a formula, the standard should be articulated. In addition, if the RBC is calculated from several components of the types listed previously, then each of the components should correspond to the same RBC standard. It is not sensible to combine

Minimal pricing risk standards with Triple A investment risk standards, for example.

Once the RBC calculation is established and published, the model law needs to specify the actions prescribed or permitted by the state regulator. If a Triple A standard were published in the statement then the regulator might need to take modest action if the actual surplus fell to some percentage (less than 100%) of the RBC capital and more serious action if the standard fell to a lower percentage of the RBC. In effect the two percentages can be viewed as defining the prudent margin standard and the minimum standard as percentages of the triple A standard. Similarly, if the prudent margin standard is published in the statement, modest action might be prescribed or permitted at that level or at a level a little below that level. More significant regulatory action might be prescribed or permitted at lower percentages of the RBC.

Even though any form of the standard might be used to achieve the desired regulatory effects, choice of the published standard has ramifications which should be considered. For example, the public might misinterpret

the standard to imply either greater or less financial strength than is intended; companies might interpret the standard to permit less than optimal surplus levels; or the standard might be misused for rate-of-return purposes in ratemaking proceedings. Having the same standard for PC and Life/Health companies is probably desirable. The bank and S&L standard is perceived as being only slightly above a Minimum standard.

PRINCIPLES

The PC Actuarial of the Advisory Committee to the NAIC Working Group proposed a number of principles that the RBC calculation should reflect. It may not be practical to simultaneously achieve all of the objectives covered by these principles. The principles, paraphrased from the latest available draft of that Advisory Committee's work, are as follows:

A. Formula Mechanics

1. The formula should be thoroughly tested. The testing should explore whether (a) the formula meets the other principles described below, (b) the results when applied to financially troubled companies of the past generally suggest that the

RBC formula would have speeded the regulatory oversight process, (c) when applied to current companies it seems to reasonably discriminate between "strong" and "weak" companies, with a minimum number of false readings, etc.

2. The formula should reflect individual company circumstance to the fullest extent practical.
3. The formula should be practical. It should focus on the major risk elements and recognize that minor or unusual risks cannot be considered in this process.
4. The formula should be simple to explain. Even if mechanics of the formula are complex, the basic formula should be intuitively sensible and simple.
5. The formula should evolve over time. The formula and its accompanying parameters will need to be reviewed regularly and updated periodically to reflect changes in the insurance industry.
6. The formula should produce reasonably consistent results from year-to-year, both for the industry in total and for an individual company.

B. Induced Behavior

1. The formula should motivate companies to "do the right thing."
2. The formula should not be susceptible to false manipulation by changes in financial statement presentation.
3. Care should be taken to prevent the potential abuse of the risk-based capital formula. The formula is not intended as a capital requirement for ratemaking, for example, and should not be characterized in a way which could be used for that purpose.

C. Economic Consequences

1. The formula should be reasonably consistent with economic reality. Legislating capital requirements which are inconsistent with the market forces will cause changes in price level, capital level, etc. which may not be helpful to the public or the industry.
2. The formula should maintain a "level playing field" between insurers and self-insurers, between US insurers and alien insurers, among different industry segments, etc.

3. The formula should be designed to minimize the cost of insolvencies. It cannot prevent failures, which in a competitive market are necessary and perhaps desirable as inefficient companies are driven from the market by competitors.

LEGAL ENTITY EXAMINED

For most financial analysis purposes, insurer groups are examined rather than individual companies. A. M. Best ratings, for example, generally apply to the company group. Regulators, however, are responsible for individual companies, and have limited oversight on the group. Typically, companies in a group will be domiciled in different states. No single regulator is responsible for the whole group.

If a group is in financial trouble, the assets available to the regulator are those which are legally under the control of the individual company. If the assets are legally under the control of the sibling or parent company, those assets are available to the regulator only with the permission of the regulator in that domicile and only with the permission of the Board and management of those entities. For healthy companies, this issue is not significant. For

financially impaired companies, the distinction is critical.

