



Institute of Actuaries of Australia

Treatment of Future Unascertained Personal Injury Claims

Submission to the Corporations and Markets Advisory Committee

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Introduction

1. The Corporations and Markets Advisory Committee (CAMAC) has been asked to comment on a proposal that certain creditor protections be extended to “future unascertained personal injury claimants”. As part of its review, the CAMAC has called for submissions from interested parties.
2. Actuaries play a key role in the insurance industry and are uniquely positioned to provide a detailed insight into the financial dynamics of personal injury liability claims. The Institute of Actuaries of Australia is the professional body representing Australian actuaries and has a keen interest in informing public debate in such areas.
3. This submission is intended to assist the CAMAC with its study of the potential implications of creditor protection policy change in this area. The submission is not intended to be a comprehensive analysis of all the issues. Rather, we have attempted to outline a number of key issues which we believe the CAMAC will need to address as part of its review. We would be happy to participate in a discussion with the CAMAC to elaborate on any of the issues raised or to provide further assistance as required.

Institute interest in issues

4. The Institute of Actuaries of Australia (Institute) is the professional body for actuaries in Australia. We represent the interests of over 1,400 Fellows and 1,600 other members.
5. A substantial number of our members specialise in general insurance. In our role as general insurance professionals, we play an essential role in the sound design, pricing, liability evaluation, and performance monitoring of all general insurance products, but especially of liability insurance, which often involves personal injury claims. From 1 July 2002, members have a statutory responsibility to advise boards of private sector insurance companies on balance sheet provisions for outstanding claim and premium liabilities.
6. Since 1978, the Institute has been running a series of General Insurance Seminars, which are recognised as the premier forum for discussing financial management, design, pricing and reserving issues in this field.
7. The Institute, as a professional body, aims to contribute to and inform public debate on both practical and policy issues, in the interest of the general public. As a result of this background, and because of our skills, which are based on the quantitative and mathematical analysis of financial systems, the Institute’s members are uniquely

placed to contribute to a practical understanding of the financial issues involved in making changes such as those proposed.

8. This submission is provided in this context.

The proposal being considered

9. The detail of the proposal being examined by the CAMAC has been reproduced as Appendix A. The following summary of the proposal has been extracted from the Introduction to the Terms of Reference.
10. *"It is proposed that the existing creditor protections should be extended to future unascertained creditors where a mass future claim is afoot. Specifically, provisions could provide that if a company is subject to a mass future claim:*
 - *existing creditor protections will apply to any future unascertained personal injury claimants;*
 - *conduct intended to avoid or reduce payments to personal injury claimants will be prohibited (that is, a new provision modelled on Part 5.8A of the Corporations Act); and*
 - *if the company is put into external administration, the external administrators will be required to admit and make provision for future unascertained personal injury creditors."*
11. It is further proposed that the protections will **not** apply if *"it can be shown that it is not reasonably possible to either:*
 - *identify the circumstances giving rise to the future personal injury claims and the class of persons who will bring the claims; or*
 - *reasonably estimate the extent of the company's liability under such claims."*
12. By the nature of our training and experience, actuaries have a strong practical understanding of the evaluation and quantification of risk. In this context, the Institute offers comment on the following elements of the proposal:
 - defining a "mass future claim";
 - estimating provisions and the implications of uncertainty in the estimates;
 - practical considerations with "long-tail" liabilities.
13. Each of these is addressed in turn in the following sections.

Mass future claim

14. The proposal involves the extension of creditor protection where a mass future claim is afoot. The proposal defines this as follows:

"either

- *the company has been subject to an unusually high number of claims for payment arising from particular acts or omissions leading to personal injury; or*
- *more than one company of a similar industry, or other companies with similar business operations to the company in question have been subject to such claims;*

and

- *there is a strong likelihood of numerous future claims of this type."*

Situations which may give rise to mass future claims

15. We would expect that many of the claim situations to be covered by the proposed extended creditor protections will be in respect of personal injury claims involving gradual onset diseases. By their nature, the symptoms of such diseases may take many years to manifest themselves, and the claims themselves can be very complex.

Defining the eligible claimant group

16. One of the issues to consider is how to define the eligible claimant group. There may be a number of dimensions to this, including the following:
- defining the group for the purpose of estimating the liability;
 - establishing who is eligible to be compensated from the funds once those funds have been set aside for "future unascertained personal injury claimants".
17. The following "potted history" of the emergence of claims for compensation from asbestos exposure, can be used to illustrate the issue:

Asbestos-related disease can take a number of forms. When compensation claims for asbestos-related disease first emerged, they were primarily for mesothelioma and asbestosis. The former is an almost invariably fatal cancer, with the second a debilitating but often non-fatal lung disease. Claims for lung cancer then became more common. Often these claims were (and often still are) rejected as not being asbestos-related, particularly where the claimant was a cigarette smoker, unless asbestosis was also present. As time went on, claims also emerged for asbestos-related pleural disease, and pleural plaques (the latter typically not producing any ill-effects). More recently some claims have been made for compensation for mental

anguish from fear of contracting an asbestos-related disease following some form of asbestos exposure¹.

In the early years, most claims tended to come from those who mined asbestos, or those who worked directly with asbestos or asbestos-heavy products. Over time, new types of claimant emerged, often with more incidental exposure - children who lived near the mines, the partners of miners, people who have renovated homes built with asbestos products, and so on.

