Study Note on the Actuarial Evaluation of Premium Liabilities

Prepared by:

Claudette Cantin, F.C.A.S., F.C.I.A.

Philippe Trahan, F.C.A.S., F.C.I.A.

May 1999

Study Note on Actuarial Evaluation of Premium Liabilities

Abstract

In Canada, appointed actuaries are required to opine on the adequacy of the policy liabilities for property-casualty insurers. Policy liabilities include both claims and premium liabilities. Several papers have been written and actuarial techniques have been developed to estimate claims liabilities. Premium liabilities, however, have received little, virtually no attention in the actuarial literature.

To date, we believe that only Canadian actuaries have been evaluating these liabilities. However, other countries are following that lead. We understand that in some states, regulators will soon require actuarial opinions on the adequacy of unearned premiums for policies with terms exceeding twelve months.

The evaluation of premium liabilities consists of examining all related assets and liabilities to ensure that the anticipated net costs to discharge an insurer's obligations with respect to its insurance and reinsurance contracts, except its claim liabilities, are provided for.

This paper intends to provide the practicing actuary with some guidelines on the evaluation of the premium liabilities. We will review the individual components of the premium liabilities and the related regulatory requirements and CIA recommendations. Finally, we will present an actuarial approach to evaluate the equity in the unearned premium, the unearned premium deficiency and the deferred policy acquisition expenses.

Acknowledgement

The authors would like to express their gratitude to Jean-Luc Allard, Richard Belleau, Jean Côté, Bernard Dupont and Betty-Jo Hill for their thorough review and constructive comments.

A special thanks also goes to Patrick Dubois, Peter Garrett, Miria McKie, Leeann Organ, Tania Johnstone and Bill Premdas whose patience and efforts have helped us put together this study note.

Table of Contents

I. Introduction

II. Definition

III. Deferred Policy Acquisition Expenses (DPAE or DPAC)

IV. Other Components

V. CIA Recommendations and Regulatory Requirements
   - A. DPAE Asset
   - B. Investment Income
   - C. Other Liabilities Versus Premium Liabilities
   - D. All Lines Combined Versus By Line Equity
   - E. Subsequent Events

VI. An Illustrative Example
   - A. Equity in the Unearned Premium: A Step-by-Step Approach
   - B. Discounting
   - C. Gross Calculations
   - D. Assumed Business

Exhibits

I Equity in Net Unearned Premium Reserve
II Selection of Net Loss Ratios
III Discounting of Net Premium Liabilities
IV Equity in Gross Unearned Premium Reserve

Appendices

A Selection of Loss Ratios
B Seasonality Adjustment Factor
C Discounting of Net Premium Liabilities
D Discounting of Gross Premium Liabilities
E Calculation of Loss Trend Factors
F Average Accident Date and Average Writing Date of the Unearned Premium
G P&C-1 Expense Exhibit
H Statutory Actuarial Opinions

Bibliography

I. Introduction

Appointed actuaries for property-casualty insurers[1] in Canada are required by regulators to provide an actuarial opinion on the adequacy of the policy liabilities. Policy liabilities include both claim liabilities and premium liabilities.

There was no regulatory requirement in the United States for an actuarial opinion on premium liabilities until 1998. This has changed as a number of states now require an actuarial opinion on the adequacy of the unearned premium reserve for certain types of policies with terms exceeding twelve months.

Over the years, several papers have been written and standard actuarial techniques have been developed to estimate the claim liabilities and its various components. Premium liabilities have received virtually no attention in the actuarial literature.

The Canadian Institute of Actuaries (CIA) "Recommendations for Property – Casualty Insurance Company Financial Reporting" provides a definition of premium liabilities as well as considerations to be taken into account in the evaluation of premium liabilities. A number of approaches have been used to estimate premium liabilities but to date none have been documented. The emphasis of these approaches has been on unearned premium and deferred policy acquisition expenses (DPAE) as they represent the largest components of the premium liabilities. In particular, discussions between actuaries and some regulators have tended to focus on the treatment of investment income in assessing the equity in the unearned premium. Other components of premium liabilities, such as contingent commissions, retro-rated policies, and reinsurance adjustments, have received little attention.

The evaluation of premium liabilities encompasses much more than assessing the adequacy of the excess of the pro-rata unearned premium over the DPAE. It consists of examining all related assets and liabilities to ensure proper provision is made for the anticipated net costs incurred to discharge an insurer's obligations with respect to its insurance and reinsurance contracts, except its claim liabilities.

The purpose of this paper is to provide a framework for the evaluation of the premium liabilities and to fill a gap in the actuarial literature. It defines and reviews the individual components of the premium liabilities as well as the regulatory requirements and CIA recommendations and standards of practices related to premium liabilities. It also presents an actuarial approach for estimating the equity in the unearned premium, the premium deficiency and the DPAE.

The approach shown herein is in accordance with the CIA recommendations and Standards of Practice as well as statutory requirements as of December 31, 1997.

---

[1] The term insurer, used throughout this study note, includes stock insurance companies and mutuals.

II. Definition

Premium liabilities have generally been defined as the cost of running off the unexpired portion of an insurer's policies and reinsurance contracts.

The following definition from the CIA Standards of Practices is in fact broader as it does not restrict premium liabilities to policies inforce, therefore liabilities can arise from policies already expired.

> *"Premium liabilities represent all the anticipated net costs to discharge the insurance company's obligations with respect to its insurance policies and reinsurance contracts except its claim liabilities."* [2]

According to that definition, premium liabilities consist of all assets and liabilities resulting from an insurer's policies (direct, assumed and ceded) other than those resulting from the collection of premiums currently due or payment of claims already incurred.

For most companies, the premium liabilities, which can be found on either side of the balance sheet (asset and liability), are composed of the following items:

- Unearned Premiums
- Premium Deficiency
- Deferred Policy Acquisition Expenses (DPAE)
- Provision for Retro-Rated Policies
- Earned But Not Recorded Premiums (EBNR)
- Audit Premiums
- Premium Development on Reinsurance Assumed
- Ceded Reinsurance Retro-Rated Contracts (Swing Rated Contracts/Sliding Scale)
- Provision for Contingent Commissions
- Unearned Reinsurance Commissions

In practice, they can be grouped into these four large categories:

- Future claims and adjustment expenses on inforce policies
- Administrative costs of servicing the inforce policies (maintenance costs)
- Anticipated premium adjustments
- Anticipated reinsurance expense (or commission) adjustments

---

[2] Canadian Institute of Actuaries, Recommendations for Property-Casualty Insurance Company Financial Reporting.

A simplified view of the balance sheet, highlighting the elements of premium liabilities, is as follows:

Premium Liability Element	Asset	Liability	Surplus
Unearned Premiums	Ceded Unearned Premium	Gross Unearned Premium	
Premium Deficiency		Premium Deficiency	
Deferred Policy Acquisition Expenses (DPAE)	Deferred Policy Acquisition Expenses		
Provision for Retro-Rated Policies	(1)	(1)	
Earned But Not Recorded Premiums (EBNR)		Gross Unearned Premium (negative amount)	
Audit Premiums		Gross Unearned Premium (negative amount)	
Premium Development on Reinsurance Assumed	Reinsurance Receivables		
Ceded Reinsurance Retro-Rated Contracts	(1)	(1)	
Provision for Contingent Commissions		Provision for Contingent Commissions	
Unearned Reinsurance Commissions		Unearned Reinsurance Commissions	
	Cash		Additional Policy Reserve
	Investment		Contributed Surplus
	Receivables	Payables	Earned Surplus

(1) Depending on the adjustment, it can be either an asset or a liability item.

Other elements of the balance sheet are also impacted by the various premium liability elements. For instance, a decrease in the unearned premium may increase the asset or the surplus of the company.

The largest component of premium liabilities is the future claims and adjustment expenses. For companies with large quota-share reinsurance, the unearned reinsurance commissions may also be a significant item on their balance sheet.

The provision for premium liabilities is not shown explicitly on the balance sheet of a Canadian insurer's annual statement (PC-1 or PC-2). Premium liabilities are the net total of the unearned premium, DPAE and other related assets and liabilities on the balance sheet.

Finally, the **equity in the unearned premiums (EQUP)** is defined as the expected profits on the unexpired policies. An illustrative example highlighting its calculation is shown in Section VI.

III. Deferred Policy Acquisition Expenses (DPAE or DPAC)

The policy liabilities of an insurer, which include claim liabilities and premium liabilities, can also be thought of in terms of liabilities for past events and liabilities for future events. **Liabilities for past events** are provided by the unpaid claim provision (outstanding case provision, IBNR and supplemental provision), the accounts payable (expenses) as well as premium or commission adjustments on policies which are expired. **Liabilities for future events** are the expected losses and maintenance expenses on the unexpired portion of the policies inforce at the end of the year. The unearned premium provides for these "future" liabilities. In the event that the unearned premium is less than the liabilities for future events, then a premium deficiency exists.

Premiums should be earned on a basis consistent with the occurrence of losses. For most lines, this translates into earning the premiums on a pro-rata basis. However, for some lines, earning premium evenly throughout the year is not appropriate. For example, motorcycle premiums cannot be earned evenly over the year as the bulk of the exposure is from April to October. Similarly, extended warranty premiums should be earned as losses are paid out, i.e. the risk increases with the elapsed time on the warranty (e.g. a three year warranty will have more exposure to losses in the third year and may not have any exposure in year one as manufacturers may be providing coverage for that year). In those instances, the actuary should ensure that the unearned premiums for these lines reflect their exposure to risk, i.e. the occurrence of losses.

An insurer's income is recognized on a pro-rata basis over the term of a policy, e.g. a twelve-month policy written on July 1st is 50% earned at December 31st. The expenses are also pro-rated over the term of the policy. Claims are accounted for as they occur. Some expenses are incurred over the term of the policy i.e. endorsements, changes to coverage, mid-term cancellations, changes in reinsurance programs. However, **all prepaid expenses** (i.e. all the front-end expenses incurred by an insurer to write business and issue policies) are incurred at the time the policy is issued. These expenses, also referred to as **acquisition expenses**, include commissions, taxes, renewal costs, advertising, licenses and fees, associations and dues, etc.

The **deferred policy acquisition expense (DPAE)** provision is an asset which amortizes the prepaid expenses over the policy period, provided that such costs are recoverable from expected profits. This results in a better match of premium (income) and expenses. The DPAE provision cannot exceed the expected profits on the unexpired policies, i.e. it cannot exceed the equity in the unearned premiums. The deferred expenses are equal to the proportion of prepaid expenses which relates to the unexpired portion of the policy (unearned).

Therefore, if a profit is expected, it is declared on a pro-rata basis in the income statement and the balance sheet. However, if a loss occurs it is declared immediately. This is consistent with conservative accounting principles.

A simple example will illustrate this concept.

Assume a policy that is written July 1st , 1997 for a twelve month term, under the following two scenarios[3]:

	CASE 1	*CASE 2*
Premium	$100	$100
Losses + LAE	$60	$70
Prepaid Expenses	$20	$20
Maintenance Expenses	$10	$20
Profit/(Loss)	$10	($10)

The following chart tracks how the various cash flows associated to this policy are accounted for in the income statement and in the balance sheet. The top part represents the policy's income statement, which shows that half of the premium, half of the losses and half of the maintenance expenses are incurred at year-end, six months after the inception. The bottom part provides a view of the balance sheet item related to that policy after six months.

[3] Further assume that claims and adjustment expenses are incurred evenly over the term of the policy.

CASE 1

	July 1 – Dec 31 1997	Jan 1 – June 30 1998	July 1 – Dec 31 1998
Premium (Revenue)	$50 Earned	$50 Earned	
Loss + LAE	$30 Incurred	$30 Incurred	
Expenses	$5 Maintenance	$5 Maintenance	
	$20 Prepaid	$0 Prepaid	

Issue
July 1, 1997

Expiry
June 30, 1998

	January 1, 1998	January 1, 1999
Premium	$50 Unearned	$0 Unearned
Loss & LAE	$30 Expected Future Losses	
Expenses	$5 Future Maintenance	
	$15 Equity in UP	
	$10 DPAE	$0 DPAE

Since the EQUP or expected profit of $15 ($50–$30–$5) is higher than the portion of prepaid expenses that are deferrable (50% x $20 = $10), the DPAE is equal to $10.