COMPANY-TO-COMPANY VARIATIONS

The principles cited above and the objectives of the RBC system, encourage the development of a RBC requirement which matches the individual company circumstances as closely as possible. This objective suggests the following:

1. Individual company experience should be considered, to the extent credible.
2. Factors by line of insurance should be used, where relevant, e.g. reserve adequacy and profitability.
3. Factors by investment class should be used, where relevant.

RATIONALE FOR THE APRIL, 1991, RBC DRAFT

In April, 1991, the NAIC Working Group circulated a RBC Draft Schedule with four main components as follows:

1. Loss and LAE reserve risk
2. Pricing risk
3. Credit risk
4. Investment risk

That Schedule is preliminary and will change. However, for purposes of this paper we summarize the calculation and comment on the rationale for the formulas and factors. This discussion is not intended to be an endorsement of the calculations.

LOSS and LAE RESERVE RISK

The loss and LAE reserve RBC is intended to provide for the chance that a company's reserves might develop adversely. For each line of business, the formula uses the highest industrywide calendar year percentage reserve development over the past nine years as the starting point for determining the RBC for reserve risk.

Before applying this percentage to the company's held undiscounted reserves, adjustments are made to reflect each company's historical experience in establishing adequate reserves. The percentage is further modified to reflect a conservative estimate of investment income.

The formula and the rationale are described in greater detail in the sections below.

Formula

The following formula describes the reserve calculation in the RBC Draft

$RBC\_RSV_i = RSV_i * [(1 + RSVFAC_i * COADJ\_RSV_i) * INV\_RSV_i - 1.0]$

Where

RBC_RSV_i is the loss and LAE reserve RBC requirement for line of business i.

RSV_i is the company loss and LAE reserve (net of reinsurance and gross of interest discount) for line of business i at the latest year-end.

$RSVFAC_i$ is the industrywide RBC reserve charge for line of business i.

INV_RSV_i is the investment income discount for reserves for line of business i.

$COADJ\_RSV_i$ is the credibility adjustment for individual company experience calculated as follows:

$COADJ\_RSV_i = (CO\_DEV_i / IND\_DEV_i) * Z_i + 1.0 * (1 - Z_i)$

Z_i=MIN{.5* square root of (latest yr net earned $prem_i$/$500 million), 0.50}.

CO_DEV_i is the company ten year average reserve development. for line of business i.

IND_DEV_i is the industry ten year average reserve development for line of business i.

Rationale

The main elements of the calculation are **RSVFAC**, **INV_RSV** and **COADJ_RSV**. These are discussed below.

RSVFAC

The factors to represent the reserve development potential were selected by observing the industry Schedule P loss and LAE reserve development runoff through December 31, 1989 for year-end reserves for the past ten years. For each line of business the year-end reserve showing the highest percentage reserve development was selected for incorporation in the model. Exhibit 2 shows the observed percentage deficiencies by line of business. This data is based on loss and allocated loss adjustment expense reserve development, but the resulting factors would be applied to reserves for loss and all LAE.

The data contains some distortions which might require adjustment before factors are finally selected. For example, medical malpractice and workers compensation development includes the effect of "unwinding" some loss and LAE reserve discount. Loss portfolio and financial reinsurance transactions may effect the data

RESERVE RISK

Schedule P Loss & ALAE Development Experience and Discount Factors

(1) Line Of Business	(2) Worst Year	(3) Reserve Development	(4) Discount Factor	(5) Discounted Reserve Factors
Homeowner/Farmowner	1983	20.0%	0.908	9.0%
Private Passenger Auto	1985	20.4	0.917	10.4
Commercial Auto	1984	23.6	0.917	13.3
Workers' Compensation	1985	17.8	0.818	-
Commercial Multi Peril	1983	41.4	0.908	28.4
Medical Malpractice	1983	46.1	0.786	14.8
Special Liability	1985	21.6	0.908	10.4
Other Liability	1983	46.1	0.829	21.1
Combined 2 yr Line	1984	15.3	0.962	10.9
International	1984	22.2	0.858	4.8
Reinsurance A & C	1980	48.3	0.876	29.9
Reinsurance B	1984	89.9	0.876	66.4
Reinsurance D	1984	98.5	0.831	65.0

Reserve Development from December 31, of the "worst year" through December 31, 1989 for all accident years prior to and including the "worst year".