18. Had the extended creditor protections now being mooted been in place some twenty or so years ago, and a company with asbestos-related claim exposure been placed into administration at that time, the estimate of the personal injury claim liabilities would probably have been based on the following:
 - expectations of a relatively large number of claims;
 - 90% or more arising from asbestosis and mesothelioma;
 - primarily in respect of people with relatively high direct exposure to asbestos.
19. This "defines" the claimant group for the purposes of estimating the liability.
20. As we now know, the claimant profile which has emerged is quite different:
 - they involve a larger number of types of asbestos-related disease;
 - they arise from a wider spectrum of claimants (including those with incidental exposure, for example).
21. The question then arises as to whether these unforeseen - or if foreseen, discounted as being unlikely to be material - groups of claimants would also be eligible to qualify as creditors for the purposes of accessing the pool established for "future unascertained personal injury claimants".
22. [The fact that there may well have been higher numbers of claims emerging - even without the widening of the disease categories and the exposed group - is covered in a later section, which discusses uncertainty in the estimates.]
23. Several interpretations are possible, including the following:
 - It is proposed that the amount of funds to be set aside be determined on the basis of an estimated number and average size of claim. Types of claim and claimant not explicitly reflected in that calculation therefore fall outside the definition of eligible claimants.
 - The estimates are, by their nature, uncertain. Any calculation can only establish what might be a **reasonable** pool of funds. The funds should then be available to all personal injury claimants - or at least a broadly

¹ These claims are relatively rare in Australia but have become quite common in the US.

defined group of claimants (for example, "those who suffer personal injury as a result of the use of asbestos in products produced by Company X") - not one based on boundaries established using imperfect information.

Estimating provisions

24. The third element of the proposal is to require external administrators to "*admit and make provision for mass future claims for personal injury*". It is proposed that the provision be calculated taking into account:
 - the number of potential claimants;
 - the level of damages awarded for similar claims;
 - industry analyses;
 - academic studies;
 - independent actuarial analyses;
 - such other matters as the external administrator thinks relevant.
25. The estimation of liabilities of this type is a core actuarial skill. This is recognised by the Australian Prudential and Regulatory Authority (APRA) which has a statutory valuation role for actuaries in general insurance. Actuarial advice is also regularly sought by non-insurance companies which self-insure risks. In some cases, particularly workers' compensation, actuarial "sign off" of self-insurance liabilities is mandated by another regulatory body.
26. There are a number of formal standards and requirements which apply to the evaluation of liabilities of this type. These are summarised below.
 - The actuarial evaluation of potential liabilities of general insurers, self-insurers and statutory bodies for personal injury claims is covered by the Institute's Professional Standard 300, *Actuarial Reports and Advice on General Insurance Technical Liabilities* (PS300). This standard sets out the process an actuary is to follow and issues he or she is expected to consider when undertaking a valuation of this type. Further guidance is provided in the Institute's Guidance Note 353 *Evaluation of General Insurance Technical Liabilities* (GN353). The principles set out in these documents are equally applicable to the valuation of such liabilities in other contexts.
 - The Approved Actuary for a general insurance company must also comply with requirements set down by the APRA, and in particular the Prudential Standard 210 *Liability Valuation for General Insurers* (GPS210) and

Guidance Note 210.1 *Actuarial Opinions and Reports on General Insurance Liabilities* (GGN210.1)².

- Companies must also comply with the relevant accounting standards. In Australia, general insurance claim liabilities are subject to Accounting Standard AASB1023 *General Insurance Contracts* (AASB1023). Insurance accounting standards generally are under review by the International Accounting Standards Board (IASB). It is expected that the outcome of this review will flow through to AASB1023.

Provisions for other liabilities are generally covered by Accounting Standard AASB137 *Provisions, Contingent Liabilities and Contingent Assets* (AASB137). This, too, is likely to change, following the release of an exposure draft of changes to the corresponding international standard (IAS37) by the IASB in 2005. If the changes proceed as expected, a material liability to future unascertained personal injury claimants will need to be recognised in an entity's accounts.

- Broadly, each of GPS210, AASB1023 and the exposure draft of IAS37, requires a provision comprising a present value estimate of the expected value of the liability, plus a margin reflecting the uncertainty around this estimate.
27. Copies of PS300 and GN353 are attached. Copies of the APRA, AASB and IASB documents can be provided on request.
 28. We consider it essential that actuarial advice be sought regarding the evaluation of the liabilities, because of the deep understanding actuaries have of the financial dynamics of personal injury risk and claim experience. In undertaking the actuarial evaluation, the actuary should consider, where available, expert advice specific to the nature of the liabilities. We would expect that the actuary would conduct the study under PS300, and subject to the guidance of GN353, GPS210, GGN210.1 and AASB137 as appropriate.
 29. We would also recommend that the estimate be subject to regular, preferably annual, actuarial review - at least while the liabilities remain significant. As discussed below, the estimates are subject to uncertainty and can be expected to change over time.

Uncertainty in the estimates

30. The quantification of liabilities of this type involves making a series of assumptions regarding the size of the group exposed to injury or disease, the proportion of those who are exposed who will suffer such an injury or contract such a disease, the proportion of those affected who will seek compensation, and the amounts those

² Some elements of the prudential standards are in the process of being changed. As part of the proposed changes, GPS210 and GGN210.1 are to be deleted and replaced by GPS310 *Audit and Actuarial Reporting and Valuation* and GGN310.2 *Liability Valuation*. The thrust of the valuation requirements are unchanged.

people will receive. Allowance also needs to be made for the non-damages costs, including legal costs and the costs of claim management and administration.

31. It is to be expected that the **estimate** of the company's liability for personal injury claims will change over time. There are many reasons for this, including (but not limited to) the following:
- Whilst the company's liability for personal injury claims arises from past actions, the quantum will ultimately depend on future events. The liabilities are affected by a range of factors including claimants' propensity to claim, changes in judicial and societal attitudes, changes in economic conditions, and technological (and particularly medical) advances.
 - Estimates will inevitably be based on imperfect data and other information. Over time, information is corrected, replaced and updated, and more reliable estimates can be made.
 - The models which are used to determine the liability estimates are themselves imperfect, and involve approximations and assumptions. Regular analysis of the variation between the projected experience and the actual outcome is used to improve the predictive power of the model.
 - Changes can have unexpected consequences. Even if the change itself can be predicted as part of the estimation process, the response to that change may be unpredictable.
32. The estimation of liabilities involves interpretation of data and other information, and the application of judgement. The fact that the liability estimate will change over time, does not necessarily mean that the estimate is not "reasonably quantifiable". It is simply a reflection of the fact that the eventual outcome is dependent on future events.