The profit or loss for the insurer is equal to:

	December 31, 1997	*December 31, 1998*
Earned Premium	$50	$50
– Incurred Loss & LAE	$30	$30
– Incurred Expenses (Maintenance and Prepaid)	$25	$5
+ Change in DPAE[4]	$10	($10)
PROFIT/(LOSS)	$5	$5

The $10 profit is recognized pro-rata over the term of the policy. Without the provision for DPAE, there would be a loss of $5 recorded at December 31, 1997 and a profit of $15 recorded at December 31, 1998. The deferral of expenses results in a better match between revenue and expenses.

[4] DPAE at year-end less DPAE at the beginning of the year.

In case 2 the expected profit on this policy is a loss of $10.

The following chart tracks how the various cash flows associated with the policy are accounted for in the income statement and in the balance sheet.

CASE 2

	July 1 – Dec 31 1997	**Jan 1 – June 30 1998**	**July 1 – Dec 31 1998**
Premium	$50 Earned	$50 Earned	
Loss + LAE	$35 Incurred	$35 Incurred	
Expenses	$10 Maintenance	$10 Maintenance	
	$20 Prepaid	$0 Prepaid	

Issue
July 1, 1997

January 1, 1998

Expiry
June 30, 1998

January 1, 1999

Premium	$50 Unearned	$0 Unearned
Loss & LAE	$35 Expected Future Losses	
Expenses	$10 Future Maintenance	
	$5 Equity in UPR	
	$5 DPAE	$0 DPAE

The DPAE is decreased to the expected profit of $5 even though the deferrable expenses amount to $10 (50% x $20). Prepaid expenses can be deferred only to the extent they are recoverable from expected future profits.

The profit/(loss) by year is as follows:

	December 31, 1997	*December 31, 1998*
Earned Premium	$50	$50
– Incurred Losses & LAE	$35	$35
– Incurred Expenses (Maintenance and Prepaid)+	$30	$10
Change in DPAE	$5	($5)
PROFIT/(LOSS)	($10)	$0

A loss is declared in the first year compared to a profit under Case 1. This follows the accounting principle that a premium deficiency should first be recognized by writing off any deferred acquisition costs to the extent required.

Note that if insurance accounting was done on a policy year basis, no DPAE provision would exist. All premiums would be earned when the policy is inforce, thus all expected claims and all future expenses would have to be recognized in the liabilities and all commissions, taxes, and other issuing costs would be expensed immediately.

The DPAE provision is equal to the "unearned" acquisition costs. These can be approximated by:

$$\frac{\text{Paid Acquisition Costs}}{\text{Written Premium}} \times \text{UP}$$

The insurer calculates the DPAE amount usually equal to commissions and taxes. These are prepaid and easy to calculate. Some insurers also include additional prepaid expenses in their DPAE. However, they are more difficult to determine. The insurers may complete detailed reviews of the general expenses by categories and assign a portion of each category that may be deferrable to estimate these other costs. In practice, insurers approximate them.

The actuary's role is to determine if the DPAE as calculated by the insurer is recoverable from expected future profits, i.e. to determine if the equity in the unearned premium is sufficient to cover the calculated DPAE.

There is no regulatory limitation on the DPAE asset. However, DPAE cannot exceed the EQUP.

IV. Other Components

The largest component of the premium liabilities is future claims and adjustment expenses. The importance of the other components varies by insurer, depending on their book of business or their reinsurance programs.

These other components discussed below can be grouped into two major categories: those which relate to commission adjustments, and those which relate to premium adjustments.

Note that although some practitioners may not consider some of these items (e.g. contingent commissions) as premium liabilities, they are liabilities related to the insurer's business. Thus, they should be included in the calculation. Moreover, OSFI requires that the actuary comments on all actuarial liabilities, other than claims and premiums, which include all of the items below.

The **contingent commissions** (profit sharing commissions) that insurers pay their agents or brokers based on the results and volume of business of individual producer (agent/broker). These agreements vary by company and are often established over one-year or three-year periods. If the agreement is over a three-year running period, then some commissions may be incurred as of the statement date, and they should be accrued. Contingent commissions are often not accrued in the balance sheet, but these liabilities can be significant.

Some insurers with large quota share treaties may have significant **unearned commission** on the ceded premiums. These commissions may vary depending on the ultimate loss ratios of the business. The actuary should assess the calculated unearned commission using his/her estimate of the loss ratios. The unearned commissions are booked as a liability and are earned pro-rata over the terms of the policies.

A **provision for Retro-Rated Policies** liability is made when insurers issue policies for which the premium is adjusted yearly based on the actual experience on the policy. The final premium is not known until all losses are reported and settled. The provision to be accrued is equal to the difference (either positive or negative) between the estimated final premium and the paid premium at the date of the statement.

Several other components deal with premium development. In some instances the insurers will be at risk on insurance contracts but the transactions are processed only after the effective date of the policy. This may happen because of reporting or processing delays, or because of the very nature of the insurance product. These **earned but not recorded premiums** (EBNR) are also part of the premium liabilities. This item is usually small and mostly arises from reinsurance assumed business.

Other examples of premium development to be evaluated as part of the premium liabilities are **audit premium** where the final premium is not known until the coverage expires, and **premium development on reinsurance assumed and retro-rated reinsurance ceded.** The sources of development on reinsurance assumed or ceded to be considered include: changes in subject matter premium which is usually unknown until the end of the contract period, swing rated excess of loss treaties which call for a rate adjustment based on the loss experience during the coverage period, and reinstatement premium for catastrophic or

other layer (additional premium to be paid when the limit of coverage provided by the layer has been exhausted).

V. *CIA Recommendations and Regulatory Requirements*

In the previous sections, we have introduced the concept of premium liability and discussed its components. We now turn our attention to regulatory requirements specific to the premium liabilities. This section will focus on items where differences exist between regulators and/or CIA Standards of Practice[5].

A. DPAE Asset

Federally and provincially registered insurers (except provincial insurers in Alberta) may set up a DPAE asset up to the equity in unearned premium. The Alberta regulators require insurers to record 80% of the unearned premiums in their balance sheet. This is equivalent to having an asset for DPAE equal to 20% of UP. The actuary is still responsible for determining that 80% of the UP is sufficient to cover future losses and maintenance expenses on the unexpired policies. If not, then an additional liability should be recorded for the difference.

B. Investment Income

The CIA Standards of Practice require actuaries to recognize the time value of money in evaluating the policy liabilities, except when regulators do not allow discounting. Under the CIA requirements the expected losses should be discounted not only up to the average occurrence date of the losses arising from the unearned premiums, but to the average payment date of all future losses.

The Office of the Superintendent of Financial Institutions (OSFI) does not currently allow discounting of claims liabilities (except for some lines e.g. accident benefits). For premium liabilities, OSFI allows limited recognition of discounting.

Under OSFI guidelines, investment income can be included in determining the equity on the unearned premium only if the unearned premium reserve is sufficient to cover future undiscounted claims and expenses (i.e. if there is no premium deficiency). Current OSFI guidelines allow for investment income to be recognized only from the valuation date to the average earning date of the unearned premium (or average accident date of future claims). For one-year policies, this results in approximately four months of investment income (some Canadian practitioners might not agree with these guidelines).

The Inspecteur General des Institutions Financieres (IGIF) has different rules for Quebec provincially registered companies. IGIF's position on the issue is that actuaries should follow the CIA Recommendations, thus effectively accepting discounting.

This issue will disappear only when discounted policy liabilities in the balance sheet are allowed by all regulators.

---

[5] We refer the reader to the "Consolidated Standards of Practice" and to the "Recommendations for Property-Casualty Insurance Company Financial Reporting" which are listed in the bibliography.

Therefore, for statutory purposes, and except for Quebec provincially registered insurers, the calculation of premium liabilities should recognize investment income on the unearned premium only for the period between the valuation date and the average earning date (or the average occurrence date of losses on the unexpired policies), i.e. three to four months.

C. Other Liabilities Versus Premium Liabilities

The actuarial opinion included in the OSFI instructions for the preparation of actuarial opinion for statutory purposes includes a line for "Other Liabilities". This opinion is shown in Appendix H. The actuarial opinion required from IGIF is also included. At this point IGIF and OSFI have a different viewpoint on the components of premium liabilities versus other liabilities.

The CIA definition, and the one we adopted in this paper is the broad definition. Premium liabilities include all assets and liabilities related to future costs arising from all insurance or reinsurance contracts of an insurer. These contracts can either be inforce or expired.

At this time we understand that OSFI includes only liabilities related to the unexpired portion of the policies inforce. OSFI's position is that the unearned premiums should not be charged with future costs or development on policies/contracts that are already expired. Instead, a separate liability item ("other liabilities") should be set up for those premium liabilities which are not related to the unearned premiums. IGIF, on the other hand, uses the broad definition. Although we agree that future liabilities related to expired policies should not be charged against the inforce policies when calculating the equity in the unearned premiums, these liabilities (assets) should still be part of the total premium liabilities as they relate to the insurance (reinsurance) contracts of the insurer.

D. All Lines Combined Versus By Line Equity

For regulatory purposes the equity in unearned premiums may be calculated on an all lines combined basis. This means that deficiencies in some lines are offset by redundancies in other lines. This approach is appropriate on an ongoing concern basis to the extent that a company's mix of business does not change significantly from year to year. It is appropriate since it is unlikely that a company would stop writing its more profitable lines.

A more rigorous and conservative approach consists of evaluating the equity by line of business, split in a manner consistent with the way the insurer acquires business and measures profitability.

However, the current position of some regulators on the recognition of investment income in calculating the equity in UPR creates a mismatch between expected future costs and premiums, especially for long tail lines. Thus, insurers with large portfolios of long-tail risks would be penalized using a by-line approach. For the long tail line, full recognition of investment income needs to be accepted before using a by-line calculation because investment income is an important pricing consideration for these products.

E. Subsequent Events

The major Quebec ice storm of January 1998, raised the issue of subsequent events and their treatment with regard to premium liabilities in the actuarial opinion.

The CSOP Section 4.6 (second exposure draft May 1997) offers the following guidelines.

> "The actuary should correct any data defect or calculation error which a subsequent event reveals.
>
> For work with respect to an entity, the actuary should take a subsequent event into account in the selection of methods and assumptions for a calculation, other than a pro forma calculation, if the subsequent event:
>
> - Provides information about the entity as it was at the calculation date, or
> - Retroactively makes the entity a different entity at the calculation date, or
> - Makes the entity a different entity after the calculation date and a purpose of the work is to report on the entity as it will be as a result of the event.
>
> The actuary should not so take the subsequent event into account if it makes the entity a different entity after the calculation date and a purpose of the work is to report on the entity as it was at the calculation date, but the actuary should report that event."

According to this, each subsequent event has to be analyzed separately. No general rule can be applied.

The first step is to classify the event according to the three criteria listed above:

- Does it provide information about the entity as it was?
- Does it retroactively make the entity different?
- Does it make the entity different after the calculation date?

The reporting of a claim incurred **on** or **before** the statement date provides information about the insurer as it was. On the other hand, the reporting of a claim incurred **after** the statement date, especially when it cannot be expected, makes an entity different **after**.

In the case of the ice storm, although the actual premium liabilities are likely to be much larger than the premium liability anticipated at 12/31/97 (due to the ice storm) the calculation should not reflect the impact of the ice storm. The actuarial guidance was that the appropriate course of action was to disclose the impact of the ice storm in the notes to financial statements, but make no changes to the premium liabilities calculation.

The considerations leading to this conclusion were that:

- the ice storm did not make the insurance company different retroactively, and

- the purpose of the actuarial report was to report on the insurance company as it was at December 31st

A storm that would be predicted to occur or continue after the statement date, should be considered in the premium liabilities on the basis that it provides information on the insurer as it was at 12/31/97.

An example of a subsequent event which was considered in the evaluation of premium liabilities was the implementation of a new automobile compensation system – Bill 164 in Ontario on January 1, 1994. In this case, the key event was the announcement of Bill 164 effective date, which definitively occurred in 1993 and was well known in advance at the time of calculating the premium liabilities. It was thus taken into account in the December 31, 1993 evaluation.

Obviously, from these examples, each event is different and no general rule can be applied to their treatment. However, one criteria remains, that is the potential size of the claims resulting from the event must exceed the materiality[6] level.

[6] According to the CIA Recommendations, "A difference is material if it is significant to the user of the financial statements. The member should choose a standard of materiality which will reasonably satisfy each normal user of the financial statements".

