



Institute of Actuaries of Australia

Practical Considerations in Valuing Premium Liabilities

Prepared by

Elaine Collins, BSc (Hons), MEc, FIAA
Samantha Hu, BCom, AIAA

Presented to the Institute of Actuaries of Australia
XIV General Insurance Seminar 2003
9-12 November 2003

This paper has been prepared for issue to, and discussion by, Members of the Institute of Actuaries of Australia (IAAust). The IAAust Council wishes it to be understood that opinions put forward herein are not necessarily those of the IAAust and the Council is not responsible for those opinions.

© 2003 Institute of Actuaries of Australia

The Institute of Actuaries of Australia
Level 7 Challis House 4 Martin Place
Sydney NSW Australia 2000
Telephone: +61 2 9233 3466 Facsimile: +61 2 9233 3446
Email: insact@actuaries.asn.au Website: www.actuaries.asn.au

[Thu, 06 November 2003, 08:24]

ABSTRACT

This paper explores a number of technical and practical issues concerned with the calculation of the central estimate of premium liabilities as required to be determined at least annually as part of Australian regulatory returns. Premium liabilities consist of the liabilities arising from unexpired policies for which the insurer is on risk, evaluated using actuarial techniques.

The evaluation of premium liabilities is not a widespread practice; to date, only Australia, Singapore and Canada require the evaluation of these. We briefly discuss some of the differences in requirements between Australia and overseas jurisdictions.

Comparison is made between the prospective and retrospective approaches for assessment of premium liabilities. Each component of the central estimate of premium liabilities and unearned premium liabilities is identified, and a number of issues are noted that may influence the approach to the evaluation of central estimates of premium liabilities. It is demonstrated that the actuary should separately allow for future premium refund claims, which can be material, particularly for short tail classes and single premium consumer credit.

Special cases are also discussed, including multi-year policies, proportional reinsurance treaties, and the use of underwriting rather than accident year. The required reinsurer recognition of premiums receivable for future underlying policies yet to be written is inconsistent with the reporting requirements of credants, which must only establish premium liabilities for business written prior to the balance date. Analysing claims by underwriting year, rather than accident year, requires closed and unclosed business to be split into that which is earned and unearned. The paper notes how the inclusion of various levels of unclosed business leads to varying levels of immediate realisation of future profits and losses.

Future developments and their impact on premium liabilities, are also considered. It is concluded that an actual versus expected analysis of change of valuation result should be shown for central estimates of premium liabilities, in the same way as it is usually undertaken for central estimates of outstanding claim liabilities. This would allow the suitability of the previous premium valuation basis to be evaluated. We also consider the implications of requiring the adoption of the higher of the central estimate of premium liabilities and unearned premium liabilities. Finally, we examine two particular changes to the accounting treatment of premium liabilities that will be implemented under International Financial Reporting Standards, effective 1 January 2005 (may be delayed to 1 January 2007).

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to Bob Buchanan, John de Ravin, Evelyn Chow and Claudette Cantin for their assistance with various aspects of this paper during its preparation, and to Laurel Kong for her thorough review and useful observations.

In addition, we would like to thank our colleagues at KPMG Actuaries for their patience and constructive comments, with particular appreciation to Greg Martin.

A special thanks also goes to a number of Australian domestic insurers, who allowed us to combine and utilise some of their recent data for the numerical results set out in the paper.

The views expressed herein are entirely those of the authors, Elaine Collins (eccollins@kpmg.com.au) and Samantha Hu (samanthahu@kpmg.com.au), and do not necessarily reflect those of the Institute of Actuaries of Australia or their employer, KPMG Actuaries.

CONTENTS

1. Introduction.....	1
1.1 Scope	1
1.2 Statutory regulations	1
1.3 Definitions.....	2
2. Components of premium liabilities.....	4
2.1 Components of retrospectively assessed unearned premium liabilities (UPL) 4	
2.2 Components of prospectively assessed central estimate of premium liabilities (CEPL)	5
3. Determining the central estimate.....	7
3.1 Main approaches.....	7
3.2 Risk claims and refund claims.....	8
3.3 Example using two methods	10
3.4 Outwards reinsurance recoveries & premiums	11
3.5 Adjustment to premiums.....	12
3.6 Expenses associated with unexpired risk.....	13
3.7 Discounting.....	13
3.8 Other factors.....	14
4. Issues arising.....	15
4.1 Seasonality & trends	15
4.2 Multi-year policies.....	15
4.3 Closed and unclosed business.....	17
4.4 Inwards reinsurance premium liability recognition.....	18
5. Future developments.....	20
5.1 Actual versus expected analysis	20
5.2 Comparison of UPL and CEPL.....	20
5.3 International Financial Reporting Standards (IFRS).....	21
6. Bibliography.....	23

APPENDIX

A Refund example	24
------------------------	----

1

INTRODUCTION

1.1 Scope

This paper explores a number of technical and practical issues concerned with the calculation of the central estimate of premium liabilities as required to be determined at least annually as part of Australian regulatory returns. Premium liabilities consist of the liabilities arising from unexpired policies for which the insurer is on risk, evaluated using actuarial techniques.

As from 1 July 2002, the Australian Prudential Regulation Authority (APRA) requires insurers to calculate a "Premium Liability", in place of an Unearned Premium Liability, for regulatory returns. This "Premium Liability" consists of two components:

- The central estimate of the unexpired risk reserve (URR) plus expense loadings (referred to as the Central Estimate of Premium Liabilities or CEPL in this paper), and
- A risk margin to provide a total premium liability at a 75% probability of sufficiency.

This paper is concerned with the first of these components, the estimation of the Central Estimate of Premium Liabilities (CEPL). Issues concerned with the determination of risk margin estimation forms a separate topic, which will not be discussed herein. Also outside the scope of this paper is the calculation of outstanding claims liabilities.

1.2 Statutory regulations

As far as we understand, only two countries besides Australia require the assessment of premium liabilities by an actuary for general regulatory reporting purposes. These countries are Singapore and Canada. In the USA, some states require an actuarial opinion on the adequacy of premium liabilities in certain circumstances.

In Australia, the estimation of premium liabilities is required for the purposes of both general financial performance and position reporting to APRA as well as completing the new risk based capital (RBC) minimum capital requirement (MCR) calculation for solvency purposes required by APRA.

In Singapore, RBC solvency requirements are not yet in force, so the purpose of premium liability estimation is limited to completing general financial performance and position returns to the regulator, the Monetary Authority of Singapore (MAS). It is important to show the separate items comprising premium liabilities, so that these items can be correctly allowed for in the accounts. This is particularly important, since there is a wide variety of accounting treatments by different insurers (non-accrual accounting is still allowed in Singapore).

In Canada, although the actuarial professional standards refer to the calculation of premium liabilities, premium liabilities are not actually stated in either the statutory returns or the published financial statements. The provision for premium liabilities is shown in the Actuary's Opinion filed with the statutory statements. This is used to test the recoverability of the Deferred Policy Acquisition Cost (DPAC) and the existence of premium deficiency.