What is reasonably quantifiable for this purpose?

33. At any time, there can be considered to be a range of **reasonable** estimates of the liability. Whilst a single estimate is chosen for the purposes of preparing financial statements, the implications of the range of estimates needs to be considered in decision-making for corporate administration.
34. In some cases, particularly where new types of claims are emerging, the reasonable range may be quite wide. Examples of the range of values which may emerge is available from the recent James Hardie Inquiry. The advisor to the inquiry, for example, suggested a reasonable range of estimates as at February 2001 to have been between \$600 million and \$825 million³.

³ Table 6.10, *James Hardie Actuarial Expert Witness Report*, prepared by KPMG Actuaries Pty Ltd, and dated 4 June 2004

35. The proposal being considered by CAMAC requires not only that there is a strong likelihood of future claims but also that the liability be able to be **reasonably estimated**. It is our view that a requirement that the liability be able to be reasonably estimated is unnecessary and may be counterproductive. Other creditors may, whilst accepting that the future personal injury claim liabilities exist, argue that those liabilities are not able to be reasonably estimated.
36. Under current Australian accounting concepts, “reliable” estimation is a fairly forgiving requirement. An uncertain estimate is “reliable” if its uncertainty can be adequately conveyed, so that users do not place undue reliance on it. *“In other words, if there is faithful representation of information, including the uncertainties surrounding it, it may be possible for it to be regarded as being reliable.”* (AASB Statement of Accounting Concepts *Qualitative Characteristics of Financial Information* SAC 3:18).
37. “Reasonable” presumably implies a weaker test. It is our view that, if it is clear that there is a liability to future unascertained personal injury claimants, it should always be possible to place a reasonable, albeit uncertain, estimate on its value. Nevertheless, or perhaps for this very reason, we believe that it would not be desirable to make “reasonable estimation” part of the criteria for protection. If the liability exists and its value is material, then a genuine attempt to protect claimants’ interests should be made.
38. We have argued similarly, in response to the IASB’s exposure draft of proposed changes to IAS37, which governs accounting for such liabilities, that “reliable estimation” should not be a criterion for recognition. If, as expected, this proceeds, a material liability to future unascertained personal injury claimants will need to be recognised in an entity’s accounts. At present, AASB137 would appear to require either recognition or disclosure as a contingent liability, depending on whether it is “probable” (more likely than not) that the entity will need to make payments.
39. The strengthened requirement under IAS37 for an entity to make provision for a material liability for future unascertained personal injury claimants should mean that, in the situations which are covered by the creditor protection proposals, there will already exist at least one estimate of the size of the potential liability. We recommend that independent review of that estimate be required should it appear likely that the proposed provisions are to be invoked.

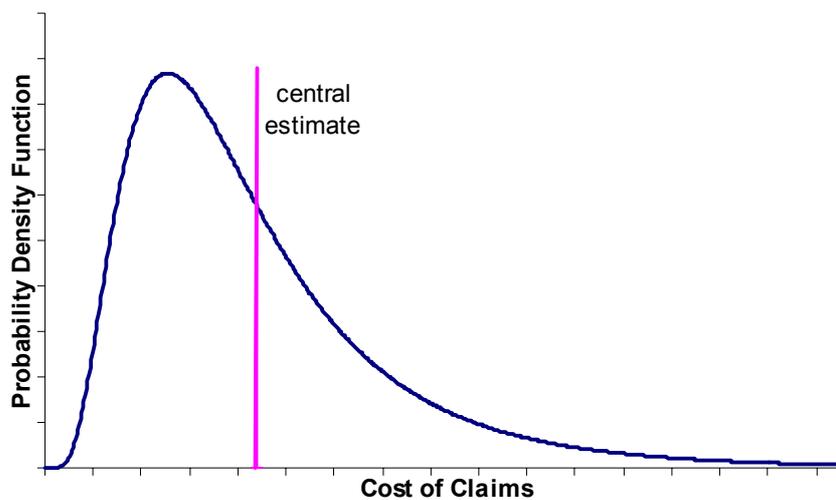
Responding to the uncertainty

40. This uncertainty in liability estimates is well-recognised in the insurance industry. The prudential regulator, APRA, has established minimum capital requirements for general insurance companies that take into account the company risk profile. As part of the assessment of the minimum capital, APRA requires that provisions for claims

be set by an Approved Actuary on the basis of a 75% probability of adequacy, with allowance for discounting at sovereign debt rates⁴.

41. The concept of a probability of adequacy reflects the fact that there is a distribution of possible values. The "expected value" of the liability (which is often referred to as the "central estimate") is the probability-weighted average of all possible outcomes.
42. For liabilities of the sort that we are discussing, the probability distribution is typically "positively skewed". An illustration of a positively skewed probability distribution is shown in Figure 1 below.

Figure 1: Example of positively skewed probability distribution



43. As shown in Figure 1, the positively skewed distribution means that the most likely outcome is that the cost will prove to be somewhat less than the central estimate, but there is a low probability that it may be considerably higher than the central estimate.
44. General insurance companies respond to the uncertainty in the estimates of the claim liabilities by incorporating a margin above the central estimate in the reserves recorded on the balance sheet. Whilst practice varies from company to company, Australian companies generally hold balance sheet reserves intended to give at least a 75% probability of adequacy, the minimum standard required for statutory reporting by APRA. Many insurers adopt a more stringent standard for their accounts, up to a 95% probability of adequacy, but more commonly in the range 80% to 85%.
45. Interestingly, for highly skewed or other unusual distributions, an estimate at the 75% probability of adequacy may provide little or no margin above the central estimate - and may even be lower than the central estimate. This means that care

⁴ This is covered in Prudential Standard GPS210.

should be taken in specifying particular threshold probability levels as part of the proposed creditor protection extension⁵.