VI. An Illustrative Example

This section presents an actuarial approach for determining the equity in the unearned premium (EQUP). This calculation, in turn, serves in determining the premium deficiency and the DPAE.

We believe the method and calculations covered in this section are fairly representative of approaches currently in use by actuaries in their actuarial evaluation.

Section A outlines a step-by-step approach to calculate the EQUP for a fictitious multi-line insurer as of December 31, 1997. Considerations and assumptions involved in the calculations (expected loss ratios, future expenses, contingent commissions, etc.) are discussed in detail.

Sections B, C and D deal with discounting, gross premium liabilities calculations, and the treatment of assumed business in the calculation of EQUP.

A. EQUITY IN THE UNEARNED PREMIUM: A STEP-BY-STEP APPROACH

Dubois Fire & Casualty Insurance Company (DF&C) is a federally registered insurance company writing business primarily in Ontario. It is wholly owned by Kosciuzsko Insurance Company (KIC), which is also federally registered. DF&C's book of business is comprised of automobile insurance (split among third party liability (TPL), accident benefits (AB) and physical damage (PD) coverages), personal property (PP) and general liability (GL) exposures. Its book is split 70%/30% between one-year and six-month policies respectively. DF&C also underwrites aviation business but cedes it all to TupolevInsure (TvI), a specialty aviation writer for which DF&C acts as a fronting company.

DF&C is reinsured under two different treaties:

- Proportional reinsurance for all lines with a 75% retention.
- Excess-of-loss treaty for general liability covering losses in excess of $250,000 up to $1,000,000. The applicable reinsurance rate is 1.25% of the subject written premiums.

DF&C and KIC have entered into an intercompany reinsurance arrangement whereby KIC assumes 40% of DF&C's exposures (net of all reinsurance) and cedes 25% of its exposures to DF&C (also net of all reinsurance). To simplify the calculation, we have assumed that internal adjustment expenses and maintenance expenses are also ceded on the same basis.

DF&C has a contingent commission agreement with its independent brokers. Under this agreement, commissions are adjusted on a three-year rolling average basis.

Finally, DF&C participates in the Facility Association and the Risk Sharing Pool. The Facility Association (FA), Risk Sharing Pool (RSP) and Plan de Répartition des Risques (PRR) are residual market pools for automobile insurance in Canada.

Residual markets have been established primarily to ensure insurance availability to high risk insureds which would otherwise be unable to find affordable insurance. Under the RSP and the PRR, insurers transfer risks written at the insurer's own rates to the pool, and receive back from the pool a share of all insurers' cessions based on their market share.

These are risks that the insurer deems unacceptable according to its own criteria. The business ceded to these pools is subject to a maximum percentage of direct written exposures or premiums. Under the FA, the risks are underwritten by the FA servicing carriers at FA rates, and losses and expenses are allocated to insurers licensed to write automobile insurance based on their market share.[7]

a) Overall Calculation

Exhibit I illustrates the calculation of the equity in the net unearned premium. This calculation is in accordance with the CIA standards of practice. Similar calculations (shown in Exhibit IV) are done to obtain the EQUP on a gross basis.

The process starts with the unearned premiums. To the extent possible, they should be adjusted for retro-rated policies, reinsurance assumed and ceded, or for any other future development on unexpired policies. These adjustments should be done on a line-by-line basis.

An expected loss ratio by line of business is estimated based on historical experience and current considerations. This calculation and the related assumptions are covered in the next section.

The unearned premium is then converted to expected losses by multiplying the unearned premium by the overall estimated ultimate loss ratio. External (allocated) adjustment expenses (ALAE), and internal (unallocated) adjustment expenses (IAE), maintenance expenses and contingent commission adjustments, as well as all other cost adjustments (such as reinsurance costs) are added to the total estimated expected losses.

The EQUP is then calculated as the difference between the unearned premiums and the expected claims and expenses (IAE, ALAE, maintenance expenses, contingent commissions, etc.). The investment income is factored in by discounting future claims and expenses. The maximum allowable DPAE asset is equal to the equity in unearned premium.

In cases where the EQUP is negative (i.e. a premium deficiency exists), the DPAE must be reduced by the amount of the deficiency. If the DPAE is reduced to zero and the EQUP remains negative, in other words if the absolute value of the negative EQUP exceeds the deferrable expenses, a premium deficiency must be booked as a liability for the remaining deficiency. A negative EQUP indicates that the unearned premium reserve will not be sufficient to cover future claims and expenses on the unexpired portion of the inforce policies.

Note that under current OSFI requirements, investment income can be included in the equity calculation only if there is no premium deficiency. We have included the statutory calculations in Exhibit I.

---

[7] For further information, see Facility Association Plan of Operations and Procedures Manual of the PRR.

b) Estimated Ultimate Loss Ratio

Exhibit II shows the estimation of the ultimate loss ratios for third party liability (TPL). Calculations for the other lines of business are shown in Appendix A. The starting point is the company's historical experience. Because losses tend to be cyclical and the experience of a single year is too small to be fully reliable, our selection is based on the latest three calendar/ accident years. The historical loss ratios are adjusted to the current and expected conditions for the period over which the unearned premium will be earned. These adjustments are discussed below.

For small, volatile or new lines of business, industry experience can be used to select the loss ratios, with appropriate adjustments to take into account differences between the insurer's operations and industry averages.

On-Level Factors: Premiums are adjusted to their current rate level using on-level factors. These factors are derived from the insurer's rate change history.

In April of 1995, DF&C increased AB rates by 30%. Following the introduction of Bill 59 in 1996, DF&C decreased its rates for both accident benefits (AB) and physical damage (PD) automobile coverages and increased its rates for TPL. The resulting on-level factors exceed 1.00 for TPL and are below 1.00 for AB (except in 1995) and PD coverages.

Catastrophe (CAT) Loading: Historical loss ratios need to be adjusted for catastrophe losses. These losses are rare but large and can significantly distort loss ratios. The losses are smoothed by removing the actual CAT losses from the historical data and adding an appropriate loading. The CAT loading is derived from the experience over a long time period to account for the infrequent nature of these losses. This loading, which varies by line of business, increases the historical loss ratio for **each** year.

As shown in Exhibit II, DF&C experienced CAT losses of $435,000 during 1996. We removed this amount from the incurred losses before developing them to ultimate. For TPL, a judgmental loading of 0.3% was selected and was then added back to the ultimate losses. The CAT losses were not developed to ultimate. We assumed that, because of their unusual nature, case reserves are adequate.

Historical loss ratios should also be adjusted for the impact of large, non-catastrophic losses. A procedure similar to the one described above may be used whereby a judgmental threshold is set. Individual losses in excess of that threshold are considered large losses and the amount in excess is removed from historical losses before computing the loss ratios. Ideally, the selected threshold should reflect the time value of money and be detrended for older years. For example, assuming a $200,000 threshold for general liability for 1997 and a 10% loss trend, the thresholds for 1996 and 1995 should then be $181,818 and $165,289, respectively.

Loss Development Factor (LDF): These factors are used to develop reported losses to the ultimate. It is appropriate and often practical to select the reporting pattern implied by the IBNR projections, as long as it is reflective of future claims reporting development.

Trend Factors:

Trend Selections: Trend factors which reflect inflation in the cost of claims need to be taken into account when projecting ultimate loss ratios. Although business plans may be used to estimate trends, industry data or the company's historical data is probably a better starting point since it is unbiased and cannot be distorted by overly pessimistic or optimistic assumptions used by management. Alternatively, trend factors used for ratemaking purposes can also be used.

Trending Period: The smoothed ultimate loss ratios are trended to the average accident date of losses arising from the unearned premiums. For one-year policies, the average accident date (AAD) is six months after the policy inception date. The same logic can be applied to determine the accident date of losses which will arise from the unearned premium. Calculations, shown in Appendix F, result in average accident dates of May 1, 1998 and March 1, 1998 for one-year and six-month policies respectively, assuming premiums are written evenly throughout the year.

Trends are assumed to impact losses uniformly over the year. Losses are trended from the experience period's AAD (July 1) to the AAD of losses arising from the unearned premium (May 1). The last leg of the trending period may not cover a full year but about ten months. As such, even if some lines could exhibit seasonal trends, it is unlikely that selected trends would be materially different if seasonality was considered.

Loss trends under Bill 59 are expected to differ from those under Bill 164. As a result, DF&C makes use of two trends for each coverage. Selected TPL trends for Bill 164 and Bill 59 are 5.0% and 0.0% respectively. The accident-year 1995 trend factor of 1.068 was calculated by first bringing losses from their average accident date (July 1, 1995) to the effective date of Bill 59 (November 1, 1996) using the 5.0% trend. From there, losses were trended for an additional 17 months at 0.0%, to the average accident date of the unearned premium (May 1, for one-year policies).

Historical premiums should also be trended to the average writing date (AWD) of the unearned premium, which is September 1, 1997 for one-year policies (November 1, 1997 for 6-month policies).[8] The premium trends account for rate group drifts (physical damage), change in insured value (personal property) and policy limit drifts (third party liability). We assume the impact of these factors is not material.

Benefit Changes: Bill 59 (Automobile Insurance Rate Stability Act), which became effective November 1, 1996, introduced significant changes in benefits for Ontario automobile drivers. Assuming that premiums were adjusted to reflect the full impact of Bill 59 on loss costs, the historical loss ratios do not need to be adjusted. However, in those instances where premium changes do not keep up with loss cost changes, historical loss ratios should be adjusted accordingly.

[8] Appendix F shows how these dates were derived.

Other Adjustments:

Seasonality: Most of the unearned premium is earned over the January to June period, with a large portion of it being earned during the winter months. Seasonal variations in loss ratios impact our selections as claims level varies by quarter. For example, there are usually more automobile collision claims during the winter months than during the summer months.

Appendix B shows the distribution of expected loss ratios by month. Using the 24th method, the average loss ratio applicable to the unearned premium is 79.6%. The average loss ratio, assuming no seasonality or exposure growth, is 80.4% (simple average of the monthly ratios). This implies that a seasonality adjustment factor of 0.990 (79.6%/80.4%) is applied to the selected loss ratios to account for the difference in the loss ratio levels by month. This reflects the fact that, on average, unearned premiums will generate lower loss ratios than if they were earned evenly throughout the year.

Policy Term: Another factor relates to the composition of the insurer's portfolio. The bulk of policies are still 12-month terms. However, there are companies which primarily offer three and six-month policies. For example, niche companies targeting higher risk insureds typically offer three and six-month policies. This mix should be taken into account as it impacts trending periods, on-level factors, and seasonality adjustments amongst others.

Changes in Reinsurance Program: For those reinsurance contracts made on an accident-year basis, consideration should also be given to changes in the insurer's reinsurance program. Most reinsurance contracts are effective at the beginning of the calendar year. Losses occurring during 1998, arising from a policy underwritten during 1997 (hence attributable to the unearned premiums), will be subjected to the 1998 reinsurance program. Adjustment should be made to the historical loss ratios to reflect the prevailing reinsurance program conditions.

For example, DF&C might decide to double its excess-of-loss (XOL) retention from $250,000 to $500,000, effective January 1, 1998. Assume a $350,000 loss occurs January 15 on a policy which was underwritten during 1997. Under the previous treaty, DF&C's liability was limited to $250,000; under the 1998 terms, DF&C is liable for the full amount. Therefore, the increased retention may or may not increase the loss ratio on the unearned premium depending on the terms of the contract. The selected loss ratio should be adjusted accordingly.

In this example, the loss ratios on the unearned premium should be increased by the ratio of expected losses under the new XOL treaty to the expected losses under the current XOL treaty.

Premium Development: As noted earlier, unearned premiums used in the EQUP calculations should be fully developed before being multiplied by the ultimate expected loss ratios. Examples of premium development are audit premiums, where the final premium is unknown until the expiration of the coverage. Premium development may also exist on reinsurance assumed business due to a time lag between the recording of the premiums by the primary insurer, and the reporting to the assuming party. Swing rated excess-of-loss treaties, which provide for a rate adjustment based on the loss experience, are another example.

Other: There are other factors which could require adjustments to historical loss ratios. This paper has focused on the factors which actuaries are most likely to encounter. No list, however extensive, can be expected to cover all situations. Actuarial judgment and skills should be used to determine the required adjustment if it is felt the impact is material.

c) Internal Adjustment Expenses

Internal adjustment expenses (IAE) will be incurred on future claims. As such, they need to be taken into account when calculating future losses and expenses arising from the unearned premiums.