In these countries, the general purpose financial reporting standards require the financial statements to show Unearned Premium Liability (UPL), which is Unearned Premium Reserves (UPR) offset by Deferred Acquisition Costs (DAC), rather than an actuarial premium liability.

In addition, a Premium Deficiency Reserve (PDR) is created if UPL is inadequate when DAC has already been reduced to zero. Premium Deficiency Reserve (PDR) is not explicitly required in current Australian accounting standards; nevertheless it may be required if accounts are to represent a true and fair view.

Table 1: Summary of Accounting and Statutory reporting requirements

Country	Financial Statements	Statutory Returns
Australia	UPR – DAC	CEPL
Singapore	UPR – DAC + PDR	Max (UPL, CEPL) *
Canada	UPR – DAC + PDR	UPR – DAC + PDR

* Singapore initial calculation by line of business, more details are in section 5.2.

1.3 Definitions

APRA prudential standard GPS210 defines premium liabilities as “Insurance liabilities which relate to claim payments arising from future events insured under existing policies up until their next renewal”.

In Singapore, MAS defines premium liabilities as “the reserves for unexpired risks and includes liabilities for all benefits, claims and expenses, acquisition costs, maintenance costs and policyholders' experience participation to be incurred after the end of the particular accounting period on which the actuarial investigation is conducted”.

The Canadian Institute of Actuaries' definition is even broader, "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".

In the USA, certain states require a calculation of premium liabilities for contracts with a term in excess of one year. However, we note that future profits are spread over the future period if the UPL exceeds the premium liability, but, if the premium liability exceeds the UPL, future losses are to be taken into account immediately.

2

COMPONENTS OF PREMIUM LIABILITIES

Australian Standard GPS210 states that “the value of the Premium Liabilities must include an amount in respect of the internal expenses that the insurer expects to incur in administering the policies and settling the relevant claims. The Premium Liabilities are to be determined on a fully prospective basis; both net and gross of expected reinsurance recoveries (as a result there is no need to separately report a deferred acquisition cost)”.

Australian Accounting Standards Board’s AASB1023 states that Premium Liabilities is essentially the UPL, which is Unearned Premium Reserve (UPR) adjusted for the amortisation of Deferred Acquisition Costs (DAC). In this paper, we have referred to {UPR-DAC} as Unearned Premium Liabilities (UPL). There is provision to write down the DAC to the recoverable amount (minimum zero). This is a retrospective assessment. APRA has also historically indicated that a Premium Deficiency Reserve (PDR) can be set up where, after DAC is reduced to zero, UPL is still insufficient to meet future costs. It appears that PDRs have not been common in Australian insurers’ accounts.

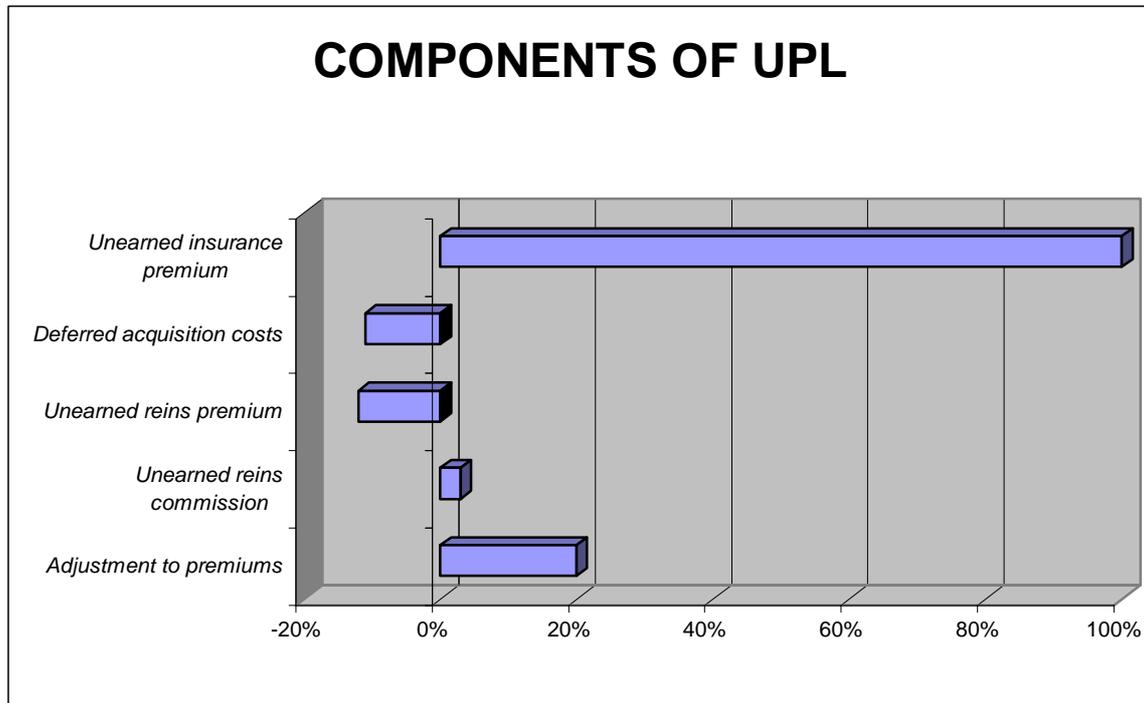
2.1 Components of retrospectively assessed unearned premium liabilities (UPL)

Retrospectively assessed unearned premium liabilities (UPL) are made up of some or all of the following components:

- Unearned insurance premium (already includes loadings for profit, policy maintenance expenses, claims establishment expenses and claims management expenses)
- Deferred acquisition costs
- Unearned reinsurance premium
- Unearned reinsurance commission (conceptually equivalent to DAC for reinsurance)
- Adjustment to premiums (for any retrospectively rated policy)

The following diagram illustrates the components of UPL showing a possible set of relative sizes (noting that adjustment to premiums on a retrospectively rated policy can go either way, but is illustrated as an increase in liability here):