Discount factors using IRS methodology and data through 12/31/85.

(5) = {[(1.0 + (3)/100 x (4)] - 1.0} x 100%

for reinsurers and some primary companies. The treatment of uncollectible reinsurance might cause other distortions in Schedule P development. Finally, the revised definitions of lines of business in Schedule P in 1988 and 1989 may have created distortions.

Using this data to select the reserve factors can be interpreted as requiring that the industry have sufficient capital to withstand a repetition of the 1980's.

It is intended that the **RSVFAC** be determined based on undiscounted data and a separate factor, described below, will reflect the allowable investment income. Thus company's held reserves ($\mathbf{RSV}^{i}$) which are used in the RBC formula should be undiscounted. A company which establishes reserves on a discounted basis, should increase reserves by the amount of discount before applying the **RSVFAC**. The RBC formula would thus produce the same RBC requirement for two companies which are identical except that one company discounts its loss and LAE reserves and the other company does not.

One additional issue related to discounting remains. When comparing the RBC requirement to statutory surplus, the results could indicate one company having surplus which exceeds the RBC requirement, while the other company has surplus which falls below the RBC requirement. The company reporting higher surplus. i.e. the one carrying discounted reserves, has greater risk associated with its reserves and reported surplus. Greater risk should generally imply a greater RBC charge. In order to address this issue, it has been suggested that the amount of discount in the company's carried reserves be added to the otherwise calculated RBC requirement before making a comparison to statutory surplus.

INV_RSV

Requiring the industry to withstand the 1980's without considering the time value of money might be viewed as an inappropriately high standard. The **INV_RSV** discount factor reflects the investment income available from the assets corresponding to reserves.

Exhibit 2 shows the reserve discount factors based on the IRS-type methodology and using a 5% interest rate.

For long-tail lines of insurance it has been proposed that the interest rate should be larger than for short-tail lines of insurance because assets corresponding to reserves for long-tail lines of insurance can have longer durations than for short-tail lines.

COADJ_R8V

The credibility formula was selected judgmentally. The formula uses premium as a base for calculating credibility of a reserve level. It has been suggested that the base for credibility might be changed to reserve amount.

The company and industry development data used in the calculation would include ten years ending one year prior to the statement, i.e., ten years ending December 31, 1991 for calculations in the December, 1992 Annual Statement. The one year lag is required so that industry data is available.

The use of the credibility formula assumes that the past relationship between company financial statement reserve development and industry financial statement reserve development is predictive of the future relationship between company and industry financial

statement reserve development. A review of 10 years of reserve development prepared for the NAIC Working Group suggests that there may be little predictive power in this relationship. It has been proposed that reserve credibility calculations be eliminated or limited to cases of long-term favorable development.

PRICING RISK

The pricing risk is intended to measure the extent to which operating results might be unprofitable. The formula and rationale are described in the sections below

Formula

The following formulas describe the RBC pricing risk calculation in the RBC Draft

$$RBC\_WP_i = PREM_i * [LOSFAC_i * COADJ\_LOS_i * INV\_LOS_i + COEXP - 1.0]$$

$$RBC\_UEP_i = MAX\{0, UEP_i * [LOSFAC_i * COADJ\_LOS_i * INV\_LOS_i - 1.0]\}$$

Where

RBC_WP_i is the written premium pricing risk RBC requirement for line of business i, and

RBC_UEP_i is the unearned premium pricing risk RBC requirement for line of business i. This is like a

GAAP premium deficiency reserve. The RBC_UEP_i formula is the same as the RBC_WP_i formula, except that the expense charge is removed in the **RBC_UEP** calculation since surplus is already reduced by most expenses associated with premium written but unearned.

WP_i is the company net written premium for line of business i, for the most recent calendar year.

UEP_i is the company net unearned premium for line of business i, at the latest year-end.