Future losses should be increased by the ratio of IAE to losses. Ratios of IAE to losses are usually stable. As a result, the IAE loading used in connection with claim liabilities calculations is a good proxy for the IAE loading on the unearned premium. As can be seen from Exhibit I, the 3.5% loading applied to the expected losses, yields IAE of $271,000.[9]

External adjustment expenses (ALAE) are generally included with losses and, as such, are accounted for through the selected loss ratios. If this is not the case, they should be included in the same way as IAE.

d) Maintenance Expenses

These expenses are necessary to maintain and service policies inforce. They must be estimated and accrued as part of the unearned premium. The servicing costs include expenses associated with endorsement, mid-term cancellations, and changes in reinsurance contracts.

These expenses should be expressed as a ratio to premium:

$$\frac{\text{Maintenance Expenses on Inforce Policies}}{\text{Net Unearned Premiums}}$$

Practically, this ratio is rarely used given that an accurate estimate of maintenance expenses requires detailed expense studies which can be costly to produce. Instead, one can rely on the P&C-1 Expenses Exhibit[10], which is shown in Appendix G, and identify for each expense category the portion which belongs to policy maintenance. These expenses are divided by the earned premiums to obtain the maintenance expense ratio to be applied to the unearned premiums. As a result, the ratio shown above can be approximated by calculating for a given period:

$$\frac{33\% \times \text{General Expenses}}{\text{Net Earned Premiums}}$$

This is based on the assumption that two-third of the general expenses are front-end expenses and the remaining expenses relate to the maintenance and servicing of policies. The considerations which should be taken into account when selecting this ratio include the insurer's distribution method (companies dealing with brokers may have less maintenance

---

[9] As will be seen later, the intercompany reinsurance agreement between DF&C and its parent KIC provides for IAE cession. As such, the $271,000 IAE provision on Exhibit I includes $83,000 IAE assumed from KIC (based on the IAE ratio used by KIC's actuary).

[10] P&C-1, Page 80.20.

expenses than direct writers) and the degree of automation of the servicing insurer's operations.

The resulting maintenance provision is $286,000, which is equal to the selected maintenance expense ratio of 2.5% multiplied by the $11.45M net unearned premium provision[11].

e) Contingent Commission

These commissions arise from agreements between insurers and their brokers or agents whereby the insurer might pay additional commissions based on the level and profitability of the business produced. Typically, these results are measured in terms of loss ratios and contracts are on a three-year rolling average basis.

Contingent commissions, available from the Annual Return[12], are expressed as a percentage of the premiums earned during the year. The resulting ratio is then applied to the unearned premiums. For DF&C, the 0.2% ratio yields a $14,000 provision.

f) Net Reinsurance Costs

This item represents costs associated with reinsurance such as the commissions paid to the reinsurance brokers. It is reduced by the reinsurance commissions received from the reinsurers. It could even be negative (and thus increase the EQUP) for those insurers receiving large reinsurance commissions from their reinsurers. A loading approach is used whereby net reinsurance costs incurred during the year are divided by the premiums earned during the year. The resulting ratio is applied to the unearned premium reserve.

If the risk transfer is at the expected loss level, no additional expense is included in the reinsurance premium. Therefore, the EQUP calculations do not show any reinsurance cost item. If not, there might be a provision for the premium adjustment as a result of the experience level.

Finally, costs associated with the purchase of excess-of-loss protection should also be included. In DF&C's example, the premium is equal to 1.25% of the subject written premiums. This translates into a $4,000 provision which reduces the EQUP.

g) Adjustment for Retro-Rated Policies

These policies allow for premium adjustment based on actual loss experience. The difference between the ultimate premium and the paid premium at the valuation date will dictate the magnitude of the premium adjustment. DF&C, like most P&C insurers doing business in Canada, does not have retro-rated policies.

---

[11] As mentioned before, the intercompany reinsurance agreement between DF&C and KIC provides for the cession of maintenance expenses.

[12] From Page 80.10 row 83.

B. DISCOUNTING

The CIA recommends that the premium liabilities provision be established on a present value basis using expected payment patterns. The "Recommendations for Property-Casualty Insurance Company Financial Reporting" provides guidance related to the selection of a discount rate and provisions for adverse deviations (PFAD). The CIA recognizes, however, that its position is different from some regulators and that its recommendations do not apply in instances where the regulators preclude present value liabilities.[13]

As noted earlier, the statutory premium deficiency must be calculated using undiscounted claims and expenses.

The approach shown here is consistent with the CIA Recommendations.

Exhibit III shows the calculations required to obtain discount factors applicable to the future expected claims and expenses.

First, an expected payment pattern is selected for each line of business. It is appropriate, and often practical, to select the payment pattern implied by the IBNR projections, as long as it is reflective of future claims payment.

If future settlements are expected to behave differently than historical paid claims development, the selected patterns should reflect future paid claims development. This could arise from a change in legislation which affects both claims already reported and future claims. That was the case with the implementation of Bill 59 (discussed later). Another good example can be found in medical malpractice, where the time allowed to file a lawsuit after the discovery of an injury is prescribed by the statute of limitations. Extending the statute over a longer period also points to different payout patterns than those used in IBNR projections as, under the revised statute, one would expect claims to be paid over a longer time period.

The payouts are then discounted to reflect the time value of money. The CIA, without specifically defining an appropriate discount rate, provides guidance in selecting an investment rate of return. Among other things, the selected rate of return should depend on the projected rate of return on the insurer's assets, market rates, the method of reporting investment return and valuing assets, the expected investment expenses and the expected losses arising from asset default.[14] Based on these considerations, a discount rate of 7.0% for the first five years, and 5% for future years was selected for DF&C.

---

[13] "Pending better definition by the profession of an appropriate provision for adverse deviations, regulation in some jurisdictions requires the liabilities in government financial statements to be the sum, rather than the present value, of those payments. Where there is such a requirement, the recommendation in this section to establish a present value provision does not apply to the valuation of liabilities in government financial statement and (...) it likewise does not apply to the valuation of liabilities in published financial statements."

[14] The Recommendations for Property-Casualty Insurance Company Financial Reporting provides an extensive list of considerations in Section 5.04.

When claim liabilities are discounted, the inherent uncertainty again increases. In addition to the risk of underestimating or overestimating the overall amount of the claim liabilities, there are the additional risks that the timing of the future payment of those liabilities or the expected return on investments will differ materially from the assumptions underlying the calculation. Actual claim and external adjustment expense payments could occur more or less rapidly than projected due to random variations and the timing of large claim payments. Also, the yield on assets supporting the liabilities may be affected by capital gains or losses, or significant changes in economic conditions.

The CIA standards require that a provision for adverse deviations (PFAD) be included to account explicitly for the uncertainty in the three following variables:

- Claims Development
- Reinsurance Recovery
- Interest Rate

Exhibit III illustrates how each PFAD is included in the calculation. The claims development margin, judgmentally selected between 2.5% and 15%, increases the discounted loss ratio[15]. The reinsurance recovery margin, which varies between 0% and 15%, makes provision for the possibility that the insurer will not be able to recover reinsurance receivables. Hence, it is applied to the expected ceded claims (as a percentage of the net unearned premium) and the resulting margin is added on to the discounted loss ratio (already loaded with the claims development). Finally, the interest rate margin (varying between 50 and 200 basis points) is treated as an additive factor which decreases the selected discount rate. The following table lists the selected margins by LOB:

Line of Business	*Net Claims Development Margin*	*Reinsurance Recovery Margin*	*Interest Rate Margin*
Auto- TPL	12.5%	5.0%	50 basis points
Auto- AB	10.0%	5.0%	50 basis points
Auto- PD	5.0%	5.0%	50 basis points
Personal Property	5.0%	5.0%	50 basis points
General Liability	12.5%	5.0%	50 basis points

The selected loss ratios are discounted to the average accident date (AAD) of the unearned premium by multiplying the discounted payment pattern (Column (7) in Exhibit III) by the undiscounted loss ratios loaded for claims development and reinsurance recovery margins, as described above.

A further step is needed to discount the loss ratio from the AAD to the evaluation date. The average accident date is four months after the evaluation date. These four months, in fact, recognize the investment income generated on the unearned premium when the unearned premium is fully invested. However, because part of the unearned premiums is held by brokers for up to sixty days after the policy inception, the investment income on premium receivables is credited to the brokers, not to the insurer. The larger the premium receivables as a proportion of the unearned reserve provision, the larger the offset to the four month additional discount.

[15] These selections are based on considerations mentioned in the CIA Memorandum on Provision for Adverse Deviations (P&C) released January 1, 1994.

The methodology described in this section produces discounted loss ratios, which find their way back in Exhibit I, where they are applied to the unearned premiums to yield discounted losses. For TPL, the selected undiscounted loss ratio of 72.5%, once discounted and loaded with PFAD, is 70.4%. As only 50% of the unearned premium is held by the DF&C, an extra two months (instead of four) of investment income is credited to DF&C, resulting in a 69.6% discounted loss ratio. This loss ratio is then used in Exhibit I to calculate the expected discounted losses arising from the unearned premium. As seen previously, regulators allow investment income in the EQUP calculation as long as the unearned premium reserve is sufficient to cover future **undiscounted** claims and expenses, i.e. that there is no premium deficiency.

Expenses are also discounted, under similar circumstances. Maintenance expenses are incurred until the policy expires. Given that the average earning date of the unearned premium is May 1, 1999, the maintenance expenses provision is discounted four months.

Internal adjustment expenses are discounted using a factor equal to the ratio of the total discounted losses to the total undiscounted losses (excluding any pools such as the Facility Association where the IAE are paid by the pool).

The discount factor applicable to the contingent commissions depends on the length of the period over which the underwriting results (which influence the commissions) are measured. DF&C's agreement with its broker provides for commissions to be determined on three-year rolling average basis. The average accident date of that period is assumed to be the period's midpoint[16]. The discount rate, the interest rate margin and the reinsurance recovery margin are the same as those used to discount losses. This is not true of the claims development margin however. Although the contingent commissions ultimately depend on the claims development, they are subject to less volatility than the underlying losses. This stems from the fact that the agreement provides for a minimum and a maximum commission. Hence, even though GL losses can be quite volatile, the impact of their variability on the contingent commissions level is dampened by these limits. As a result, the claims development margin included in the contingent commissions discount factor is lower than those used in the claims discount. In DF&C's case, the claims development margin was judgmentally set at 5.0%, keeping in mind that the impact of the contingent commissions on the resulting EQUP is not significant.

The maximum allowable DPAE, after discounting, and subject to the limitation of 30% of the total unearned premium, is then calculated as the difference between the unearned premium reserve and the sum of the discounted losses and expenses.

---

[16] This assumption does not differ significantly from the theoretically correct answer of 1.48 year (1.065 ^ 1.48 = 1.065 ^ -.5+1.065 ^ -1.5+ 1.065 ^ -2.5 / 3).

C. GROSS CALCULATIONS

The appointed actuary must also provide an opinion on the gross unearned premium provision, the gross DPAE and deferred reinsurance commission, and the gross statutory premium deficiency. The same calculations described in sections A and B must be performed on a gross basis.

The considerations and assumptions used to perform the EQUP calculations on a gross basis are similar in most respects to those used for the net calculations described in the previous two sections. This section intends to focus on the differences, and on the issues related to gross calculations.

a) Overall Calculations

Exhibit IV illustrates the calculations needed to derive the equity in the gross unearned premiums. It is similar in many respects to Exhibit I, although there are a number of differences worth noting.

Additional Lines of Business: Insurance companies can act as fronting companies (they write the business and cede it to the other party). Companies with low acquisition expenses could follow that strategy when they expect the ceding commissions to outweigh the costs incurred to underwrite the business. Whatever the rationale, the fronting company, even though it has ceded the business to a third party, remains liable to the insureds should the third party go bankrupt or default on its obligations to indemnify the cedant under the agreement. As such, the gross claims provision needs to account for this liability and, therefore, the calculations underlying the equity in the gross unearned premium should include the additional exposures.

An extra line of business appears on Exhibit IV to account for the fact that, DF&C acts as a fronting company for TupolevInsure (TvI). The undiscounted expected loss ratios should be derived in a manner consistent with the approach described above, using, if possible, the historical loss experience.