46. The response to uncertainty, for the purposes of the extended creditor protection currently being considered, may depend on the particular situation:
- In a case involving evaluation of the impact on creditors of certain corporate transactions affecting share capital, it may be reasonable to estimate the liability for "future unascertained personal injury claimants" on the basis of a probability of adequacy no lower than that represented by the expected value (or central estimate) - and potentially incorporating a margin above this central estimate. This recognises that one function of share capital is to provide a buffer in the event of adverse conditions. When the company's liabilities are uncertain, an evaluation of an appropriate buffer needs to consider the "size" of the uncertainty in the liabilities.
 - In a case involving external administration, the information sought by the administrator in making provision for future unascertained personal injury claimants **should include** illustration of the uncertainty. This may take the form of a range of reasonable estimates, or calculations under a number of claim scenarios. It may be appropriate for an interim distribution to creditors to be based on the high-end estimate from this range, or a higher probability of adequacy. At a later stage a final distribution might be based on the updated central estimate.

Practical implementation issues

47. As noted previously, many of the claim situations to be covered by the proposed extended creditor protections will be in respect of personal injury claims involving gradual onset diseases. By their nature, the symptoms of such diseases may take many years to manifest themselves. Asbestos liabilities, for example, are still emerging more than forty years after exposure. The amount of the liability may not become certain for many, many years – even decades.
48. The framework will need to adequately balance the need for trade creditors to receive prompt payment, with the need for personal injury creditors to receive a fair allocation of the available assets. The following sub-sections discuss a number of issues for consideration:
- management of the claims
 - dealing with movements in the estimate of the liability

⁵ APRA has considered the scope for such outcomes in its prudential regulations, and specifies that the margin above the central estimate should be no less than one half of the standard deviation of the central estimate. If CAMAC wishes to propose specific threshold probability levels as part of its response to Government we would be happy to work with CAMAC to establish appropriate definitions to accommodate unusual situations.

- changing the size of the liability
- potential for risk transfer
- mechanisms to "top up" the fund.

Management of claims

49. Personal injury claims can be very complex and require specialist claim management skills. The way in which the claims are managed can materially affect the ultimate cost of those claims. The infrastructure put in place to manage the wind-up of the company is unlikely to be the most appropriate from a claim management perspective, particularly in the long term. Alternative claim management mechanisms may therefore need to be put in place to efficiently and effectively handle the claims.
50. The framework which is put in place to put effect to the proposal, should it proceed, should allow the liquidator to enter such claims management agreements as are deemed appropriate. Different claim management pathways that may be followed include the following:
 - Establishment of a trust and a separate company to be the trustee of that trust, and to manage the claims and the fund. Recent examples of this approach include the Medical Research and Compensation Foundation established by James Hardie, and the HIH Claims Support Scheme established by the Federal Government.
 - Outsourcing the management to a third party provider. This may be direct, or through a trust arrangement. For example, as part of the HIH Claims Support Scheme insurance companies were contracted by the trustee to provide certain claims management services.
51. Alternatively, consideration may be given to establishing a statutory body to manage all liabilities of this type for companies in liquidation.

Dealing with movements in liability estimates

52. The estimate of the liability will change over time. Situations will develop where the estimates are revised upwards implying a shortfall in the fund, whilst others will involve downward estimate revisions, implying surplus funds. Measures will need to be put in place to ensure that, as far as is practicable, personal injury claimants who have claims on the fund at different times are treated equitably.
53. An example may help to illustrate this. Assume that a pool for future personal injury claimants is established based on an estimated liability and a liquidation distribution of \$0.70 in the \$1.00. The experience is heavier than expected, and after five years the liability estimate is increased. How does the scheme manage this situation?

- Does the \$0.70 in the \$1.00 payable to claimants get reduced for claims lodged after the date of the estimate adjustment?
 - Does the payout proportion remain at \$0.70 in the \$1.00 with claims settled at that level until the funds are exhausted?
 - Do all personal injury claimants receive an “interim distribution” based on a worst case scenario, until such time as the liability is reasonable certain, with a final distribution then paid to all claimants if the funds permit?
54. Consideration needs also to be given to how the scheme manages a situation where the experience is better than expected, and there are surplus funds after settlement of all claims.

Changing the size of the liability

55. An issue that often arises with compensation for those suffering personal injury, is whether restrictions on quantum should be applied. Common approaches include use of benefit thresholds, deductibles or caps. Such measures may be used to help achieve a balance between the generosity and affordability of compensation.
56. For example, thresholds or deductibles are commonly used to eliminate trivial claims. This can result in significant administrative savings, and helps to direct limited funds to those who have the greatest need.
57. The CAMAC may wish to consider whether situations may arise in which it may be appropriate for the liquidator to have the flexibility to apply quantum restrictions in order to reduce the uncertainty and/or size of the liability estimate and achieve agreement between all parties. This will clearly be a sensitive issue. Most Australian jurisdictions already apply thresholds and/or caps for personal injury compensation, so applying further thresholds and/or caps may be considered unduly harsh.
58. If the framework put in place to extend the creditor protections was to include the flexibility for such quantum restrictions, we would recommend that it also include significant protections to ensure that the approach was taken only as a last resort.

Potential for risk transfer

59. A practical solution to the problems of uncertainty and timeliness of the liquidation is to have a commercial transfer of the liabilities to a specialist claim manager (such as an insurance company). The advantage for the liquidation, is that the uncertain liability is replaced by a "certain" insurance premium⁶. The downside is the

⁶ The insurance premium may well be structured with an up-front payment (or series of payments), subject to an experience-based adjustment at a pre-determined future date or series of dates. Whilst not removing the uncertainty in the short-term, the period of uncertainty would be significantly reduced.

additional cost - the loading in the premium for the insurer's profit (the return for taking on that uncertainty).

60. In theory, all risk is insurable - the only question is the price. In practice, the market may be unwilling to take on risks of this type. The insurability may be enhanced if the uncertainty can be reduced, for example through applying deductibles, thresholds and/or caps - or even restricting the heads of damage which can be claimed.
61. An insurance mechanism can be structured where only part of a claim is covered by insurance. This may be used to achieve the payout to the claimant which reflects the distribution from the liquidator (for example, if the distribution is based on \$0.70 in the \$1.00, then the insurance policy could cover 70% of the claim). The creditor protection framework would need to recognise that payment by the insurer also extinguishes the liquidator's liability.