Figure 1: Components of UPL



2.2 Components of prospectively assessed central estimate of premium liabilities (CEPL)

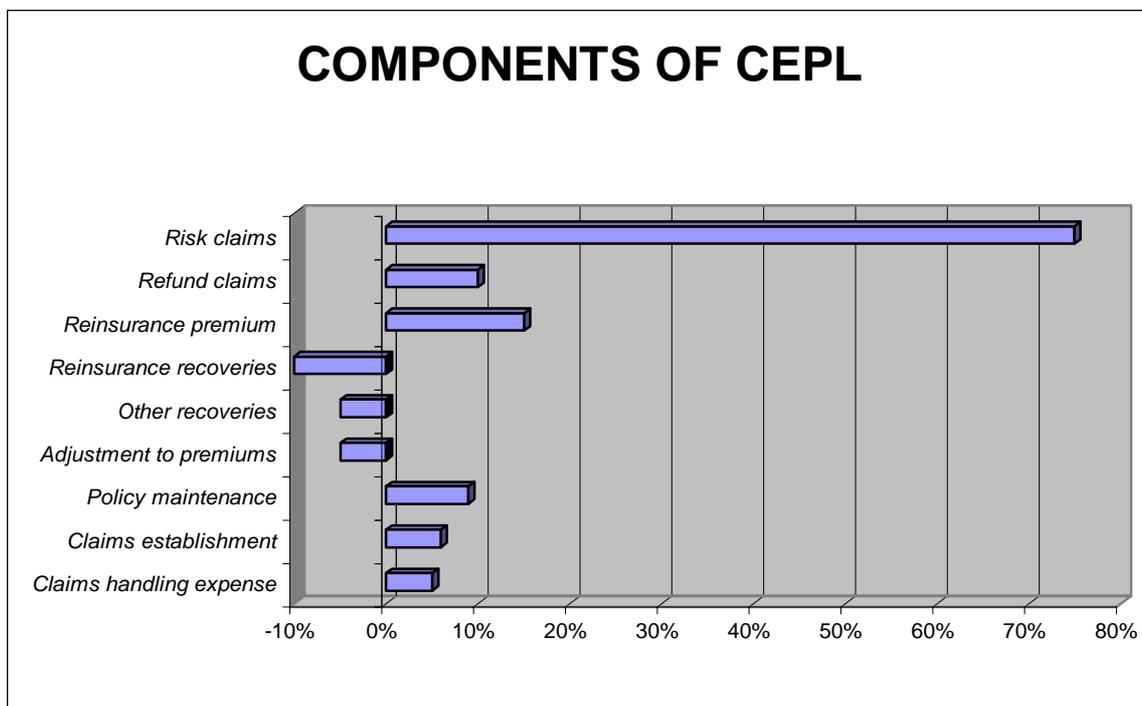
Prospectively (actuarially) assessed central estimates of premium liabilities (CEPL) are made up of some or all of the following components

- Risk claims
- Refund claims (refund of premium on policy cancellation)
- Reinsurance premium (net of commission for reinsurance treaties not yet incepted)
- Reinsurance recoveries (including for reinsurance treaties not yet incepted)
- Other recoveries
- Adjustment to premium (for any retrospectively rated policy)
- Policy maintenance expenses
- Claims establishment expenses
- Claims management expenses

Note that Unearned Premium and Deferred Acquisition Cost (DAC) are not included above, as these concepts are only relevant under the retrospective assessment of liabilities.

The following diagram illustrates the components of CEPL showing a possible set of relative sizes (noting that adjustment to premiums on a retrospectively rated policy can go either way, but is illustrated as a reduction in liability here):

Figure 2: Components of CEPL



We will examine issues relevant to the calculation of these components in the following sections.

3

DETERMINING THE CENTRAL ESTIMATE

3.1 Main approaches

The two main approaches to determining central estimates of premium liabilities were described in Bob Buchanan's technical guidance note [Buchanan 2002]:

- The premium approach where the central estimate of premium liabilities equals the UPL less anticipated profit margin; or
- The claims approach, where the central estimate of premium liabilities is evaluated directly from actuarial analysis of claims experience.

For the premium approach, the profit margin needs to be subtracted from the UPL $\{=UPR-DAC\}$ to obtain the CEPL, where

- $CEPL < UPR - DAC$ where profit margin is positive; and DAC is original value of initial expenses
- $CEPL = UPR - DAC$ where profit margin zero or slightly negative by no more than is needed to drive DAC to zero; and DAC is entered as an appropriately reduced value
- $CEPL > UPR - DAC$ where profit margin is negative by more than needed to drive DAC to zero; and DAC is entered as zero.

For the claims approach, actuarial analysis is undertaken by multiplying a measure of exposure by a claim cost factor. The measure of exposure could be:

- Projected number of policies exposed - with a risk premium per policy applied to estimate claims; or
- Projected earned premium - with a loss ratio applied to estimate claims

An expense loading is also added for this approach. Expense loadings are discussed in section 3.6.

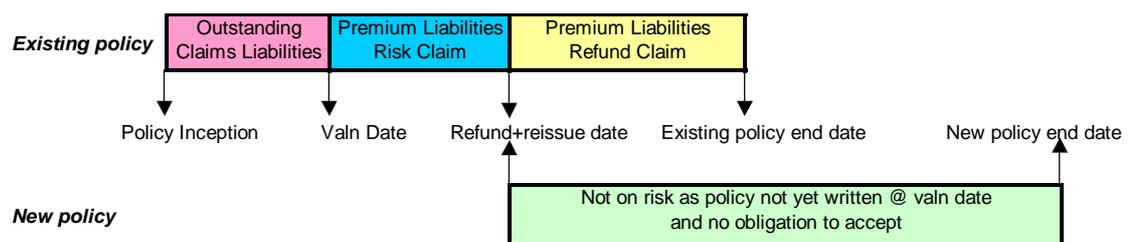
These approaches seem to have been accepted by actuaries and commonly applied to calculations of premium liabilities. We will use the abovementioned claims approach in two different ways within this section.

3.2 Risk claims and refund claims

Claims can be separated into risk claims and refund claims. Risk claims occur when a loss arises under the defined cover, and refund claims occur when an existing policy is terminated, requiring a partial premium refund. The separation of claims into risk and refund claims was beyond the scope of Bob Buchanan's note [Buchanan 2002], but we have used the claims approach in two different ways to allow for refunds. The two different methods calculate the relevant component value for central estimates of premium liabilities and we discuss variations in the results.

We note that premium liabilities need to take account of any expected premium refunds due, but not of any replacement policy to be re-issued (since that risk is not yet written by the valuation date). This is demonstrated in the diagram below.

Figure 3: Apportionment of existing and new policies



Future premium refunds due to policy cancellations can be significant in short tail classes, such as householders and motor vehicle property damage. Short tail domestic classes experience a high level of refunds (around 20%) for the following reasons:

- Amendment of cover resulting in a different premium
- Cessation of cover (e.g. house or car being sold)

Future exposure at the valuation date may not all be expired as risk claims, since some may be expired as refund claims. If these refund claims are not explicitly taken into account, the value of unexpired risk may be underestimated.

When analysing refunds, we note that past refunds can be observed in the following ways:

- By accident period of associated earned premium, where they are an "average" mixture of developed and undeveloped quarters. Refund rates by accident period should be reasonably stable and reflect this mixture.

- By policy or underwriting period of associated earned premium. Recent policy quarters will be undeveloped, since they do not include all refunds that will ultimately occur, causing the refund rate for the recent periods to appear artificially low however the refund rates for older quarters will be mature.
- By financial period in which the refund actually occurs, where refunds are an “average” mixture of developed and undeveloped periods. Refund rates should reflect this mixture.