$LOSFAC_i$ is the industrywide RBC charge for line of business i.

INV_LOS_i is the accident year investment income discount for line of business i.

$COADJ\_LOS_i$ is the credibility adjustment for individual company experience calculated as follows:

$$COADJ\_LOS_i = (CO\_LR_i/IND\_LR_i)*Z_i + 1.0*(1-Z_i)$$

Z_i=MIN(.5* square root of (latest yr net earned $prem_i$/$500 million), 0.50).

CO_LR$_i$ is the company ten year average loss and LAE ratio for line of business i.

IND_LR$_i$ is the industry ten year average loss and LAE ratio for line of business i.

COEXP is the expense ratio for the company for all lines of business combined.

Rationale

The main elements of the calculation are the **LOS_FAC**, the **INV_LOS**, **COEXP**, and **COADJ_LOS**. These are discussed below.

LOS_FAC

The factors to represent the pricing risk were selected by observing industrywide Schedule P accident year loss and LAE ratios for each line of business. The highest ratio over the past 10 years for each line of business was selected as the **LOS_FAC**. Exhibit 3 displays the selected accident year loss and LAE ratios by line of business.

PRICING RISK

Schedule P Accident Year Loss & ALAE Ratio and Discount Factors

(1)	(2)	(3)	(4)	(5)
Line Of Business	Worst Year	Loss & LAE Ratio	Discount Factor	Discounted Loss & LAE Ratio
Homeowner/Farmowner	1984	0.825	0.919	.758
Private Passenger Auto	1985	1.041	0.921	.959
Commercial Auto	1983	1.081	0.921	.996
Workers' Compensation	1984	1.033	0.856	.884
Commercial Multi Peril	1984	0.921	0.918	.845
Medical Malpractice	1983	1.702	0.763	1.299
Special Liability	1984	0.896	0.919	.823
Other Liability	1984	1.080	0.825	.891
Combined 2 yr Line	1983	0.710	0.961	.682
International	1988	1.235	0.884	1.092
Reinsurance A & C	1989	1.122	0.884	.992
Reinsurance B	1984	1.488	0.884	1.315
Reinsurance D	N/A	N/A	N/A	N/A

Evaluated at December 31, 1989.

Discount factors using IRS methodology and data through 12/31/85.

The data issues described in the reserve discussion above also apply to the loss and LAE ratios.

INV_LOS

Requiring the industry to withstand the 1980's without considering the time value of money might be viewed as an inappropriately high standard. The discount factor calculation is included to reflect the investment income potential of collected premium.

Exhibit 3 shows the accident year discount factors based on the IRS-type methodology and using a 5% interest rate. The discount factors in this table are based on an accident year payment pattern. These factors differ from the discount factors in the reserve table because the reserve table factors are based on a reserve date payment pattern (many accident years combined).

For both reserve and pricing risk purposes the RBC Draft uses the mid-1980's loss experience in combination with a 5% interest rate. Since the actual mid-1980's interest rates exceeded 10%, the process might be viewed as assuming a 1980's loss and LAE ratio and reserve deficiency at a time when interest rates

are only 5%. The combined effect might be viewed as a high standard for RBC.

COEXP

This item includes all expenses other than loss adjustment expenses. The all-lines expense ratio is used so that the RBC Schedule could be completed without requiring the use of the Insurance Expense Exhibit which is not necessarily prepared until after the Annual Statement in filed. In most situations the use of the all-lines expense ratio will produce a RBC charge which is very close to the RBC charge that would be produced by use of line-by-line expense charges.

COADJ_LOS

The credibility formula was selected judgmentally.

The company and industry loss and LAE ratio data used in the calculation would include ten years ending one year prior to the statement, i.e., ten years ending December 31, 1991 for calculations in the December, 1992 Annual Statement. The one year lag is required so that industry data is available.

The predictive power of the relationship between the 10-year company average loss ratios and the 10-year industry average loss ratios has not been tested for RBC purposes, but it seems reasonable that such a relationship exists.