Mechanisms to "top up" the fund

62. An option which CAMAC may choose to consider is for there to be a mechanism for Government to step in between the liquidator and the claimants to "top up" the fund (i.e. to provide the difference between the ultimate cost of claims and the fund established through the liquidation).
63. Such an option may be considered cost effective if it is expected that doing so would reduce the burden that would otherwise be placed on the social welfare and public health systems.
64. The cost of the "top-up" provided may be limited by applying caps or thresholds as discussed previously.
 - For example, the funding could be limited to the balance of the settlement for medical costs and loss of income, and exclude general damages. This would mean that the claimant receives the full entitlement in respect of medical and income compensation, but only that part of the general damages amount that can be provided directly by the fund. This may prove difficult with negotiated settlements, as opposed to damages awards, as the settlements may not be formally segmented by head of damage.
 - Alternatively the payment may be topped up to a maximum of 90% (for example), an approach that was used in the HIH Claims Support Scheme established by the Federal Government.

Miscellaneous issues

65. Where, prior to liquidation, the company's liability for personal injury claims was covered, to some extent, by existing commercial insurance arrangements, recoveries may arise under those policies. Consideration will need to be given as to whether those recoveries go to the benefit of all creditors, or only to personal injury creditors.

The response may depend on the exact wording of the insurance contract, and the likely extent of the recoveries. In situations where the claims are expected to be almost totally covered by existing commercial arrangements, it may be appropriate to "ring fence" the liabilities and the potential insurance recovery asset for the sole benefit of unascertained personal injury claimants.

66. The existence of insurance policies does not guarantee payment, particularly over the very long term, as may be associated with claims of this type. Contract conditions may not be able to be maintained, and the possibility of insurer failure needs to be considered.
67. The questions regarding to whose benefit recoveries accrue may also arise where the company has a right of recovery against a third party in respect of the personal injury claims. (These sorts of questions have arisen as part of the HHH liquidation.)

Summary

68. The Institute supports the proposal to strengthen the protections to future unascertained personal injury claimants.
69. The issues involved are complex, largely because of the uncertainty inherent in liability estimates of this type. Establishing a practical framework which can accommodate this uncertainty will be a key challenge.
70. Key issues to resolve include:
 - defining the group of eligible claimants;
 - determining the means of distributing the funds to those claimants;
 - the approach to handle the uncertainty in the liability estimates;
 - how claims will be managed; and,
 - dealing with the insurance recoveries and existing company provisions.
71. The actuarial profession has established processes and techniques for estimating liabilities for personal injury claims and for illustrating and quantifying the uncertainty of those estimates. Those processes and techniques are continually enhanced and refined.
72. It is our view that, if it is clear that there is a liability to future unascertained personal injury claimants, it should always be possible to place a reasonable, albeit uncertain, estimate on its value. Nevertheless, or perhaps for this very reason, we believe that it would not be desirable to make "reasonable estimation" part of the criteria for protection. If the liability exists and its value is material, then a genuine attempt to protect claimants' interests should be made.

73. The Institute is keen to assist the CAMAC to develop an understanding of the financial dynamics of personal injury liability claims, and the potential implications in the context of extended creditor protections.
74. We would welcome the opportunity to discuss the issues raised in the proposal and in this submission. Please contact Philip French, Director, Public Affairs on philip.french@actuaries.asn.au or phone (02) 9239 6106.

Appendix A: The Proposal

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PROPOSAL FOR THE TREATMENT OF FUTURE UNASCERTAINED PERSONAL INJURY CLAIMANTS

Introduction

It is proposed that the existing creditor protections should be extended to future unascertained creditors, where a mass future claim is afoot. Specifically, provisions could provide that if a company is subject to a mass future claim:

- *existing creditor protections will apply to any future unascertained personal injury claimants;*
- *conduct intended to avoid or reduce payments to personal injury claimants will be prohibited (that is, a new provision modelled on Part 5.8A of the Corporations Act); and*
- *if the company is put into external administration, the external administrators will be required to admit and make provision for future unascertained personal injury creditors.*

Preliminary test – Mass Future Claim

The proposed new protections would be targeted, such that they would only apply where an exceptional number of personal injury claims have arisen out of a company's action or product, and more claims of that nature are expected (i.e. where a mass future claim is afoot). Specifically, the protections would only apply where:

- *either*
 - *the company has been subject to an unusually high number of claims for payment arising from particular acts or omissions leading to personal injury; or*
 - *more than one company of a similar industry, or other companies with similar business operations to the company in question, have been subject to such claims;*

and

- *there is a strong likelihood of numerous future claims of this type.*

Where such a mass future claim is afoot, the new provisions could extend a range of existing creditor protections to facilitate recovery of amounts that will be owed to future unascertained personal injury claimants.

The proposed protections would have the effect of prohibiting certain transactions unless the interests of future personal injury claimants are sufficiently provided for. It would be unreasonable to impose such restrictions if it is not reasonably possible to identify the nature of the future claims or the extent of the company's financial exposure to those claims. Accordingly, the new protections will not apply if it can be shown that it is not reasonably possible to either:

- identify the circumstances giving rise to the future personal injury claims and the class of persons who will bring the claims; or*
- reasonably estimate the extent of the company's liability under such claims.*

1. Extension of general creditor protections

A number of provisions in the Corporations Act require persons involved in corporate decision making to consider the impact of certain transactions on the ability of the company to pay its creditors. The provisions apply to those transactions that are most likely to reduce the pool of assets (or share capital) available for the creditor to recover against any liability. The protections seek to maintain an appropriate allocation of risk between creditors and shareholders. That is, creditors are entitled to rely on the capital of the company remaining undiminished by any expenditure outside the limits of the company's objects.