Theoretically, the rate used to discount aviation expected claims should be derived by considering the projected return on TvI's assets and other factors described earlier. However, this is rarely practical and the returns generated on DF&C's assets will be used instead. This is generally a reasonable proxy. The same can be said of the interest rate margin, which should be selected based on TvI's portfolio, but is instead chosen by giving consideration to DF&C's portfolio. The claims development margin should reflect the LOB's uncertainty; the reinsurance recovery margin does not apply.

Maintenance Expenses: Even though the insurer cedes part or all of a policy, it is still responsible for servicing and maintaining the inforce policy. This also holds true for aviation policies underwritten through the fronting agreement. Hence, in order to yield the same expense provision, the maintenance expense ratio will be a lower proportion of the gross unearned premium than it is of the net unearned premium.

Internal Adjustment Expenses: Typically, internal adjustment expenses are not subject to reinsurance and cost the same to the insurer on both gross and net bases. The IAE loading will be a higher proportion of the net unearned premium than it is of the gross unearned premium in order to yield the same IAE provision.

For those less frequent treaties which allow insurers to cede part of their internal adjustment expenses, the IAE ratio will be lower than in the circumstances above, and will depend on how many IAE are ceded. Both gross and net loadings could be equal in cases where these expenses are ceded on a quota-share basis.

Discounting: The selected paid loss development factors are not usually the same for gross and net bases. DF&C has a $250,000 excess-of-loss treaty protecting its GL exposures. The gross payment pattern could be longer than the net pattern due to the fact that DF&C stops paying claims once they exceed $250,000. Also, there is no need for the reinsurance recovery PFAD when discounting gross policy liabilities.

b) The Discounting Paradigm

The previous subsection highlighted the major differences between gross and net calculations. This subsection will briefly discuss a conceptual problem which arises from the discounting of gross policy liabilities.

As seen before, the discount rate used on a net basis reflects the insurer's projected rate of return, its method of reporting investment return and valuing assets, etc. When selecting a discount rate for the gross calculations, the actuary effectively selects a discount rate for the ceded business, which is added to the net business to produce gross figures. Hence, the actuary is implicitly required to make assumptions about the reinsurer's investment portfolio, returns and valuation methods. Although this is conceptually problematic, it will often be reasonable to use the same discount rate on both gross and net bases even though the actuary has little or no knowledge of the reinsurer's investment returns.

In a similar fashion, although the interest rate margin should be based on the reinsurer's portfolio, it will often be reasonable to assume the same margin as the one used for net calculations. On the other hand, the claims development margin could differ between net and gross bases. Under the $250,000 GL excess-of-loss treaty mentioned previously, ceded losses are expected to be more volatile than net losses. In this case, claims development margins used in discounting gross policy liabilities should be at least as high as those used to discount net policy liabilities. If the reinsurance was proportional, the claims development margins would be equal under both gross and net bases.

The GL exposures are protected under a $250,000 XOL treaty. The gross claims development margin has been set at 15.0%, which is higher than the 12.5% margin used on a net basis. On the other hand, the proportional treaty under which DF&C cedes 25% of its premium (for all LOB) does not warrant selecting different claims development margin for the gross discounting calculations.

D. ASSUMED BUSINESS

This section will focus on issues and considerations which arise from situations where the insurer participates in pools and associations, or assumes business from other companies. More specifically:

- Facility Association and other residual markets
- Intercompany reinsurance arrangements

Under each of these situations, the insurer assumes business from a third party. Although different in nature, a number of analogies can be established between considerations related to ceded business, and those which the actuary needs to take into account when factoring in the impact of assumed business on EQUP calculations.

a) Facility Association and Other Residual Markets

Premiums and claims written by the FA and other residual market pools are then shared amongst insurers, also based on each insurer's total market share. Administrative expenses are reimbursed to the carriers, subject to certain limits. Part of the claims expenses can also be refunded.[17]

These pools typically provide the participating insurers with a report which indicates the unpaid claims provision and the unearned premium reserve. The selected loss ratio and the discount factor used by the pool's actuary, in connection with his year-end valuation of the pool's liabilities, to calculate the EQUP are provided to the participating insurers. In addition, the pool's actuary provides those insurers with his/her estimates of the pool's premium deficiency. In his/her policy liabilities report, the insurer's actuary should disclose that he/she has relied on the assumptions made by the pool's actuary.

The 92.6% loss ratio shown in Exhibit I is already discounted and was provided by the pool's actuary. An actuary could also perform a separate calculation instead of using the figure provided by the pool.

---

[17] For example, the PRR states that "insurers are also entitled to a full reimbursement of outside settlement expenses they have paid on transferred risks, except those expenses relating to claim adjusters; Insurers are however entitled to the reimbursement of fees paid to claim adjusters retained to make the original appraisal of a claim involving bodily injury covered under an Automobile Third Party Liability policy, or to make a supplemental appraisal in exceptional circumstances where an inadmissible or fraudulent claim is suspected, or to uphold the original appraisal of the claim against a formal contestation". Under the RSP, the allowance is calculated on the basis of the insurer's last approved private passenger automobile rate filing, subject to a maximum.

b) Intercompany Reinsurance Arrangements

These arrangements are similar to ceding reinsurance, but to an affiliate or a parent company. They can take many forms. Our example will focus on DF&C's arrangement which is analogous to proportional reinsurance. Considerations raised by including these arrangements in EQUP calculations are best understood by going through DF&C's example.

Under the agreement, DF&C assumes 25% of KIC's exposures (net of any other reinsurance). This increases DF&C's gross unearned premium reserve by $4,250,000. The selected undiscounted loss ratio of 72.5% and the .931 discount are identical to those used by KIC's actuary in his own EQUP calculations. The KIC actuary may use (but he is not required to) our assumptions when including the exposures KIC is assuming from DF&C. The agreement will also specify if other items such as IAE and maintenance expenses are subject to cession by the parties. Computations of these items should follow the same process.

Bibliography

Canadian Institute of Actuaries, "Consolidated Standards of Practice"

Canadian Institute of Actuaries, Consolidated Standards of Practice, 2nd Exposure Draft, May 1997.

Canadian Institute of Actuaries, "Memorandum on Provision for Adverse Deviations (Property & Casualty)", January 1, 1994.

Canadian Institute of Actuaries, "Recommendations for Property-Casualty Insurance Company Financial Reporting", January 1990.

Claudette Cantin, "Policy Liabilities - An Actuarial Perspective", CIAA Information Circular 1989-7.

Facility Association, "Plan of Operation", March 1995.

Groupement des Assureurs Automobile, Plan de Répartition des Risques, "Procedures Manual", December 31, 1996.

Insurance Accounting and Systems Association, "Property-Casualty Insurance Accounting (Sixth Edition)", 1994, Chapter 5.

Price Waterhouse Coopers, "A Guide to Corporate Income Tax: Study Note", September 1, 1998.

Tillinghast - Towers Perrin, "Estimates of Discounted Loss Costs and Required Direct Premiums for Ontario Private Passenger under the Government Proposed Product Dated February 1996 and Changes Dated May 1996", Ministry of Finance, May 31, 1996.

Equity in Net Unearned Premium Reserve
As of December 31, 1997
($000's)

A. Claims and External Adjustment Expense Data

Line of Business	Net Unearned Premium (a)	Estimated Ultimate Loss Ratio (b) 1995	1996	1997	Selected Undiscounted Loss Ratio (b)	Discount Factor	Discounted Loss Ratio (c)
Auto - Third Party Liability	1,500	0.656	0.681	0.740	0.725	0.960	0.696
Auto - Accident Benefits	2,100	0.958	0.944	0.870	0.900	0.858	0.772
Auto - Physical Damage	2,700	0.620	0.636	0.650	0.650	1.039	0.676
Auto - Total	6,300	0.741	0.749	0.745	0.751	0.949	0.713
Personal Property	600	0.667	0.641	0.594	0.600	1.060	0.636
Liability	300	0.886	0.860	0.978	0.950	0.985	0.936
(1) Total - Voluntary Business	7,200	0.741	0.745	0.742	0.747	0.958	0.716
(1a) Facility	350				0.926	1.000	0.926
(1b) Assumed from KIC	4,250				0.725	0.931	0.675

B. Actual Data Other Than Claims

	1995	1996	1997	Selected
(2) Earned Premiums - Voluntary Business (a)	19,487	22,543	24,546	
(3) Maintenance Exp. [1/3 of Gen. Exp.] (a)	521	540	580	
(4) Maintenance Expense Ratio [(3) / (2)]	2.7%	2.4%	2.4%	2.5%
(5) Selected Internal Adjustment Expense Ratio (d)				3.5%
(6) Contingent Commission Ratio (e)				0.2%

C. Equity in Unearned Premium Reserve

	Undiscounted	Discounted
(7) Unearned Premiums - Voluntary Business [(1)]	7,200	7,200
(7a) Unearned Premiums - Facility Association [(1a)]	350	350
(7b) Unearned Premiums - Assumed from KIC [(1b)]	4,250	4,250
(8) Expected Claims & ALAE - Voluntary Business [(7) x (1) disc.]	5,378	5,152
(8a) Expected Claims & ALAE - Facility Assocation [(7a) x (1a)]	324	324
(8b) Expected Claims & ALAE - Assumed from KIC [(7b) x (1b)]	3,081	2,869
(9) Maintenance Expenses (f)	286	280
(10) Internal Adjustment Expenses [(5) x (8)] + [2.7% x (8b)] (g)	271	258
(11) Contingent Commissions [(6) x (7)]	14	14
(12) Cost of Excess-of-Loss (h)	4	4
(13) Equity in Unearned Premium Reserve (i)	2,441	2,900
(14) Actual Deferred Policy Acquisition Expenses (a)	1,510	1,510
(15) Statutory Premium Deficiency (j)	0	N/A

Notes:

(a) From DF&C.
(b) From Appendix A, Rows (16) and (17).
(c) From Appendix C, Row (17).
(d) From DF&C Policy Liabilities Report as of December 31, 1997.
(e) From P&C-1, Page 80.10, Row 83.
(f) (4) x [(7) + (7b)] x [Discounted: Appendix C, Sheet 1, Row (16)].
(g) KIC's actuary uses a 2.7% IAE ratio.
(h) Based on 1.25% of Subject Written Premiums.
(i) [(7) + (7a) + (7b) - (8) - (8a) - (8b) - (9) - (10) - (11) - (12)].
(j) Max [(14) - (13), 0].

Selection of Net Loss Ratios
Auto - Third Party Liability
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	3,413	3,823	4,013
(2) On-Level Factors (b)	1.321	1.342	1.078
(3) Drift Factors (c)	1.004	1.002	1.000
(4) Ultimate Premium [(1) x (2) x (3)]	4,529	5,140	4,328
(5) Incurred Losses (a)	2,482	3,300	2,454
(6) Incurred CAT Losses (a)	-	435	-
(7) Incurred Normal Losses [(5) - (6)]	2,482	2,865	2,454
(8) Loss Development Factor (d)	1.130	1.210	1.315
(9) Trend Factor (e)	1.068	1.017	1.000
(10) Other Adjustment Factors (f)	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	2,994	3,524	3,227
(12) Projected Loss Ratio [(11) / (4)]	66.1%	68.6%	74.6%
(13) CAT Loading (g)	0.3%	0.3%	0.3%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	66.3%	68.8%	74.8%
(15) Seasonality Adjustment (h)	0.990	0.990	0.990
(16) Adjusted Loss Ratio [(14) x (15)]	65.6%	68.1%	74.0%
(17) Selected Loss Ratio (g)			72.5%

Notes:
(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) Limit Drift from Appendix E, Sheet 2, Column (5).
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1.
(f) Estimated Impact of Bill 59.
(g) Judgmentally Selected.
(h) From Appendix B, Sheet 1, Row (7).