CREDIT RISK

The areas of credit risk identified in the RBC Draft are the following: (1) agents balances, (2) accrued premiums from retrospectively rated policies (retros), (3) reinsurance ceded, (4) accrued investment income, (5) other receivables.

The RBC calculation applies a factor to each of these credit risk areas. The factors are selected judgmentally considering (1) factors used by private rating organizations, (2) factors used in individual state Insurance Department RBC formulas, and (3) internal consistency among the factors.

Agents Balances

There is a statutory surplus charge for agents balances overdue by more than 90 days. The 90 days overdue balance usually proves to be collectible, so those

amounts reduce the need for a RBC charge. Therefore, a low RBC charge is associated with this item.

Reinsurance Ceded

The current model applies a ceded reinsurance credit risk charge to the sum of reinsurance recoverables on paid losses, unpaid losses and unearned premium. The credit risk associated with ceded reinsurance has two main components. First, there is the possibility that the reinsurer will be financially unable to meet its obligations. Second, the ceding company and the assuming company may disagree on the amounts due under the contract. This suggests a RBC charge for reinsurance recoverable which is greater than the percentage charge on a corporate bond with a similar credit rating.

A reinsurance transaction produces the RBC ceded reinsurance charge described here for the ceding company as well as a **RSVFAC** charge for the assuming company described in the Reserve Risk section. While the economic effect of these RBC charges on reinsurance transactions has not been fully explored, there are several offsets to the sum of the reinsurance recoverables which are being contemplated by the

Working Group and which are discussed under the Reinsurance Issues section later in this paper.

Accrued Retros

The credit risk associated with accrued retros is analogous to the ceded reinsurance risk. First, the policyholder may be financially unable to meet its obligations to the insurer. Second, the policyholder and the insurer may disagree on the amounts due under the contract.

Other Credit Risk

Smaller charges are applied to other credit risk items.

INVESTMENT RISK

The investment categories identified in the RBC Draft calculation are the following: (1) bonds, there are several categories identified in the Annual Statement, (2) stocks, there are several categories identified in the Annual Statement, (3) mortgages, (4) real estate, (5) short term investment, and (6) other invested assets.

The RBC calculation applies a factor to the assets in each of the investment categories. The factors are

selected judgmentally considering (1) life insurance RBC working group factors, (2) factors used by private rating organizations, (3) factors used in individual state Insurance Department RBC formulas, and (4) internal consistency among the factors.

Bonds

The bond charge varies by category of bond. The RBC Draft uses four classes of bonds. The final RBC Schedule will likely reflect the six-class system used in the current annual statement.

Preferred Stocks--Non-affiliates

The factor for non-affiliated preferred stock is lower than the factor for non-affiliated common stock to reflect the lower market volatility for preferred stock.

Common Stocks-Non-Affiliates

This factor is intended to represent the volatility of the market value of the investment.

Common Stocks-Affiliates

This is one of the more controversial elements of the RBC calculation.

In the PC industry, investments in subsidiaries constitutes a significant portion of insurer surplus. Subsidiaries can be classified in several ways. First, subsidiaries might be PC insurers, life insurers, insurance agencies, premium finance companies, other financial services entities or non-financial service entities.

Second, the degree ownership might range from 100% to under the 10% threshold usually used to distinguish subsidiaries from other investments. Third, the investment may be small or large in relation to the parent company total assets or to the parent company surplus.

Finally, the market value of the subsidiary may be readily determinable because it is publicly traded and the parent company could sell its shares without affecting the market price. More typically the market value of the subsidiary is not readily determinable. The book value of most subsidiaries is based on cost or statutory surplus of the subsidiary.

On one hand, for RBC purposes the investment in a subsidiary might be viewed as any other investment. Perhaps, the charge would be somewhat higher than the common stock charge to consider (1) risks associated with the concentration of parent company assets in the subsidiary (2) the lack of liquidity for the subsidiary, and (3) the fact that subsidiaries in the PC business will have risks which are closely correlated with the parent company risks.