If past ultimate claim frequencies and past ultimate loss ratios are calculated from exposure after past refunds, the following two flaws can arise:

- a) Future refunds can be more expensive than claims. That is, refund claims may have a “loss ratio” of around 95% (100% - 5% administration fee), whereas typical short tail risk claims may have a loss ratio in the range of 50% - 80%, well below 95%. The key point here is that a portion of the profit margin is typically refunded when a policy is cancelled, which means that a central estimate of the risk claims only might understate the cost of refund claims.
- b) Past refunds analysed by underwriting periods are not mature. If past ultimate claim frequencies and past ultimate loss ratios are calculated from exposure after past refunds, recent frequencies and loss ratios may appear lower than older quarters. The progress over quarters is not consistent, since the recent denominators are artificially inflated (i.e. they do not exclude all refunds that will ultimately occur). If the actuary adopts or gives weight to recent frequencies and loss ratios as indicators of the future, these items may be underestimated.

The results of our example for short tail domestic business analysing future refund claims separately from future risk claims using two methods are shown in the next section. Since analysis is undertaken by accident period rather than underwriting period, this example will illustrate flaw (a) only.

Undertaking the procedure of analysing future refunds separately is generally less important for long tail classes, since these classes tend not to experience high rates of refunds and unexpired risk is therefore less likely to be underestimated for this reason. Nonetheless, this position needs to be confirmed.

3.3 Example using two methods

We illustrate the above points in an example in Appendix A for a domestic class of business, using recent combined quarterly data from some Australian insurers. We work through two methods (1 and 2 detailed below), which both aim to calculate a central estimates of premium liabilities using the loss ratio method.

We contend that Method 1 obtains a more accurate answer. Method 2 is likely to be underestimated, since it does not take the full cost of refunds into account. In our example, results for Method 2 were 9% below those for Method 1.

We used “real” data in our example. Variations in ultimate loss ratios and refund rates would cause results to differ, but we believe that there would still be a material underestimation if Method 2 were used, rather than Method 1. In this example, we used the straight average of the loss ratios for the last four accident quarters as the adopted ultimate loss ratio to apply to future policy quarters.

Results of the examples are shown in the following table:

Table 2: Summary of methods descriptions and results

	Method 1	Method 2	Difference
Description	Uses policy record premium before all (past and future) refunds to calculate risk claims; refund claims explicitly calculated	Uses policy record premium after past refunds to calculate risk claims; no explicit consideration of refund claims	
CEPL	45,646,180	41,560,645	-4,085,534
% of Method 1	100%	91%	-9%

We note that where the number of exposed policy quarters is the exposure method used, two conceptually equivalent methods can still be defined to illustrate the above.

3.4 Outwards reinsurance recoveries & premiums

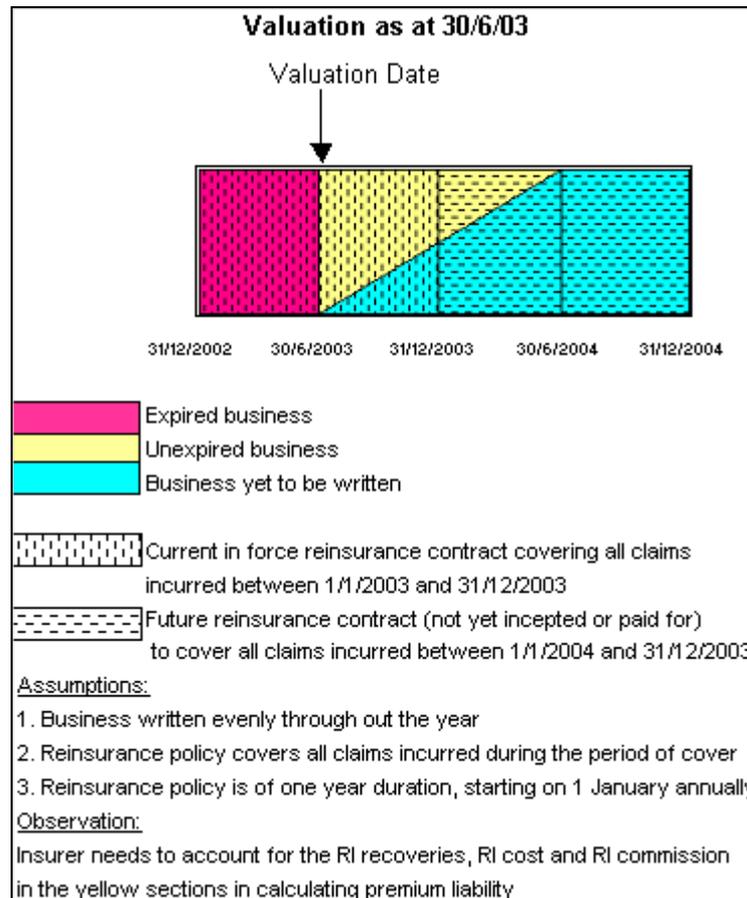
APRA requires premium liabilities to be disclosed gross and net of future reinsurance recoveries. The difference between gross and net are implied reinsurance recoverables, which will have an asset charge made against them in the MCR. Actuaries may project both gross and net figures separately, or project net and add expected future reinsurance recoveries to obtain gross figures.

Additionally, we note that if outwards reinsurance protection has not been purchased for part or all of the entire unexpired period, any applicable reinsurance premium due and related reinsurance commission receivable for the remaining unexpired period needs to be included in the net result.

Treatment of multi-year policies should follow similar principles, even though it may be more difficult to estimate outwards reinsurance premiums some years in the future.

Outwards reinsurance premiums already paid can be apportioned to business that is expired, unexpired and not yet written. Future outwards reinsurance premiums can be apportioned to business that is unexpired and not yet written. The portion of future outwards reinsurance premium that relates to business that is unexpired needs to be included in premium liabilities.

Figure 4: Apportionment of reinsurance premium



The relevance of apportioning reinsurance premiums already paid depends on the method selected to calculate the net figure. For example, if future reinsurance recoveries are calculated directly from the claims experience, then this apportionment is not required, but if the net result is calculated as a loss ratio applied to net unearned premium, then the unexpired portion of the reinsurance premiums already paid is used in calculating the net unearned premium.

3.5 Adjustment to premiums

Insurers writing retrospectively rated policies may end up ultimately receiving a different premium to the premium collected at policy inception. Both accounting standards and the regulator require ultimate premiums to be recognised. The insurer is required to take into account the estimated amount of future premium receipts or future premium refunds. Premium adjustments can also result from reinsurance reinstatement premiums.

We note that ultimate premium projection techniques are already a well-established part of the actuarial "tool kit", using methods such as chain ladder on premium receipt. Therefore we have not discussed this aspect further in this paper. Examples of portfolios where this is relevant are reinsurance business and workers' compensation.

The difference between ultimate premium and written premiums includes not only the abovementioned premium adjustments, but also unclosed business, where business has been written, but premium remains unpaid. Allowance for unclosed business is discussed in Section 4.3.