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Third Party Liability						
12	2.275	4.349	22.99%	22.99%	0.983	22.61%
24	1.180	1.912	52.31%	29.32%	0.935	27.40%
36	1.035	1.620	61.72%	9.42%	0.873	8.22%
48	1.027	1.565	63.88%	2.16%	0.816	1.76%
60	1.035	1.524	65.61%	1.72%	0.763	1.32%
72	1.035	1.473	67.90%	2.30%	0.717	1.65%
84	1.045	1.423	70.28%	2.38%	0.683	1.62%
96	1.050	1.362	73.44%	3.16%	0.651	2.06%
108	1.050	1.297	77.12%	3.67%	0.620	2.28%
120	1.042	1.235	80.97%	3.86%	0.590	2.28%
132	---	1.000	100.00%	19.03%	0.562	10.70%
Total				100.00%		81.89%

(8) Selected Undiscounted Loss Ratio (c)	72.5%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	88.6%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	4.4%
(12) Selected Claim Development Margin Factor (e)	12.5%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	70.4%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	69.6%

Notes:

(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Equity in Gross Unearned Premium Reserve
As of December 31, 1997
($000's)

A. Claims and External Adjustment Expense Data

Line of Business	Gross Unearned Premium (a)	Estimated Ultimate Loss Ratio (b) 1995	1996	1997	Selected Undiscounted Loss Ratio (b)	Discount Factor	Discounted Loss Ratio (c)
Auto - Third Party Liabilit	3,333	0.656	0.681	0.740	0.725	0.911	0.660
Auto - Accident Benefits	4,667	0.958	0.944	0.870	0.900	0.812	0.731
Auto - Physical Damage	6,000	0.620	0.636	0.650	0.650	0.982	0.638
Auto - Total	14,000	0.741	0.749	0.745	0.751	0.898	0.675
Personal Property	1,333	0.667	0.641	0.594	0.600	1.002	0.601
Liability	667	0.886	0.860	0.978	0.950	0.955	0.907
Aviation (g)	1,650	0.810	0.592	0.643	0.700	0.981	0.687
(1) Total - Voluntary Business	17,650	0.748	0.731	0.733	0.742	0.914	0.679
(1a) Facility	350				0.926	1.000	0.926
(1b) Assumed from KIC	4,250				0.725	0.931	0.675

B. Equity in Unearned Premium Reserve

	Undiscounted	Discounted
(2) Unearned Premiums - Voluntary Business [(1)]	17,650	17,650
(2a) Unearned Premiums - Facility Association [(1a)]	350	350
(2b) Unearned Premiums - Assumed from KIC [(1b)]	4,250	4,250
(3) Expected Claims & ALAE - Voluntary Business [(2) x (1) disc.]	13,105	11,984
(3a) Expected Claims & ALAE - Facility Assocation [(2a) x (1a)]	324	324
(3b) Expected Claims & ALAE - Assumed from KIC [(2b) x (1b)]	3,081	2,869
(4) Maintenance Expenses (d)	286	280
(5) Internal Adjustment Expenses (d)	271	258
(6) Contingent Commissions (d)	14	14
(7) Equity in Unearned Premium Reserve (e)	5,168	6,522
(8) Actual Deferred Policy Acquisition Expenses (a)	3,267	3,267
(9) Statutory Premium Deficiency (f)	0	N/A

Notes:
(a) From DF&C.
(b) From Appendix A, Rows (16) and (17).
(c) From Appendix D, Row (14).
(d) From Exhibit I, Rows (9) through (11).
(e) [(2) + (2a) + (2b) - (3) - (3a) - (3b) - (4) - (5) - (6)].
(f) Max [(8) - (7), 0].
(g) Underwritten through DF&C's fronting agreement with TvI.

Selection of Net Loss Ratios
Auto - Third Party Liability
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	3,413	3,823	4,013
(2) On-Level Factors (b)	1.321	1.342	1.078
(3) Drift Factors (c)	1.004	1.002	1.000
(4) Ultimate Premium [(1) x (2) x (3)]	4,529	5,140	4,328
(5) Incurred Losses (a)	2,482	3,300	2,454
(6) Incurred CAT Losses (a)	-	435	-
(7) Incurred Normal Losses [(5) - (6)]	2,482	2,865	2,454
(8) Loss Development Factor (d)	1.130	1.210	1.315
(9) Trend Factor (e)	1.068	1.017	1.000
(10) Other Adjustment Factors (f)	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	2,994	3,524	3,227
(12) Projected Loss Ratio [(11) / (4)]	66.1%	68.6%	74.6%
(13) CAT Loading (g)	0.3%	0.3%	0.3%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	66.3%	68.8%	74.8%
(15) Seasonality Adjustment (h)	0.990	0.990	0.990
(16) Adjusted Loss Ratio [(14) x (15)]	65.6%	68.1%	74.0%
(17) Selected Loss Ratio (g)			72.5%

Notes:

(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) Limit Drift from Exhibit E, Sheet 2, Column (5).
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1, Column (7).
(f) Estimated Impact of Bill 59.
(g) Judgmentally Selected.
(h) From Appendix B, Sheet 1, Row (7).

Selection of Net Loss Ratios
Auto - Accident Benefits
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	4,631	6,245	7,499
(2) On-Level Factors (b)	1.026	0.857	0.954
(3) Drift Factors (c)	1.000	1.000	1.000
(4) Ultimate Premium [(1) x (2) x (3)]	4,751	5,350	7,153
(5) Incurred Losses (a)	3,001	3,432	3,888
(6) Incurred CAT Losses (a)	-	-	-
(7) Incurred Normal Losses [(5) - (6)]	3,001	3,432	3,888
(8) Loss Development Factor (d)	1.128	1.237	1.494
(9) Trend Factor (e)	1.358	1.202	1.083
(10) Other Adjustment Factors (f)	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	4,597	5,101	6,288
(12) Projected Loss Ratio [(11) / (4)]	96.8%	95.4%	87.9%
(13) CAT Loading (g)	0.0%	0.0%	0.0%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	96.8%	95.4%	87.9%
(15) Seasonality Adjustment (h)	0.990	0.990	0.990
(16) Adjusted Loss Ratio [(14) x (15)]	95.8%	94.4%	87.0%
(17) Selected Loss Ratio (g)			90.0%

Notes:

(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) No Drift Factor applied.
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1, Column (7).
(f) Estimated Impact of Bill 59.
(g) Judgmentally Selected.
(h) From Appendix B, Sheet 1, Row (7).

Selection of Net Loss Ratios
Auto - Physical Damage
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	7,501	8,211	8,464
(2) On-Level Factors (b)	0.950	0.951	0.986
(3) Drift Factors (c)	1.007	1.004	1.001
(4) Ultimate Premium [(1) x (2) x (3)]	7,172	7,835	8,347
(5) Incurred Losses (a)	4,411	5,226	5,914
(6) Incurred CAT Losses (a)	-	225	525
(7) Incurred Normal Losses [(5) - (6)]	4,411	5,001	5,389
(8) Loss Development Factor (d)	1.000	0.999	1.012
(9) Trend Factor (e)	1.013	1.003	1.000
(10) Other Adjustment Factors (f)	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	4,470	5,013	5,454
(12) Projected Loss Ratio [(11) / (4)]	62.3%	64.0%	65.3%
(13) CAT Loading (g)	0.5%	0.5%	0.5%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	62.6%	64.3%	65.7%
(15) Seasonality Adjustment (h)	0.990	0.990	0.990
(16) Adjusted Loss Ratio [(14) x (15)]	62.0%	63.6%	65.0%
(17) Selected Loss Ratio (g)			65.0%

Notes:

(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) Rate Group Drift Factor from Exhibit E, Sheet 2, Column (5).
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1, Column (7).
(f) Estimated Impact of Bill 59.
(g) Judgmentally Selected.
(h) From Appendix B, Sheet 1, Row (7).

Selection of Net Loss Ratios
Personal Property
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	3,007	3,251	3,578
(2) On-Level Factors (b)	1.000	1.000	1.000
(3) Drift Factors (c)	1.000	1.000	1.000
(4) Ultimate Premium [(1) x (2) x (3)]	3,007	3,251	3,578
(5) Incurred Losses (a)	2,144	1,986	2,351
(6) Incurred CAT Losses (a)	263	-	411
(7) Incurred Normal Losses [(5) - (6)]	1,881	1,986	1,940
(8) Loss Development Factor (d)	0.992	0.991	1.050
(9) Trend Factor (e)	1.043	1.028	1.012
(10) Other Adjustment Factors	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	1,946	2,023	2,062
(12) Projected Loss Ratio [(11) / (4)]	64.7%	62.2%	57.6%
(13) CAT Loading (f)	1.0%	1.0%	1.0%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	65.4%	62.8%	58.2%
(15) Seasonality Adjustment (g)	1.020	1.020	1.020
(16) Adjusted Loss Ratio [(14) x (15)]	66.7%	64.1%	59.4%
(17) Selected Loss Ratio (f)			60.0%

Notes:
(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) Limit Drift from Exhibit E, Sheet 2, Column (5).
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1, Column (7).
(f) Judgmentally Selected.
(g) From Appendix B, Sheet 2, Row (7).

Selection of Net Loss Ratios
Liability
($000's)

	1995	1996	1997
(1) Earned Premiums (a)	935	1,013	992
(2) On-Level Factors (b)	1.000	1.000	1.000
(3) Drift Factors (c)	1.004	1.002	1.000
(4) Ultimate Premium [(1) x (2) x (3)]	939	1,015	992
(5) Incurred Losses (a)	642	652	592
(6) Incurred CAT Losses (a)	-	-	-
(7) Incurred Normal Losses [(5) - (6)]	642	652	592
(8) Loss Development Factor (d)	1.055	1.173	1.542
(9) Trend Factor (e)	1.227	1.142	1.062
(10) Other Adjustment Factors	1.000	1.000	1.000
(11) Projected Ultimate Losses [(7) x (8) x (9) x (10)]	832	873	970
(12) Projected Loss Ratio [(11) / (4)]	88.6%	86.0%	97.8%
(13) CAT Loading (f)	0.0%	0.0%	0.0%
(14) Projected Smoothed Loss Ratio [(12) x [1 + (13)]]	88.6%	86.0%	97.8%
(15) Seasonality Adjustment (g)	1.000	1.000	1.000
(16) Adjusted Loss Ratio [(14) x (15)]	88.6%	86.0%	97.8%
(17) Selected Loss Ratio (f)			95.0%

Notes:

(a) From DF&C.
(b) From DF&C's Ratechange History, using the Parallelogram Method.
(c) Limit Drift from Exhibit E, Sheet 2, Column (5).
(d) From DF&C's Policy Liablities @12/31/97.
(e) From Appendix E, Sheet 1, Column (7).
(f) Judgmentally Selected.
(g) No Seasonality Adjustment Required.

Seasonality Adjustment Factor
Automobile - All Lines

Month (1)	Monthly Loss Ratios (a) (2)	Unearned Premium Weight (b) (3)	Earned Premium Weight (4)
January	88.0%	0.958	1.000
February	86.4%	0.875	1.000
March	81.5%	0.792	1.000
April	74.3%	0.708	1.000
May	68.1%	0.625	1.000
June	70.1%	0.542	1.000
July	76.7%	0.458	1.000
August	82.2%	0.375	1.000
September	77.4%	0.292	1.000
October	79.3%	0.208	1.000
November	88.8%	0.125	1.000
December	92.2%	0.042	1.000

(5) Average Loss Ratio on the Unearned Premium (c)	79.6%
(6) Average Loss Ratio on the Earned Premium (d)	80.4%
(7) Seasonality Adjustment [(5) / (6)]	0.990

Notes:
(a) From DF&C, Based on Latest 3 Accident Years Experience.
(b) Based on the 24th Method.
(c) Weighted Average of Columns (2) and (3).
(d) Weighted Average of Columns (2) and (4).

Seasonality Adjustment Factor
Property

Month	Monthly Loss Ratios (a)	Unearned Premium Weight (b)	Earned Premium Weight
(1)	(2)	(3)	(4)
January	69.1%	0.958	1.000
February	66.4%	0.875	1.000
March	62.9%	0.792	1.000
April	61.1%	0.708	1.000
May	59.4%	0.625	1.000
June	57.5%	0.542	1.000
July	54.3%	0.458	1.000
August	52.1%	0.375	1.000
September	55.9%	0.292	1.000
October	59.4%	0.208	1.000
November	60.6%	0.125	1.000
December	64.8%	0.042	1.000

(5) Average Loss Ratio on the Unearned Premium (c)	61.5%
(6) Average Loss Ratio on the Earned Premium (d)	60.3%
(7) Seasonality Adjustment [(5) / (6)]	1.020

Notes:
(a) From DF&C, Based on Latest 3 Accident Years Experience.
(b) Based on the 24th Method.
(c) Weighted Average of Columns (2) and (3).
(d) Weighted Average of Columns (2) and (4).