Where a mass future claim is afoot, these existing creditor protections could be extended to future unascertained creditors. Specifically, this would:

- restrict company transactions which adversely affect share capital, including reductions of share capital (s256B) and share buy-backs (s257A); and*
- defer payment of membership-type debts owed by the company to its members in their capacity as members when the company goes into liquidation until the future personal injury claimants are paid in full (i.e. extending existing section 563A).*

2. Prohibition on intentional avoidance

The second proposal to strengthen creditor protections for future unascertained personal injury claimants is the introduction of a new offence provision and related compensation provisions, modelled on Part 5.8A of the Corporations Act in relation to the protection of employee entitlements. This would send a clear message that deliberate avoidance of payment to personal injury claimants is unacceptable.

Specifically, where there is a mass future claim afoot and the company has a threshold level of information about the nature of expected claims, then the new provisions would provide that a person must not enter into a relevant agreement or a transaction with the intention of, or with intentions that include the intention of, preventing the recovery of amounts owing (or a significant part of amounts owing) in respect of the unascertained future personal injury claimants.

Successful prosecution of the proposed offence would result in a penalty of up to ten years imprisonment and fines of up to \$110,000. Any person knowingly involved in such a contravention would be in breach of the prohibition, not just directors.

Where an intention to avoid payment to personal injury claimants is shown, the provisions would provide means to secure compensation not just from directors or other companies in a group, but from any person who is party to the transaction or arrangement. Such actions need only be brought to the civil standard of proof, whether or not an offence is proven, and need only prove that the proscribed intent was included in the person's intent (in contrast to dominant or sole intent tests).

When considering the details of this proposal, due regard must be had to the priority afforded by the Corporations Act to employee entitlements in a liquidation vis a vis the classification of amounts owing to successful personal injury claimants as ordinary unsecured creditors.

There may be merit in considering a special priority for amounts awarded as compensation under the new provision. This way, it is assured that the personal injury claimants who suffered damage from the conduct and are the subject of a claim under the new provision receive the maximum benefit possible from the action.

Such a priority would only come into play if an action for compensation under the new provision was successful, and be limited to the actual amount awarded under the new compensation provisions. Such a priority should not compromise the priority afforded to employee entitlements and should therefore rank below employee entitlements.

3. External administration

The third proposal to strengthen creditor protections for unascertained personal injury claimants is the introduction of a requirement for external administrators to admit and make provision for mass future claims for personal injury. This proposal adopts features of the United States reorganisation procedure within the Bankruptcy Code.

Where a court determines that the liquidator is required to admit and make provision for mass future claims for personal injury, an external administrator would be required to inform known creditors at the earliest opportunity and provide for the payment of such claims in the future. There would be scope for the appointment of a person to represent the class of personal injury claimants in any proceedings.

Provision for mass future personal injury claims would be calculated on the basis of estimates of the number of acts or omissions that may give rise to liability under the relevant head of damage; industry analyses; academic studies; independent actuarial analyses; the level of damages awarded for similar claims

in courts or administrative review bodies of Australia or other common law jurisdictions; or such other matters as the external administrator thinks relevant.

Over time, future creditors would be able to make claims against funds set aside for future claimants. If such claims are uncertain, their amount could be determined in accordance with a process similar to that provided for by section 554A of the Corporations Act (determination of value of debts and claims of uncertain value).

In the case of a liquidation, asset distributions to creditors known at the time of external administration would take place as normal except a proportion of the assets could be set aside for future creditors. If there are insufficient assets to fully fund the provision for unascertained future creditors and repay existing creditors, assets could be divided proportionately.

In the case of a deed of company arrangement, there would be some flexibility about the amount of money set aside immediately and the amount to be contributed in future as the company continues to trade. In the event that funds remain after all claims have been met, there may be a further distribution to ordinary creditors.

Courts could be empowered to appoint a representative for the class of personal injury claimants, to convene meetings with claimants and to require the preparation of an independent expert's report on the impact of the proposed compromise or arrangement on the class of personal injury claimants. The representative for the class of personal injury claimants would have standing to make submissions to the court before it approves the proposed compromise or arrangement.

Similar provisions would apply in the case of schemes of arrangement and voluntary administrations

Appendix B: Professional Standard PS300

INSTITUTE OF ACTUARIES OF AUSTRALIA

PROFESSIONAL STANDARD 300

ACTUARIAL REPORTS AND ADVICE ON GENERAL INSURANCE TECHNICAL LIABILITIES

A. INTRODUCTION

Application

1. This standard applies to actuaries preparing estimates of the technical liabilities, comprising outstanding claim liabilities and premium liabilities, for any entities involved in general insurance activities, such as general insurance companies, reinsurers, self insurers, insurance pools and statutory authorities involved in general insurance activities.
2. This standard does not apply to estimates of liabilities for life or health insurance entities.

Legislation

3. This standard covers advice which is required by legislation such as the Insurance Act 1973 as amended and any standards issued under that Act, the Corporations Act and accounting standards, the Income Tax Assessment Act and taxation rulings, and the various State and Commonwealth Acts under which Accident Compensation Schemes, State Government Insurance Offices and Workers Compensation operate.

Previous Versions

4. This standard was first issued in May 1994, replacing Guidance Note 350. This revision has been made in response to the General Insurance Reform Act (2001), and was issued in April 2002.

B. DEFINITIONS

5. An **insurer** in this standard refers to any entity in respect of which liabilities covered by this standard may need to be calculated. This includes direct insurers, reinsurers, self insurers, insurance pools, discretionary funds, and Accident Compensation Schemes.