3.6 Expenses associated with unexpired risk

Policy and Claim Handling Expenses (PCHE) are internal expense loadings associated with unexpired risk. They need to allow for expenses of policy management, claim establishment and claims handling in a hypothetical runoff situation.

This is in contrast to an outstanding claims valuation, for which only claims handling expenses are required, and to some extent claims establishment expenses for IBNR claims. We note that expenses for policy management is a new area of estimation in general insurance, but its estimation should not greatly differ in concept from claims handling expense estimation.

Expenses vary widely by insurer and past expenses associated with policy administration and claim payments should be observed before assumptions for future expenses are adopted.

We believe that PCHE should be excluded from central estimates of premium liabilities when the risk margin loading percentage is applied, since the risk margin is to apply to the variability of claims cost rather than variability of internal insurer expenses. PCHE loadings then need to be added back to obtain premium liabilities at 75% probability of sufficiency.

3.7 Discounting

Premium liabilities can have a longer mean term than the corresponding claims liability. Thus, where claims liabilities are discounted, it is reasonable to also discount premium liabilities. Discounting can be explicit by working through a period-by-period cashflow table or implicit by selecting discounted loss ratios. Discounting of premium liabilities for short tail classes is usually considered immaterial.

The rate of discounting defined in GPS210 for statutory returns is “the risk free rate; i.e. the gross redemption yield of a portfolio of sovereign risk securities with similar expected payment profile to the insurance liabilities for a given class (eg the yield on Commonwealth Government securities should be used for Australian dollar liabilities)”.

This is not necessarily the same as the rate of discounting defined in AASB1023 for financial statements, where “the discount rate or rates to be used in measuring the present value of the expected future payments shall be the rate or rates of return that the insurer anticipates it could earn if sufficient funds were available to meet claims liabilities as they fall due. The discount rate or rates shall be determined by reference to market determined risk adjusted rates of return appropriate to the insurer”. This is commonly interpreted as referring to the risk free rate unless the insurer has significant non-performing assets, in which case the discount rate may be less than the risk free rate.

In general applications, we believe that the risk free rate, defined in GPS210, is the appropriate rate to be used for both statutory returns and financial statements.

Future expected cashflows including risk margin on an undiscounted and discounted basis should be shown for premium liabilities in Approved Actuary reports in the same way as it is normally shown for outstanding claims liabilities.

3.8 Other factors

The actuary should also consider the following factors in determining the central estimates of premium liabilities:

- Changes in adequacy of premium rates
- Changes in underwriting standards
- Compliance with underwriting and pricing standards
- Changes in mix of business
- Changes in exposure
- Changes in reinsurance cover and rates
- Changes in expenses
- Changes in environmental factors
- Known unusual events in the latest accident year e.g. catastrophe
- Inflation of claim amounts

These are not separate components, but instead should be considered when estimating items identified in the previous sections.

4

ISSUES ARISING

In working through determining the central estimate of premium liabilities in practical situations, a number of issues arise, and we have discussed some of them in the sections to follow.

4.1 Seasonality & trends

Particularly subject to seasonal fluctuations are short tail classes for which premium liabilities form a large proportion of insurance liabilities. It is preferable to have monthly or quarterly data for such classes so the actuary can be in a position to note and adjust for any patterns in exposure, risk claim rates (loss ratio) or refund claim rates.

If appropriate, trends in historical loss ratios should be projected out into future periods where unexpired risk exists. Trends may also be observed in the refund rates. However the actuary should be cautious when extrapolating trends here as typically the last half year of exposure may still have refunds yet to be requested in the future, causing the refund rate for the policy period to appear artificially low. This was explored in Section 3.2.

4.2 Multi-year policies

Multi-year policies are general insurance policies, which are usually written with a single premium, but with the period of risk spanning several years. Some interesting examples of multi-year policies include builders warranty, consumer credit, mortgage insurance and tail cover for professional indemnity or medical malpractice classes.

Explanations of these types of cover are as follows:

Table 3: Description of multi-year policies

Product	Coverage
Builders warranty	Covers domestic homeowners against insolvency or departure of builders/renovators during the period of construction and defects arising in the home or renovation 7 years from completion of construction (exact term and conditions vary by state)
Consumer credit	Covers consumers, who are subject to obligations to repay credit advances via periodic instalments over many years, against being unable to repay instalments due to sickness, accident and/or unemployment.
Mortgage insurance	Covers the mortgagor for loss arising from the failure of a mortgagee to repay a loan to the mortgagor where claims under mortgage insurance meet the difference between the amount outstanding on the loan and the amount realised from the sale of the property.
Tail cover	Covers the claims arising from a previous "active periods" during which claims made cover was purchased for professional indemnity or medical malpractice classes, but is no longer purchased since the professional has ceased to actively practice.

Some issues relating to establishing premium liabilities for multi-year policies are:

- Period of risk
- Pattern of risk
- Materiality of premium liabilities

In this section, we will briefly explore these issues.

Deciding on the period of risk over which to calculate the amount unexpired is not always straightforward. For example, the earning period for builders warranty insurance can be either over the course of construction or over construction period plus 7 years. The former implies that any defect claims arising over the next 7 years are to be viewed as a result of work carried out during construction and are captured in the outstanding claims liability, whereas the latter implies a portion of the premium is earned during the period of construction whilst a portion of the premium should be earned over the 7 year period in which claims may be lodged and any liabilities thereafter form outstanding claims. Since the issue is about allocation between outstanding claims and premium liabilities, we note there may be implications for total insurance liabilities after adding risk margins, which are generally higher for premium liabilities. If premiums are earned too quickly, there are also implications for loss ratios being underestimated for a growing portfolio.

The pattern of risk needs to be established and the incidence of risk is not always uniform. For example, for mortgage insurance, the risk is higher in the earlier periods and decreases dramatically as more of the loan is repaid. Incidence of risk should be assessed by analysing the incidence and cost of claims over the life of loans for a loan portfolio, noting that claims are strongly linked to the economic cycle. Premium is to be earned in accordance with the incidence of risk, so that the expired and unexpired portions of the policy period can be separated.

Materiality of premium liabilities is more significant for multi-year policies, since a large portion of the risk remains unexpired, so that premium liabilities become a more significant component of overall liabilities. For example, in consumer credit many policies are cancelled, since loans are repaid ahead of schedule. In this case, premium liabilities need to allow for a high level of pro-rata refunds.

4.3 Closed and unclosed business

The premium liabilities which APRA requires to be evaluated is the unexpired business for which the insurer is on risk. This excludes business that is earned (period of risk is already past), but includes business that is unearned, both closed (premium has been received) or unclosed (premium has not been received, this can be referred to as “pipeline premium”). Unclosed premium is part of the difference between ultimate premium and written premiums, but is separate from the premium adjustments discussed in Section 3.5.

A matching asset allowing for unclosed premium (premium yet to be received) should be estimated and explicitly shown. Capital requirements will be increased as higher levels of unclosed premium are estimated.