On the other hand, creation of subsidiaries may enable an insurer to increase premium writings without an increase in surplus. Consider an insurer with $100 million in surplus, $300 million in premium, and $600 million in assets. If it used $100 million of those assets to establish a second insurance company with $100 million in surplus, the second company could write $300 million of premium. Total premium writings would be $600 million, but "true" surplus would be only $100 million. This is referred to as 'stacking' surplus.

The RBC Draft adopts the stacking surplus view of investments in affiliates and proposes a 100% charge against investments in affiliates.

The final RBC calculation is more likely to adopt a view intermediate between the investment view and the stacking view. In this intermediate view the RBC charge for investments in insurance subsidiaries is equal to the RBC requirement for the subsidiary. This treatment contains some implicit conservatism since in most cases SAP value of a subsidiary is less than GAAP or market value for that subsidiary.

SOME RESULTS

Applying these formulas to Best primary company data showed that investment risk was 43% of the total risk capital compared to 16% for reserves, 19% for written premium, 2% for unearned premium and 20% for credit. The investment risk was composed 38% of affiliates and 5% for other investment risk.

More than 80% of companies had actual capital exceeding the risk based capital.

These results will change as the formula is improved.

CONSIDERATIONS FOR FORMULA MODIFICATIONS

There are a number of areas where formula modifications have been discussed. Some of these are discussed below.

COMPANY GROWTH AND SIZE

The RBC Draft did not include specific consideration for the size, growth rate, or age of companies. There are a number of reasons to expect that these factors affect the financial condition of a company.

A study of insolvencies by A.M. Best & Co. identified the following causes for insolvencies from 1969 to 1990. Rapid growth accounts for 20% of the insolvencies, as categorized by Bests. This information is summarized on the next page.

	CATEGORIES	NUMBER OF COMPANIES
A.	Policyholder Obligations Larger than Anticipated	
	Deficient reserves/inadequate pricing	86
	Rapid growth	64
	Significant change in business	26
	Reinsurance failure	21
	Catastrophe losses	17
		214
B.	Asset deterioration	
	Overstated assets	30
		30
C.	Other	
	Alleged fraud	30
	Miscellaneous	28
		58
D.	Total	302

Furthermore, the A. M. Best analysis indicates that unrated companies, a group which is composed primarily of new companies, accounts for a disproportionate share of the insolvencies.

A preliminary statistical analysis by company size and growth rate prepared for the NAIC working group shows that fast growing companies demonstrate worse than average loss and LAE development and higher than average loss and LAE ratios. In addition, the analysis indicated that smaller companies show more variability in reserve adequacy and loss and LAE ratios than larger companies.

These considerations will likely be reflected in the final RBC Schedule.

COMBINING RISK COMPONENTS

Once individual RBC components are developed the components need to be combined. If the risks are 100% correlated, then the components might reasonably be summed. If the components are uncorrelated then some other means of combination is appropriate. For example it has been suggested that the combined risk equals the square root of the sum of the squares of the

uncorrelated individual risk components. Other rules for combining risk components might be examined.

REINSURANCE ISSUES

There are several proposals which are being considered by the NAIC Working Group regarding the credit risk charge for reinsurance ceded. These include:

1. Eliminating the reinsurance charge on amounts treated as non-admitted assets, e.g., non-collateralized reinsurance with unauthorized reinsurers and overdue authorized reinsurance.
2. Eliminating the ceded reinsurance charge on transactions from quota-share inter-company pooling arrangements.
3. Offsetting reinsurance balances recoverables from United States affiliates by balances payable to these affiliates.
4. Eliminating ceded risk charges entirely on reinsurance ceded to United States affiliates.
5. Eliminating ceded reinsurance charges for reinsurance ceded under involuntary pooling arrangements.

There were discussions of adjusting the reinsurance ceded charge based on the "quality" of the assuming company or based on whether the ceded balances were collateralized. The practical issues involved in classifying reinsurers based on quality and the desire to maintain a "level playing field" between U.S. and alien reinsurers makes it unlikely that a practical way to make these types of adjustments can be found.