6. An insurer's **outstanding claim liabilities** at a given date (the valuation date) are equal to the value of claim payments to be made after the valuation date, in respect of claims which, under the terms of its contracts, arose on or before the valuation date for which the insurer is expected to be liable. These liabilities will often be expressed as the present value of the claim payments and may include the insurer's internal costs of administering and settling those claims.
7. An insurer's **premium liabilities** at a given date (the valuation date) are equal to the value of claim payments to be made after the valuation date, in respect of claims which, under the terms of its contracts, will arise after the valuation date in respect of premium written on or before the valuation date and for which the insurer is expected to be liable. These liabilities will often be expressed as the present value of the claim payments and may include the insurer's internal costs of administering and settling those claims and other administration costs. Where premiums under existing contracts are payable by instalments or are adjustable on the basis of exposure, claim experience or other factors, it will usually be necessary either to adjust the premium liabilities on this account or to determine the value of an offsetting asset.
8. An insurer's **contractual prospective liabilities** at a given date (the valuation date) are equal to the value of any options or other features, valuable or potentially valuable to the insured, included in or implied by contracts in force on the valuation date. These liabilities will often be expressed as the expected positive (in favour of the insured) net present value of future cash flows, and may include the insurer's associated internal costs.
9. **Liabilities** and **technical liabilities**, where used in this standard, each refer collectively to outstanding claim liabilities, premium liabilities and, if applicable, any contractual prospective liabilities.
10. **Claim payments** refer to payments to or on behalf of the claimant, and any third party costs such as investigation, medical and legal fees associated with each claim.
11. **Recoveries** refer to amounts or expected amounts to be recovered by an insurer in respect of particular claims. A distinction is made between reinsurance recoveries and non-reinsurance recoveries (salvage, subrogation, sharing agreements, etc).
12. A **central** estimate of the liabilities is the expected value of the liabilities. In other words, if all the possible values of the liabilities are expressed as a statistical distribution, the central estimate is the mean of that distribution.

13. A **provision** is an amount set aside in an insurer's accounts, to provide for liabilities.
14. A **risk margin** (often referred to as a prudential margin) refers to the amount by which a provision for liabilities is greater than the central estimate of the liabilities to increase the probability of adequacy.

C. OUTLINE OF PROCEDURE

15. The steps which an actuary should take when advising on technical liabilities are:
 - (i) Clarify the terms of reference and purpose of the report.
 - (ii) Collect the necessary data.
 - (iii) Analyse the experience.
 - (iv) Select a valuation model.
 - (v) Select valuation assumptions.
 - (vi) Do the valuation calculations.
 - (vii) Reconcile the results with the previous investigation.
 - (viii) Analyse variability and sensitivity.
 - (ix) Reach conclusions.
 - (x) Present a written report.
16. It may be necessary to carry out several versions of part of the process to determine an appropriate central estimate and/or risk margin, for example collecting and analysing additional data. Steps may be combined or taken out of sequence. It may be appropriate to repeat parts of the process with different models or assumptions.
17. The actuary may be called upon to justify the work undertaken. The actuary should therefore compile and retain documentation which demonstrates that the work conforms with this standard, and any other external standards as appropriate.
18. An approximation to an assumption or method is acceptable provided it does not materially affect the result. A difference is material if it is significant in the context of the purpose for which the advice is given. The actuary should choose a standard of materiality which should reasonably satisfy each anticipated user of the advice.

D. DATA

19. The actuary should be familiar with the relevant aspects of the procedures for the administration and accounting of the insurer's claims and policies.
20. For each class of business, the actuary should be conversant with the general characteristics which may have a material bearing on the estimation of the liabilities. This may include familiarity with the contractual terms and legislated benefits payable under policies written, differences between the unexpired risk exposure (that exposure underlying the premium liabilities) and the exposure underlying the outstanding claim liabilities, changes in underwriting standards, changes in premium rates, case estimation procedures, as well as other attributes, such as deductibles, policy limits and reinsurance arrangements.
21. The actuary should be familiar with the general economic, legal, political and social trends in the community which may have a bearing on the liabilities.
22. It is the actuary's responsibility to ensure that the data utilised are appropriate and sufficient for the valuation. The actuary should, where possible, take reasonable steps to verify the overall consistency of the valuation data with the insurer's financial records.

E. METHODOLOGY AND PARAMETERS

E.1 Scope

23. In some cases the actuary will be asked to give advice on both outstanding claim liabilities, premium liabilities and contractual liabilities. In others he/she may be asked to advise on some combination of these. In either case, the methodology outlined below should be used.
24. Liabilities may be estimated in one of two ways:
 - Deterministically, in which case the methodology outlined below is used to estimate the central estimate, or mean value of the liabilities, or
 - Stochastically, in which case the methodology outlined below is used to estimate the overall distribution of the liabilities.

E.2 Claim Experience Model

25. The estimation of liabilities may require the subdivision of the data into groups of claims exhibiting similar characteristics. In the determination of appropriate subdivisions, a balance must be found between homogeneity and statistical reliability.
26. The claim experience should be analysed with respect to the development over time of claims or cohorts of claims. Depending on the availability and reliability of the data, analysis should include some or all of:
 - the claim frequency relative to some measure of exposure, for example number of policies, employees, wages, or total sum insured;
 - the rate of reporting claims;
 - the rate of settlement;
 - the development of payments;
 - the adequacy of case estimates;
 - the incidence of large claims;
 - the overall pattern of claim occurrence over the duration of the policy period;
 - other analyses relevant to the circumstances.
27. The experience should normally be analysed on a gross of recoveries basis. Analysis of the reinsurance and other recovery experience should be appropriate to the circumstances. In some situations it may be more appropriate to analyse the experience net of reinsurance and/or other recoveries. Separate estimates of recoverable amounts may still have to be made. In making such judgments, the actuary should be aware that the net valuation result will often be the most important.
28. Analysis of experience should take into account any special features of, or developments or trends in, the experience such as changes in deductibles, aggregate limits, claim handling procedures, the mix of business within the portfolio, changes in legislation and the impact of large claims paid and outstanding. The analysis should investigate any trends in the development of the experience, particularly those from causes other than inflation.
29. Selection of the most appropriate valuation model to estimate the liabilities is the responsibility of the actuary. The actuary may investigate more than one model before arriving at an estimate. The model or models should take into account the available data, the nature of the portfolio, and the results of the analysis of experience.