Evaluation of claims by occurrence or accident year naturally separates business into that earned and unearned. This method is usually employed by direct insurers. On the other hand, projecting claims by underwriting year, a method most often used by reinsurers, projects expired and unexpired business in combination, so that the result is required to be split into earned and unearned.

Unearned policies can be closed or unclosed, nevertheless the company is on risk for all the unexpired business. If claims by underwriting year are projected in the pattern of past years, claims arising from unclosed business should already be included.

Allowing for unclosed business is especially important for reinsurance and commercial portfolios. Unclosed business includes

- New business, which has been written but not yet processed. This should be estimated by assessing the amount and pattern of earned and unearned proportions on the basis of the average delay in processing including allowances for reinsurance premiums, as described in Section 3.4.
- Renewals with a date of attachment before the balance date which have neither been paid nor cancelled. This should be estimated using details of renewals and expected rates of cancellation from the due date to balance date.
- Broker business, where latest information about policies written has not been provided. This should be estimated using expected rates of delay.

In Singapore financial statements, we believe varying levels of unclosed business are allowed to be shown by insurers, ranging from allowance for no unclosed business to all the expected unclosed business. The inclusion of various levels of unclosed business leads to varying levels of immediate realisation of future profits and losses. It is not necessarily conservative to allow fully for unclosed business, particularly if future profits exceeding any extra capital requirements are anticipated.

4.4 Inwards reinsurance premium liability recognition

APRA has mandated that in the case of proportional treaty reinsurance business, reinsurers must recognise any premiums receivable for business written by the underlying insurer prior to the balance date which has not yet expired, as well as for future underlying policies yet to be written between the balance date and the next renewal date of the treaty. Corresponding liabilities for reinsurance commission payable and for the claims arising from this business must be recognised.

The approach stemmed from the belief that reinsurers writing unprofitable business which cannot legally be avoided should be required to account for the situation at the reporting date. However, we note that it is inconsistent with the reporting requirements of direct insurers which must only establish premium liabilities for business written prior to the balance date. For example, in a 50% quota share portfolio, the reinsurer will be recognising premium liability in excess of that recognised by the insurer. We will call the extra component to be recognised by the reinsurer a “future unexpired portion”.

Reinsurers are required to calculate the “future unexpired portion” by estimating the expected amount of premiums falling due beyond the reporting date which the reinsurer is committed to accepting. This information would largely be based on treaty EPI (estimated premium income) data supplied by the insurer. The estimate has the potential to be extremely uncertain due to possible changes in underlying insurer strategy and future market conditions for policies not yet written. Then, the ultimate adopted loss ratio applied to the “future unexpired portion” of the portfolio is subject to more uncertainty than that applied to the “current unexpired portion” of the portfolio.

APRA’s recognition rule will increase the capital requirements for reinsurers as any future anticipated profits may be insufficient to fully offset the extra capital requirements. It is unclear what implications this ruling will have on the reinsurance market in Australia both in terms of pricing and timing of contracts.

5

FUTURE DEVELOPMENTS

Finally, we will discuss how some future developments are likely to impact the evaluation of premium liabilities.

5.1 Actual versus expected analysis

An actual versus expected analysis compares actual claims with those expected under the previous valuation basis to evaluate the suitability of the previous valuation basis. The actual vs expected analysis is traditionally undertaken for the outstanding claims liability evaluation where claims occurred prior to the previous calculation date. Our market experience indicates that this analysis, while undertaken for outstanding claims liabilities, is not commonly undertaken for premium liabilities.

To evaluate the suitability of the previous premium liability valuation basis, claims occurring after the previous valuation date need to be separated into those for which the company was on or not on risk, (policy start date before or after the valuation date).

Actual claims experience for claims that occurred after the previous valuation date where policies were already incepted, can be compared to claims expected under the previous premium liability valuation basis.

The suitability of the previous premium liability valuation basis can then be evaluated with a view to formulating a suitable current basis. This is particularly important for business where premium liabilities are material such as short tail classes or consumer credit multi-year policies.

5.2 Comparison of UPL and CEPL

Prior to the new regulations in Australia there was no explicit requirement to calculate the prospective central estimates of premium liabilities. However if CEPL exceeds UPL $\{=UPR-DAC\}$, a premium deficiency is implied.

It is assumed that, in the past, insurers would have increased future premiums if premium deficiency reserves (in accordance with APRA guidance) were established. Well-known evidence of underpricing in the 1990s (particularly for Public Liability, Professional Indemnity and Builders Warranty) indicated that these deficiencies may not have been recognised.

Since CEPLs are now explicitly calculated for the regulatory returns, one would expect it to be more likely that premium deficiencies are recognised in company financial statements. Additionally, making this more probable is a current Australian Accounting Standard Board Exposure Draft ED5/122A stating that “It is proposed that, where the carrying amount of insurance liabilities less related deferred acquisition costs and intangible assets is insufficient to meet estimated future cash flows, the entire deficiency must be recognised as an expense in the income statement. AASB 1023 currently requires a write down of the deferred acquisition costs but not the recognition of an additional liability where this is warranted.”

In Singapore, the regulator requires that the maximum of {UPR less DAC} and central estimate premium liabilities be calculated by statutory line of business. The sum of $\max(\text{UPR-DAC}, \text{CEPL})$ is compared to premium liabilities at 75% sufficiency in aggregate by fund, and the higher of the two reported in regulatory returns. If premium liabilities at 75% sufficiency is lower than UPL, then company financial statements and statutory returns will be consistent, with future profits immediately realised only up to the level of UPL in Singapore. There is no such requirement in Australia. If premium liabilities at 75% sufficiency are lower than UPL, then in company financial statements, future profits will be immediately realised only up to the level of UPL. Since there is no requirement in Australia to compare premium liabilities at 75% sufficiency to UPL, in this case, returns in Australia to the regulator may imply higher immediate realisation of future profits than in financial statements.

Australian regulators allow the approximation of central estimate premium liabilities by using {UPR less DAC} where the actuary deems the difference to be immaterial. It is possible that in the future as Approved Actuaries gain more experience in calculating central estimate premium liabilities, and accounting standards change as described to require prospective calculation of premium liabilities, that APRA will require the actuary to undertake a full valuation of central estimate premium liabilities for classes currently exempt.

5.3 International Financial Reporting Standards (IFRS)

Australian reporting entities are currently working towards adopting IFRS for reporting periods commencing on or after 1 January 2005. The IFRS will bring about a variety of wide ranging changes on accounting for insurance business. Here we will only deal with changes likely to impact directly on the calculation of premium liabilities for an insurer’s financial statements.

It is proposed that AASB1023 be amended to require recognition of premium liabilities consistent with that calculated under APRA's GPS210 *Liability Valuations for General Insurers* with the exception that insurers be required to carry forward future profit margins as a part of the premium liability, to be earned in the same pattern as risk. This is more conservative than the APRA approach where any profits are immediately realised.