Dubois Fire & Casualty Insurance Company

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Third Party Liability						
12	2.275	4.349	22.99%	22.99%	0.983	22.61%
24	1.180	1.912	52.31%	29.32%	0.935	27.40%
36	1.035	1.620	61.72%	9.42%	0.873	8.22%
48	1.027	1.565	63.88%	2.16%	0.816	1.76%
60	1.035	1.524	65.61%	1.72%	0.763	1.32%
72	1.035	1.473	67.90%	2.30%	0.717	1.65%
84	1.045	1.423	70.28%	2.38%	0.683	1.62%
96	1.050	1.362	73.44%	3.16%	0.651	2.06%
108	1.050	1.297	77.12%	3.67%	0.620	2.28%
120	1.042	1.235	80.97%	3.86%	0.590	2.28%
132	---	1.000	100.00%	19.03%	0.562	10.70%
Total				100.00%		81.89%

(8) Selected Undiscounted Loss Ratio (c)	72.5%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	88.6%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	4.4%
(12) Selected Claim Development Margin Factor (e)	12.5%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	70.4%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	69.6%

Notes:
(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Accident Benefits						
12	4.000	21.863	4.57%	4.57%	0.983	4.50%
24	1.850	5.466	18.30%	13.72%	0.935	12.82%
36	1.300	2.954	33.85%	15.55%	0.873	13.58%
48	1.180	2.273	44.00%	10.15%	0.816	8.29%
60	1.130	1.926	51.92%	7.92%	0.763	6.04%
72	1.090	1.704	58.67%	6.75%	0.717	4.84%
84	1.070	1.564	63.95%	5.28%	0.683	3.61%
96	1.060	1.461	68.43%	4.48%	0.651	2.91%
108	1.050	1.379	72.53%	4.11%	0.620	2.54%
120	1.045	1.313	76.16%	3.63%	0.590	2.14%
132	---	1.000	100.00%	23.84%	0.562	13.40%
Total				100.00%		74.69%

(8) Selected Undiscounted Loss Ratio (c)	90.0%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	110.0%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	5.5%
(12) Selected Claim Development Margin Factor (e)	10.0%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	78.0%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	77.2%

Notes:

(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Physical Damage						
12	2.250	2.555	39.14%	39.14%	0.983	38.48%
24	1.130	1.136	88.05%	48.92%	0.935	45.72%
36	1.004	1.005	99.50%	11.45%	0.873	10.00%
48	1.001	1.001	99.90%	0.40%	0.816	0.32%
60	1.000	1.000	100.00%	0.10%	0.763	0.08%
72	1.000	1.000	100.00%	0.00%	0.717	0.00%
84	1.000	1.000	100.00%	0.00%	0.683	0.00%
96	1.000	1.000	100.00%	0.00%	0.651	0.00%
108	1.000	1.000	100.00%	0.00%	0.620	0.00%
120	1.000	1.000	100.00%	0.00%	0.590	0.00%
132	---	1.000	100.00%	0.00%	0.562	0.00%
Total				100.00%		94.60%

(8) Selected Undiscounted Loss Ratio (c)	65.0%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	79.4%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	4.0%
(12) Selected Claim Development Margin Factor (e)	5.0%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	68.3%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	67.6%

Notes:
(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Personal Property						
12	1.375	1.420	70.45%	70.45%	0.983	69.27%
24	1.014	1.032	96.86%	26.42%	0.935	24.69%
36	1.008	1.018	98.22%	1.36%	0.873	1.18%
48	1.005	1.010	99.01%	0.79%	0.816	0.64%
60	1.002	1.005	99.50%	0.50%	0.763	0.38%
72	1.001	1.003	99.70%	0.20%	0.717	0.14%
84	1.002	1.002	99.80%	0.10%	0.683	0.07%
96	1.000	1.000	100.00%	0.20%	0.651	0.13%
108	1.000	1.000	100.00%	0.00%	0.620	0.00%
120	1.000	1.000	100.00%	0.00%	0.590	0.00%
132	---	1.000	100.00%	0.00%	0.562	0.00%
Total				100.00%		96.50%

(8) Selected Undiscounted Loss Ratio (c)	60.0%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	73.3%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	3.7%
(12) Selected Claim Development Margin Factor (e)	5.0%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	64.3%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	63.6%

Notes:

(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Net Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Liability						
12	2.350	6.984	14.32%	14.32%	0.983	14.08%
24	1.500	2.972	33.65%	19.33%	0.935	18.07%
36	1.405	1.981	50.47%	16.82%	0.873	14.69%
48	1.150	1.410	70.91%	20.44%	0.816	16.69%
60	1.075	1.226	81.55%	10.64%	0.763	8.12%
72	1.050	1.141	87.67%	6.12%	0.717	4.39%
84	1.040	1.086	92.05%	4.38%	0.683	3.00%
96	1.025	1.045	95.73%	3.68%	0.651	2.40%
108	1.010	1.019	98.13%	2.39%	0.620	1.48%
120	1.009	1.009	99.11%	0.98%	0.590	0.58%
132	---	1.000	100.00%	0.89%	0.562	0.50%
Total				100.00%		83.98%

(8) Selected Undiscounted Loss Ratio (c)	95.0%
(9) Ratio of Expected Ceded Claims to Net UPR (d)	116.1%
(10) Reinsurance PFAD (e)	5.0%
(11) Reinsurance Recovery Margin [(9) x (10)]	5.8%
(12) Selected Claim Development Margin Factor (e)	12.5%
(13) Loss Ratio with Margin Discounted to Average Accident Date (f)	94.6%
(14) Average Earning Period for UPR (g)	4
(15) Percentage of Unearned Premium in Invested Assets (h)	50.0%
(16) Discount from the Average Accident Date to the Evaluation Date (g)	0.978
(17) Discounted Loss Ratio with Margins (13) x [1- (15) x {1 - (16)}]	93.6%

Notes:
(a) Payment Pattern from DF&C's Paid Triangles.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit I.
(d) From Exhibit I and Exhibit IV. [(Gross UPR x Gross LR) - (Net UPR x Net LR)] / Net UPR.
(e) Judgmentally Selected based on CIA Memorandum on PFAD.
(f) [Total for Column (7)] x [(8) x {1 + (12)} + (11)].
(g) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(h) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Third Party Liability						
12	2.275	4.349	22.99%	22.99%	0.983	22.61%
24	1.180	1.912	52.31%	29.32%	0.935	27.40%
36	1.035	1.620	61.72%	9.42%	0.873	8.22%
48	1.027	1.565	63.88%	2.16%	0.816	1.76%
60	1.035	1.524	65.61%	1.72%	0.763	1.32%
72	1.035	1.473	67.90%	2.30%	0.717	1.65%
84	1.045	1.423	70.28%	2.38%	0.683	1.62%
96	1.050	1.362	73.44%	3.16%	0.651	2.06%
108	1.050	1.297	77.12%	3.67%	0.620	2.28%
120	1.042	1.235	80.97%	3.86%	0.590	2.28%
132	---	1.000	100.00%	19.03%	0.562	10.70%
Total				100.00%		81.89%

(8) Selected Undiscounted Loss Ratio (c)	72.5%
(9) Selected Claim Development Margin Factor (d)	12.5%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	66.8%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	66.0%

Notes:
(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Accident Benefits						
12	4.000	21.863	4.57%	4.57%	0.983	4.50%
24	1.850	5.466	18.30%	13.72%	0.935	12.82%
36	1.300	2.954	33.85%	15.55%	0.873	13.58%
48	1.180	2.273	44.00%	10.15%	0.816	8.29%
60	1.130	1.926	51.92%	7.92%	0.763	6.04%
72	1.090	1.704	58.67%	6.75%	0.717	4.84%
84	1.070	1.564	63.95%	5.28%	0.683	3.61%
96	1.060	1.461	68.43%	4.48%	0.651	2.91%
108	1.050	1.379	72.53%	4.11%	0.620	2.54%
120	1.045	1.313	76.16%	3.63%	0.590	2.14%
132	---	1.000	100.00%	23.84%	0.562	13.40%
Total				100.00%		74.69%

(8) Selected Undiscounted Loss Ratio (c)	90.0%
(9) Selected Claim Development Margin Factor (d)	10.0%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	73.9%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	73.1%

Notes:

(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Auto - Physical Damage						
12	2.250	2.555	39.14%	39.14%	0.983	38.48%
24	1.130	1.136	88.05%	48.92%	0.935	45.72%
36	1.004	1.005	99.50%	11.45%	0.873	10.00%
48	1.001	1.001	99.90%	0.40%	0.816	0.32%
60	1.000	1.000	100.00%	0.10%	0.763	0.08%
72	1.000	1.000	100.00%	0.00%	0.717	0.00%
84	1.000	1.000	100.00%	0.00%	0.683	0.00%
96	1.000	1.000	100.00%	0.00%	0.651	0.00%
108	1.000	1.000	100.00%	0.00%	0.620	0.00%
120	1.000	1.000	100.00%	0.00%	0.590	0.00%
132	---	1.000	100.00%	0.00%	0.562	0.00%
Total				100.00%		94.60%

(8) Selected Undiscounted Loss Ratio (c)	65.0%
(9) Selected Claim Development Margin Factor (d)	5.0%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	64.6%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	63.8%

Notes:

(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Personal Property						
12	1.375	1.420	70.45%	70.45%	0.983	69.27%
24	1.014	1.032	96.86%	26.42%	0.935	24.69%
36	1.008	1.018	98.22%	1.36%	0.873	1.18%
48	1.005	1.010	99.01%	0.79%	0.816	0.64%
60	1.002	1.005	99.50%	0.50%	0.763	0.38%
72	1.001	1.003	99.70%	0.20%	0.717	0.14%
84	1.002	1.002	99.80%	0.10%	0.683	0.07%
96	1.000	1.000	100.00%	0.20%	0.651	0.13%
108	1.000	1.000	100.00%	0.00%	0.620	0.00%
120	1.000	1.000	100.00%	0.00%	0.590	0.00%
132	---	1.000	100.00%	0.00%	0.562	0.00%
Total				100.00%		96.50%

(8) Selected Undiscounted Loss Ratio (c)	60.0%
(9) Selected Claim Development Margin Factor (d)	5.0%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	60.8%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	60.1%

Notes:
(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Liability						
12	2.350	6.984	14.32%	14.32%	0.983	14.08%
24	1.500	2.972	33.65%	19.33%	0.935	18.07%
36	1.405	1.981	50.47%	16.82%	0.873	14.69%
48	1.150	1.410	70.91%	20.44%	0.816	16.69%
60	1.075	1.226	81.55%	10.64%	0.763	8.12%
72	1.050	1.141	87.67%	6.12%	0.717	4.39%
84	1.040	1.086	92.05%	4.38%	0.683	3.00%
96	1.025	1.045	95.73%	3.68%	0.651	2.40%
108	1.010	1.019	98.13%	2.39%	0.620	1.48%
120	1.009	1.009	99.11%	0.98%	0.590	0.58%
132	---	1.000	100.00%	0.89%	0.562	0.50%
Total				100.00%		83.98%

(8) Selected Undiscounted Loss Ratio (c)	95.0%
(9) Selected Claim Development Margin Factor (d)	15.0%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	91.8%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	90.7%

Notes:
(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Dubois Fire & Casualty Insurance Company

Discounting of Gross Premium Liabilities
Discounted Loss Ratios on the Unearned Premium
As of December 31, 1997

Evaluation Point in Months (1)	Selected Age to Age Factors (a) (2)	Age to Ultimate Factors (a) (3)	Estimated Percentage Paid [1 / (3)] (4)	Incremental Percentage Paid (5)	Discount Factor to Avg. Accident Date (b) (6)	Discounted Percentage Paid (5) x (6) (7)
Aviation						
12	2.371	5.176	19.32%	19.32%	0.983	19.00%
24	1.450	2.183	45.81%	26.49%	0.935	24.76%
36	1.160	1.505	66.43%	20.62%	0.873	18.01%
48	1.097	1.297	77.09%	10.66%	0.816	8.70%
60	1.060	1.182	84.60%	7.51%	0.763	5.73%
72	1.031	1.115	89.68%	5.08%	0.717	3.64%
84	1.019	1.081	92.50%	2.82%	0.683	1.93%
96	1.023	1.061	94.24%	1.74%	0.651	1.13%
108	1.018	1.038	96.37%	2.13%	0.620	1.32%
120	1.019	1.019	98.10%	1.73%	0.590	1.02%
132	---	1.000	100.00%	1.90%	0.562	1.07%
Total				100.00%		86.31%

(8) Selected Undiscounted Loss Ratio (c)	70.0%
(9) Selected Claim Development Margin Factor (d)	15.0%
(10) Loss Ratio with Margin Discounted to Average Accident Date (e)	69.5%
(11) Average Earning Period for UPR (f)	4
(12) Percentage of Unearned Premium in Invested Assets (g)	50.0%
(13) Discount from the Average Accident Date to the Evaluation Date (f)	0.978
(14) Discounted Loss Ratio with Margin (10) x [1- (12) x {1 - (13)}]	68.7%

Notes:

(a) Payment Pattern from Paid Triangles in Appendices.
(b) Yield Rate from DF&C Investment Returns; 3 month payment lag in the first year.
(c) From Exhibit IV.
(d) Judgmentally Selected based on CIA Memorandum on PFAD.
(e) [Total for Column (7)] x (8) x [1 + (9)].
(f) Assumptions:UPR is discounted 4 months, assuming 12 month policies.
(g) From DF&C P&C-1: (Unearned Premium - Premium Receivables) / Unearned Premium.