For "professional reinsurers" it is contemplated that the credit risk charges for agents balances and for accrued retrospective premiums would not apply because reinsurers generally can off-set the premium due to them from loss and LAE amounts due to the reinsured company. This is unlike the primary company situation where claim payments cannot generally be off-set by premiums due from the policyholder. For this, and other purposes, professional reinsurers would be defined as an insurer with a ratio of "written premium assumed from non-affiliates" to "direct and assumed written premium from non-affiliates" of greater than 75%.

The 1988 Schedule P changes included the creation of reinsurance lines A through D defined as non-proportional surety, property, financial guarantee, and liability respectively. Proportional reinsurance is coded into the primary lines of business. For accident year 1987 and prior, there is no split between reinsurance experience and primary experience and no split between proportional and non-proportional reinsurance. Reinsurance data was coded by line of business along with primary data.

To obtain 1987 and prior reinsurance experience for use in selecting industry loss ratios, industry loss development percentages and comparisons of company experience to industry experience, the experience from companies classified as professional reinsurers was used. The definition of professional reinsurers is the 75% rule described above. The experience from these companies was combined into three categories: Property, including financial guarantee and surety (most Schedule O lines), liability (all Schedule P lines), and the old line 30 (Schedule O) Reinsurance business. This experience includes proportional and non-proportional coverages, but it is treated as representative of non-proportional coverages.

Finally, while the IRS methodology for calculating discount factors might be workable for primary lines of business, an alternate method may be required for reinsurance lines where the payment tail extends well beyond the information in Schedule P and beyond the 15 years used for IRS purposes.

GENERAL BUSINESS RISK

The RBC Draft did not include a provision for these items. It may not be practical or appropriate to include any such charges.

MEASUREMENT BASE

The RBC factors should be applied to an objective value for the asset or liability whose risks are being measured. In most situations the measurement base is straightforward; bonds at amortized value, for example. In some cases the measurement base needs to be considered carefully.

The measurement base for the reserve in the RBC Draft is the held loss and LAE reserves. This creates the possibility of double or triple counting the effect of reserve strengthening. First, an increase in reserve

automatically generates a decrease in surplus. Second, an increase in reserves will generate an increase in the RBC charge for reserve risk. Finally, the credibility calculation might trigger an increase in the **COADJ** factor which could further increase the RBC. The triple-hit might discourage insurers from promptly recognizing reserve deficiencies.

A number of ideas have been proposed to address this problem. For example, the reserve risk could be calculated using a base other than held reserve. The base could be the held reserve plus the Excess of Statutory Reserve Over Statement Reserve. In this case, improvements to the current calculation of Excess of Statutory Reserve Over Statement Reserve might be desirable. Alternatively, with suitable adjustment to the factors, premium could be used as the base for the reserve risk calculation.

The base for measuring pricing risk is premium. Since the RBC concept is long-term, the premium for this purpose should be the premium projected to some future period. For simplicity, the RBC Draft uses the current year written premium. An alternative measurement base could be written premium projected at current growth

rates for the company or for the industry. The use of a premium projection might be particularly suitable for a fast growing company.

Furthermore, the pricing risk should reflect the potential for operating losses during a time period that would permit the company (or the regulators) to recognize the problem and to implement corrective action. The implementation of corrective action might be slowed by market conditions. From this perspective the use of only one year of premium assumes a very rapid response, and the use of more than one year of premium might be more appropriate. On the other hand, a high loss ratio is used in the RBC provision for future operating losses.

COMPARISON TO SAP SURPLUS

Once the RBC amount is calculated, it must be compared to statutory surplus. There are differences among states and thus among companies in the definitions of the Statutory Accounting Principles that determine the amount of surplus. To the extent feasible, these differences need to be removed to produce a "level playing field."

OTHER ISSUES

Other issues which the working group faces in the next few months are the following:

1. Treatment of claims-made policies.
2. Additional consideration to individual company experience and risks.
3. Credit for collateralized deferred premiums.
4. RBC calculations for concentration/ diversification, net retention and catastrophes, if reasonable approaches can be identified.

The RBC process is evolving. By the time of the May, 1992 CAS meeting there will likely be significant changes in the formulas, but we expect that the issues underlying the formula will be similar to the issues addressed above.