In effect, this means that the premium liability recognised in the accounts is to be estimated on a fully prospective basis including a risk margin advised by an actuary with explicit reference to GPS210 (however the risk margin is not specified to be at 75% sufficiency level).

6

BIBLIOGRAPHY

Australian Accounting Standards Board, "AASB Action Alert", No. 64, August 2003

Australian Accounting Standards Board, Exposure Draft ED 122A - Request for Comment on Amendments to AASB 1023 General Insurance Contracts, October 2003.

Australian Prudential Regulation Authority, General Insurance Prudential Standards GPS 210 - Liability Valuation for General Insurers, July 2002.

Blanchard, R. "Premium Liabilities – U.S. and Canadian Perspectives", 2003 CLRS Chicago, IL – September 9, 2003.

Buchanan, R. for the General Insurance Professional Standard on Liability Valuation Task Force, "Valuations under the Insurance Act – Technical Guidance Note", *Australian Actuarial Journal*, 2002 Vol 8 Issue 2, pp. 365-396.

Canadian Institute of Actuaries, "Educational Note: Valuation of Policy Liabilities - P&C Insurance Considerations Regarding Claim Liabilities and Premium Liabilities", June 2003.

Cantin, C. & Trahan, P. "Study Note on the Actuarial Evaluation of Premium Liabilities", May 1999.

Hart, Buchanan & Howe, "Actuarial Practice of General Insurance", Institute of Actuaries of Australia, 6th Edition, 2002.

Singapore Insurance Act (Chapter 142) 1966, Revised 2000.

APPENDIX

A

REFUND EXAMPLE

This numerical example illustrates our conclusions in section 3.3 regarding different methods of taking into account refund claims when calculating premium liabilities. We have used data by accident quarter for a domestic class of business, using recent combined data from some Australian insurers. Below we have outlined two different approaches, Methods 1 and 2, which both calculate premium liabilities using the loss ratio method.

A.1 Method 1

Method 1 uses policy record information and takes refunds into account explicitly, in the following steps:

- A.1.1 Obtain policy by policy record information, with entries for policy start date, gross written premium and refunds
- A.1.2 Apportion gross written premiums before past refunds by policy quarter and duration quarter since policy inception.
- A.1.3 Calculate past refund rates by policy quarter as a proportion of gross written premium
- A.1.4 Apportion associated past refunds by policy quarter (of original written premium) and duration quarter since policy inception
- A.1.5 Project future refunds and therefore select an ultimate refund rate by policy quarter
- A.1.6 Calculate gross earned premium before any past refunds by accident quarter
- A.1.7 Calculate ultimate claims by accident quarter in an outstanding claims analysis
- A.1.8 Calculate loss ratios before past refunds by past accident quarter
- A.1.9 Select loss ratios to apply to future accident quarters
- A.1.10 Apply adopted loss ratios to gross unearned premium before past refunds to obtain future claims
- A.1.11 Apply difference between adopted ultimate refund rate and actual past refund rate to gross unearned premium by policy quarter to obtain future refunds
- A.1.12 Load up the future risk claims component for policy maintenance expenses, claims establishment expenses and claims management expenses (the future refund component already includes these expenses, since it is calculated pro-rata from gross premium)
- A.1.13 Determine the central estimate of premium liabilities as the sum of the risk claims component loaded up for expenses plus the future refund component.

A.2 Method 2

Method 2 uses policy record information and does not take refunds into account explicitly, in the following steps:

- A.2.1 Obtain policy by policy record information, with entries for policy start date, gross written premium and refunds
- A.2.2 Apportion gross written premiums after past refunds by policy quarter and duration quarter since policy inception
- A.2.3 Calculate gross earned premium after past refunds by accident quarter
- A.2.4 Calculate ultimate claims by accident quarter in an outstanding claims analysis
- A.2.5 Calculate loss ratios after past refunds by past accident quarter
- A.2.6 Select loss ratios to apply to future accident quarters
- A.2.7 Apply adopted loss ratios to gross unearned premium after past refunds to obtain future claims
- A.2.8 Load up the future claims for policy maintenance expenses, claims establishment expenses and claims management expenses to determine the central estimate of premium liabilities.

A.3 Result of Example

If future refunds are not separately analysed, these methods illustrate the problem that arises, since future refunds can be more expensive than claims. That is, refund claims may have a “loss ratio” of around 95% (100% - 5% administration fee), whereas typical short tail risk claims may have a loss ratio in the range of 50% - 80%, well below 95%. Even where premiums are accurately priced, one might expect that a portion of the profit margin is refunded when a policy is cancelled, which means that a central estimate excluding risk margin might understate the cost of refund claims.

We contend that Method 1 obtains a more accurate answer. Method 2 is likely to be underestimated, since it does not take the full cost of refunds into account. In our example, results for Method 2 were 9% below those for Method 1.

We used “real” data in our example. Variations in ultimate loss ratios and refund rates would cause results to differ, but we believe that there would still be a material underestimation if Method 2 were used, rather than Method 1. In this example, we used the straight average of the loss ratios for the last four accident quarters as the adopted loss ratio to apply to future policy quarters.

Results of the examples are shown in the following table:

Table A1: Summary of methods descriptions and results

	Method 1	Method 2	Difference
Description	Uses policy record premium before all (past and future) refunds to calculate risk claims; refund claims explicitly calculated	Uses policy record premium after past refunds to calculate risk claims; no explicit consideration of refund claims	
CEPL	45,646,180	41,560,645	-4,085,534
% of Method 1	100%	91%	-9%

A.4 Detailed Calculations

The following two pages illustrate the calculation of CEPL using Methods 1 and 2.

Method 1

Policy Quarter	Written Premium before Refunds	Refunds to Date	Ultimate Refunds	Written Premium after Refund	Refund Rate to Date	Ultimate Refund Rate	UEP Before Past Refunds	Future Refunds
Sep-2001	28,780,852	7,390,918	7,390,918	21,389,934	26%	26%		
Dec-2001	25,715,647	6,814,353	6,814,353	18,901,294	26%	26%		
Mar-2002	29,890,246	7,659,230	7,659,230	22,231,016	26%	26%		
Jun-2002	33,889,910	8,426,113	8,426,113	25,463,797	25%	25%		
Sep-2002	35,147,418	10,061,446	10,061,446	25,085,972	29%	29%	3,307,090	77,866
Dec-2002	31,583,383	8,953,624	9,024,624	22,558,759	28%	29%	9,640,670	157,537
Mar-2003	35,813,736	8,767,155	10,367,788	25,445,947	24%	29%	20,645,782	1,564,376
Jun-2003	39,237,776	6,986,260	11,474,012	27,763,764	18%	29%	33,877,112	4,333,037
Avg (4)						29%	67,470,654	6,132,817