Calculation of Loss Trend Factors
As of December 31, 1997

Accident Year	Average Accident Date	Selected Annual Trend		Time Spent Under (b)		Trend Factor (c)
		Bill 164 (a)	Bill 59 (a)	Bill 164 01-Nov-96	Bill 59 01-May-98	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Auto - Third Party Liability						
1995	01-Jul-95	5.0%	0.0%	1.339	1.495	1.068
1996	01-Jul-96	5.0%	0.0%	0.337	1.495	1.017
1997	01-Jul-97	5.0%	0.0%	0.000	0.832	1.000
Auto - Accident Benefits						
1995	01-Jul-95	13.0%	10.0%	1.339	1.495	1.358
1996	01-Jul-96	13.0%	10.0%	0.337	1.495	1.202
1997	01-Jul-97	13.0%	10.0%	0.000	0.832	1.083
Auto - Physical Damage						
1995	01-Jul-95	1.0%	0.0%	1.339	1.495	1.013
1996	01-Jul-96	1.0%	0.0%	0.337	1.495	1.003
1997	01-Jul-97	1.0%	0.0%	0.000	0.832	1.000
Personal Property						
1995	01-Jul-95	1.5%	1.5%	1.339	1.495	1.043
1996	01-Jul-96	1.5%	1.5%	0.337	1.495	1.028
1997	01-Jul-97	1.5%	1.5%	0.000	0.832	1.012
Liability						
1995	01-Jul-95	7.5%	7.5%	1.339	1.495	1.227
1996	01-Jul-96	7.5%	7.5%	0.337	1.495	1.142
1997	01-Jul-97	7.5%	7.5%	0.000	0.832	1.062

Notes:
(a) Bill 164 and Bill 59 impact only Automobile Coverages.
(b) Time Span starts at Average Accident Date.
(c) [1 + (3)] ^ (5) x [1 + (4)] ^ (6).

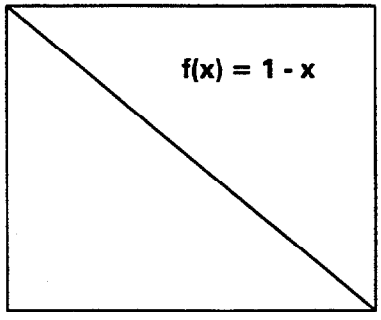
Calculation of Drift Factors
As of December 31, 1997

Calendar Year (1)	Average Written Date (2)	Selected Drift Factor (3)	Time Span from Average Written Date to 01-Sep-97 (4)	Drift Factor (a) (5)
Auto - Third Party Liability				
1995	01-Jul-95	0.2%	2.171	1.004
1996	01-Jul-96	0.2%	1.169	1.002
1997	01-Jul-97	0.2%	0.170	1.000
Auto - Accident Benefits				
1995	01-Jul-95	na		na
1996	01-Jul-96	na		na
1997	01-Jul-97	na		na
Auto - Physical Damage				
1995	01-Jul-95	0.3%	2.171	1.007
1996	01-Jul-96	0.3%	1.169	1.004
1997	01-Jul-97	0.3%	0.170	1.001
Personal Property				
1995	01-Jul-95	0.0%	2.171	1.000
1996	01-Jul-96	0.0%	1.169	1.000
1997	01-Jul-97	0.0%	0.170	1.000
Liability				
1995	01-Jul-95	0.2%	2.171	1.004
1996	01-Jul-96	0.2%	1.169	1.002
1997	01-Jul-97	0.2%	0.170	1.000

Notes:
(a) [1 + (3)] ^ (4).

A. Average Accident Date of the Unearned Premium:

On the following chart, the dotted line displays the earning pattern of the 12/31/97 unearned premium reserve through 1998.



The average earning date of the unearned premium can be found by calculating the area of the lower triangle. The unearned premium density function is:

$$f(x) \begin{cases} (1-x) & \text{if } 0<x<1 \\ 0 & \text{if } x \geq 1 \end{cases}$$

The following integral calculates the lower triangle's average, which is equal to the average earning date of the 12/31/97 unearned premium reserve.

$$\int_0^1 x\, f(x)\, dx = \int_0^1 x\,(1-x)\, dx = \frac{x^2}{2} - \frac{x^3}{3}\Bigg|_0^1 = \frac{1}{6}$$

Integrating over [0,1] results in 1/6, which is the mean of the triangle whose area is equal to half a year. Hence, the average earning period for the unearned premium is (1/6) / (1/2) x 12 months = 4 months, and the AAD is thus May 1, 1998.

Generally, it is assumed that the average accident date of losses is equal to the average earning date of the premiums. As such, we can conclude that the average accident date of losses which will arise from the unearned premium is May 1, 1998.

The calculation is similar for a six-month policy. It can easily be shown that the resulting AAD is March 1, 1998.

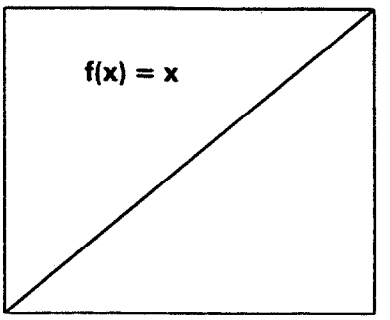
This calculation assumes that there are no unusual growth/decline in premium volume.[12]

---

[12] To account for unusual variation in premium volume, we refer the reader to the three-dimensional model presented by Miller & Davis in "A Refined Model for Premium Adjustment".

B. Average Writing Date of the Unearned Premium:

On the following chart, the dotted line displays the writing pattern of the 12/31/97 unearned premium reserve through 1997.



The average writing date of the unearned premium can be found by calculating the area of the lower triangle. The straight line can be represented using the following function:

$$f(x) \begin{cases} x \text{ if } 0<x<1 \\ 0 \text{ if } x \geq 1 \end{cases}$$

The following integral calculates the lower triangle's average, which is equal to the average writing date of the 12/31/97 unearned premium reserve.

$$\int_0^1 x\, f(x)\, dx = \int_0^1 x \cdot x\, dx = \frac{x^3}{3}\Big|_0^1 = \frac{1}{3}$$

Integrating over [0,1] results in 1/3, which is the mean of the triangle whose area is one half of the year. Hence, the average earning period for the unearned premium is (1/3) / (1/2) x 12 months = 8 months, and the AWD is thus September 1, 1997.

The calculation is similar for a six-month policy. It can easily be shown that the resulting AWD is November 1, 1998.

Insurer ..... Year .....

EXPENSES - TOTAL
($'000)

Expense Classification		Applicable to Insurance Operations				Investment Expenses (08)
		Acquisition Expenses		General Expenses (04)	Net Internal Adjustment Expenses (06)	
		Deferred at End of Year (01)	Attributable to the Year* (02)			
Salaries	02					
Employee benefits	04					
Employee acquisition	06					
Occupancy	08					
Advertising	10					
Agency (excluding commissions)	12					
Automobile and travel	14					
Allowance for doubtful accounts	16					
Bureaus and Associations	18					
Directors remuneration	20					
Donations	22					
EDP and statistical	24					
Furniture and equipment	26					
Home Office overhead	28					
Inspections and investigations	30					
Insurance	32					
Management fees	34					
Postage and courier	36					
Printing and stationery	38					
Professional fees	40					
Telephone and other communication ...	42					
Miscellaneous	44					
	46					
Regulatory assessments	48					
Total	89					

*Total on line 89 to be reported on page 20.30, line 14.

Expression of Opinion

"I have valued the policy liabilities of [ABC Company] for its balance sheet at [December 31, xxxx] and their change in the statement of income for the year then ended in accordance with accepted actuarial practice, including selection of appropriate assumptions and methods. I am satisfied that the data utilized are reliable and sufficient for the valuation of these liabilities. I verified the consistency of the valuation data with the company financial records."

[Qualifications should be included here.]

The results of my valuation together with items from the Annual Return are the following:

Policy liabilities in connection with unpaid claims	Carried in Annual Return	Actuary's Estimate
Direct unpaid claims and adjustment expenses:		
Assumed unpaid claims and adjustment expenses:		
Gross unpaid claims and adjustment expenses:		
Ceded unpaid claims and addjustment expenses:		
Net unpaid claims and adjustment expenses:		

Policy liabilities in connection with unearned premiums	Carried in Annual Return	Actuary's Estimate
Gross policy liabilities in connection with unearned premiums:		
Net policy liabilities in connection with unearned premiums:		
Gross unearned premiums:		
Net unearned premiums:		
Deferred policy acquisition expenses:		
Maximum policy acquisition expenses deferrable:		
Premium deficiency:		

	Carried in Annual Return	Actuary's Estimate
Other policy liabilities - Net		

"In my opinion, the amount of policy liabilities makes appropriate provision for all policyholders' obligations and the annual return fairly presents the result of the valuation."

FCIA
Signature of Actuary

Date opinion was rendered

FCIA
Printed name of Actuary

Expression of Opinion

I have valued the policy liabilities of XYZ Insurance Company for its balance sheet at December 31, 1997 and their change in the statement of income for the year then ended in accordance with accepted actuarial practice, including selection of appropriate assumptions and methods. I am satisfied that the data utilized is reliable and sufficient for the valuation of these liabilities. I have verified the consistency of the valuation data with the company's financial records.

The results of my valuation with items from the Annual Return are the following:

	Carried in Annual Return ($000)	Actuary's Estimate ($000)
Policy liabilities in connection with unpaid claims		
Direct unpaid claims and adjustment expenses	$	$
Assumed unpaid claims and adjustment expenses	$	$
Gross unpaid claims and adjustment expenses	$	$
Unpaid claims recoverable from other insurers under the loss transfer provisions	$	$
Ceded unpaid claims and adjustment expenses	$	$
Net unpaid claims and adjustment expenses	$	$
Policy liabilities in connection with unearned premiums		
Gross policy liabilities in connection with unearned premiums		$
Net policy liabilities in connection with unearned premiums		$
Gross unearned premiums	$	
Net unearned premiums	$	
Deferred policy acquisition expenses	$	
Unearned commission	$	
Maximum policy acquisition expenses deferrable		$
Premium deficiency	$	$

In my opinion, the amount of policy liabilities makes appropriate provision for all policyholders' obligations and the annual return fairly presents the results of the valuation.

Joe Doe
Fellow, Canadian Institute of Actuaries

Montreal, Quebec
Date

Bibliography

Canadian Institute of Actuaries, "Consolidated Standards of Practice"

Canadian Institute of Actuaries, Consolidated Standards of Practice, 2nd Exposure Draft, May 1997.

Canadian Institute of Actuaries, "Memorandum on Provision for Adverse Deviations (Property & Casualty)", January 1, 1994.

Canadian Institute of Actuaries, "Recommendations for Property-Casualty Insurance Company Financial Reporting", January 1990.

Claudette Cantin, "Policy Liabilities - An Actuarial Perspective", CIAA Information Circular 1989-7.

Facility Association, "Plan of Operation", March 1995.

Groupement des Assureurs Automobile, Plan de Répartition des Risques, "Procedures Manual", December 31, 1996.

Insurance Accounting and Systems Association, "Property-Casualty Insurance Accounting (Sixth Edition)", 1994, Chapter 5.

Price Waterhouse Coopers, "A Guide to Corporate Income Tax: Study Note", September 1, 1998.

Tillinghast - Towers Perrin, "Estimates of Discounted Loss Costs and Required Direct Premiums for Ontario Private Passenger under the Government Proposed Product Dated February 1996 and Changes Dated May 1996", Ministry of Finance, May 31, 1996.