Accident Quarter	EP Before Past Refunds	Ultimate Claims	LR Before Refunds	Expenses	Future Risk Claims	Future risk claims incl expenses	Future Refunds	Future Risk and Refund Claims
Sep-2001								
Dec-2001								
Mar-2002								
Jun-2002								
Sep-2002	30,957,643	15,248,021	49%					
Dec-2002	32,585,834	15,353,229	47%					
Mar-2003	33,026,575	20,444,167	62%					
Jun-2003	33,663,518	18,409,326	55%					
Total	130,233,569	69,454,743						
Avg (4)			53%	10%	35,921,239	39,513,363	6,132,817	45,646,180

Written Premium Apportionment (BEFORE past refunds)

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	4,645,526	8,238,856	7,026,507	6,133,022	2,736,941	28,780,852
Dec-2001	4,317,052	7,357,015	6,318,440	5,391,990	2,331,151	25,715,647
Mar-2002	4,593,561	8,573,227	7,411,293	6,381,146	2,931,018	29,890,246
Jun-2002	5,151,541	9,681,700	8,435,952	7,199,340	3,421,378	33,889,910
Sep-2002	5,735,718	10,110,835	8,562,300	7,431,475	3,307,090	35,147,418
Dec-2002	5,326,750	8,951,438	7,664,525	6,654,034	2,986,636	31,583,383
Mar-2003	5,382,479	9,785,475	8,627,369	8,063,852	3,954,560	35,813,736
Jun-2003	5,360,664	10,310,779	9,792,769	9,200,424	4,573,140	39,237,776

Ultimate Refund Apportionment

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	740,987	1,902,882	2,066,402	1,853,499	827,148	7,390,918
Dec-2001	713,115	1,759,719	1,924,341	1,687,577	729,600	6,814,353
Mar-2002	728,189	1,967,924	2,166,150	1,916,618	880,350	7,659,230
Jun-2002	791,421	2,153,729	2,389,484	2,095,584	995,895	8,426,113
Sep-2002	1,021,241	2,606,733	2,810,804	2,507,018	1,115,651	10,061,446
Dec-2002	948,424	2,307,822	2,516,085	2,244,747	1,007,545	9,024,624
Mar-2003	958,347	2,522,850	2,832,164	2,720,351	1,334,076	10,367,788
Jun-2003	954,463	2,658,282	3,214,738	3,103,775	1,542,755	11,474,012

Written Premium Apportionment (AFTER ultimate refunds)

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	3,904,539	6,335,974	4,960,104	4,279,523	1,909,793	21,389,934
Dec-2001	3,603,937	5,597,295	4,394,099	3,704,413	1,601,550	18,901,294
Mar-2002	3,865,371	6,605,304	5,245,144	4,464,529	2,050,668	22,231,016
Jun-2002	4,360,120	7,527,970	6,046,468	5,103,756	2,425,483	25,463,797
Sep-2002	4,714,477	7,504,102	5,751,497	4,924,457	2,191,439	25,085,972
Dec-2002	4,378,325	6,643,616	5,148,440	4,409,287	1,979,090	22,558,759
Mar-2003	4,424,132	7,262,625	5,795,205	5,343,501	2,620,484	25,445,947
Jun-2003	4,406,201	7,652,497	6,578,031	6,096,649	3,030,385	27,763,764

Method 2

Policy Quarter	Written Premium before Refund	Refunds to Date	Refund Rate to Date	UEP After Past Refunds
Sep-2001	28,780,852	7,390,918	26%	
Dec-2001	25,715,647	6,814,353	26%	
Mar-2002	29,890,246	7,659,230	26%	
Jun-2002	33,889,910	8,426,113	25%	
Sep-2002	35,147,418	10,061,446	29%	2,191,439
Dec-2002	31,583,383	8,953,624	28%	6,459,378
Mar-2003	35,813,736	8,767,155	24%	15,359,823
Jun-2003	39,237,776	6,986,260	18%	27,845,315
Avg (4)				51,855,954

Accident Quarter	EP After Past Refunds	Ultimate Claims	LR After Refunds	Expenses	Future Risk Claims	Future claims incl expenses
Sep-2001						
Dec-2001						
Mar-2002						
Jun-2002						
Sep-2002	23,101,797	15,248,021	66%			
Dec-2002	23,994,974	15,353,229	64%			
Mar-2003	23,973,669	20,444,167	85%			
Jun-2003	24,167,207	18,409,326	76%			
Total	95,237,648	69,454,743				
Avg (4)			73%	10%	37,782,405	41,560,645

Written Premium Apportionment (BEFORE past refunds)

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	4,645,526	8,238,856	7,026,507	6,133,022	2,736,941	28,780,852
Dec-2001	4,317,052	7,357,015	6,318,440	5,391,990	2,331,151	25,715,647
Mar-2002	4,593,561	8,573,227	7,411,293	6,381,146	2,931,018	29,890,246
Jun-2002	5,151,541	9,681,700	8,435,952	7,199,340	3,421,378	33,889,910
Sep-2002	5,735,718	10,110,835	8,562,300	7,431,475	3,307,090	35,147,418
Dec-2002	5,326,750	8,951,438	7,664,525	6,654,034	2,986,636	31,583,383
Mar-2003	5,382,479	9,785,475	8,627,369	8,063,852	3,954,560	35,813,736
Jun-2003	5,360,664	10,310,779	9,792,769	9,200,424	4,573,140	39,237,776

Past Refund Apportionment

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	740,987	1,902,882	2,066,402	1,853,499	827,148	7,390,918
Dec-2001	713,115	1,759,719	1,924,341	1,687,577	729,600	6,814,353
Mar-2002	728,189	1,967,924	2,166,150	1,916,618	880,350	7,659,230
Jun-2002	791,421	2,153,729	2,389,484	2,095,584	995,895	8,426,113
Sep-2002	1,021,241	2,606,733	2,810,804	2,507,018	1,115,651	10,061,446
Dec-2002	948,424	2,307,822	2,516,085	2,195,743	985,550	8,953,624
Mar-2003	958,347	2,522,850	2,173,892	2,088,067	1,024,000	8,767,155
Jun-2003	954,463	1,524,230	1,843,296	1,779,672	884,599	6,986,260

Written Premium Apportionment (AFTER past refunds)

Policy Quarter	Duration by quarter					Total
	0	1	2	3	4	
Sep-2001	3,904,539	6,335,974	4,960,104	4,279,523	1,909,793	21,389,934
Dec-2001	3,603,937	5,597,295	4,394,099	3,704,413	1,601,550	18,901,294
Mar-2002	3,865,371	6,605,304	5,245,144	4,464,529	2,050,668	22,231,016
Jun-2002	4,360,120	7,527,970	6,046,468	5,103,756	2,425,483	25,463,797
Sep-2002	4,714,477	7,504,102	5,751,497	4,924,457	2,191,439	25,085,972
Dec-2002	4,378,325	6,643,616	5,148,440	4,458,292	2,001,086	22,629,759
Mar-2003	4,424,132	7,262,625	6,453,478	5,975,786	2,930,560	27,046,580
Jun-2003	4,406,201	8,786,549	7,949,472	7,420,753	3,688,541	32,251,516