30. Selection of the claim experience assumptions should have regard to the valuation model and the analysis of the experience. These assumptions should allow for trends in the claim experience, changes in underwriting, alteration of policy terms and assumptions about reinsurance or other recoveries.
31. The claim experience assumptions should reflect the latest available data to the extent that these are credible in the forecast of future claim experience.
32. Any change in assumptions should be allowed to emerge fully in the valuation to which they relate, rather than partially in anticipation of further emergence in future valuations. The effect of any change should be disclosed.

E.3 Other Parameters

Inflation

33. Future claim payments may well be greater, as a result of wage or price inflation, court decisions or other economic or environmental causes, than current payments for similar claims. Such factors should be allowed for when estimating liabilities.

Discount Rates

34. A schedule of future single period rates embedded in current market values of riskless debt might normally be the starting point for determining the appropriate discount rate(s). Circumstances may also arise where it is appropriate to take account of the insurer's assets and investment policy. Variations from market rates may be allowed for in the choice of discount rate. A series of rates or the equivalent single rate may be used for the purposes of discounting.

Expenses

35. If an allowance for future expenses is required, this allowance may vary between the outstanding claim and premium liabilities. The complexity of the approach used to determine the allowance should be commensurate with the materiality of the amount of the allowance.

E.4 Consistency of Outstanding Claim and Premium Liabilities

36. The assumptions used to estimate premium liabilities would generally be expected to be consistent with those used to estimate the outstanding claim liabilities. Where the assumptions are not consistent, or where the calculation of premium liabilities uses an approach requiring different assumptions to the outstanding claim liability estimation, the actuary should explain the reasons for the differences.
37. Where consistent assumptions are used to estimate both outstanding claim liabilities and premium liabilities, the actuary should consider and comment on their suitability for the estimation of both liabilities.

E.5 Valuation Results

38. It is the actuary's responsibility to ensure that the valuation calculations are carried out accurately.
39. The actuary has a responsibility to consider the reasonableness of the estimates produced and to quantify the effects of any changes in the valuation basis since the previous actuarial valuation. The actuary should seek explanation where possible for any major departures from past results.

F. UNCERTAINTY AND RISK MARGINS

Uncertainty

40. The extent of the liabilities depends on future economic, social and environmental factors outside the control of the insurer as well as on unknown past and future events and the insurer's own actions. It is part of the actuary's task to comment upon uncertainty, both as a technical matter and in the presentation of results.
41. There are a number of components of this uncertainty, including:
 - **model selection error**, deriving from the difference between the actual process generating the claim experience and the closest member of the family of claim experience models selected;
 - **parameter error**, deriving from the sampling error in model parameter estimates;
 - **parameter evolution error**, deriving from the inclusion in a model as constants any parameters which are in fact subject to change over time;
 - **process error**, deriving from the random departure of future claim experience from model expectations.

42. Assessment of uncertainty will generally require use of one or more of:
- statistical analysis;
 - sensitivity analysis - making changes to the model assumptions and/or the models themselves;
 - analysis of the outcomes of previous valuations; and
 - analysis of different scenarios.
43. In some cases, the range of reasonable uncertainty may be large. Care should be taken as conclusions which may be drawn at different ends of this range may be totally different (eg large profits vs insolvency).

Risk Margins

44. In most cases, some judgement will be required in establishing appropriate risk margins. It is the actuary's responsibility to support this judgement with such formal analysis as is practical.
45. For a variety of reasons it may be appropriate that provisions required for the purposes of accounts be calculated to include risk margins. Legislative, accounting or other standards may require this.
46. The directors of the entity have the ultimate responsibility for the provision, and not the actuary. The directors should determine the level of prudence which they consider to be appropriate. The actuary's advice on risk margins should assist them in adopting a provision commensurate with this level of prudence.
47. Where risk margins are calculated, this could be done by reference to either:
- the coefficient of variation of the liabilities; or
 - the full distribution of the liabilities.
48. Where a coefficient of variation is used, the actuary should state whether it is obtained by:
- internal estimation, ie estimation from the same data set as the central estimate of liability with which it is associated; or
 - externally estimated, ie obtained from some source external to that data set.
49. Where external estimation is used to estimate the coefficient of variation, the source should be stated, and its appropriateness explained. The explanation might make particular reference to one or both of the following:

- the extent to which uncertainty associated with the central estimate is induced by the methodology by which that estimate is produced;
 - any differences, such as volume, between the data sets that serve as sources of the central estimate and coefficient of variation respectively.
50. Where internal estimation is used to estimate the coefficient of variation, the actuary should discuss the following:
- the model of claim experience used to generate the coefficient of variation;
 - the allowance for variability of economic parameters such as inflation and discount rates;
 - any adjustment applied to allow for lack of reliability of the data on which the central estimate is based; and
 - any other components used in the internal estimation process.
51. If risk margins have been calculated on the basis of individual classes of business viewed in isolation, it will usually be appropriate to allow for a reduction in risk margins in respect of individual classes of business resulting from the diversification across different classes of business written by the insurer. The amount of such allowance should be determined consistently with the overall principles used in the determination of risk margins.
52. When advising on risk margins, the actuary should have regard to their reasonableness and consistency over time, between classes of business and between reports for different purposes.

G. REPORTING

53. The actuary should prepare, date and sign a written report. The report should state:
- who has commissioned the report and, if different, the addressee(s) of the report;
 - the name of the actuary and the capacity in which the actuary is acting;
 - the purpose of the report or the terms of reference given;
 - the extent, if any, to which the report falls short of, or goes beyond, its stated purpose;
 - the extent of compliance with this standard and the reasons for not complying fully with this standard; and
 - any restrictions on the actuary

54. The report should deal with:
- the nature, accuracy and interpretation of the data;
 - the analysis of experience;
 - the valuation model and key assumptions;
 - any changes in the method and key assumptions since the last similar report;
 - comparisons of actual experience with that expected under the assumptions in the last similar report;
 - the results of the valuation;
 - uncertainty of the valuation result.
55. The report should describe the steps taken by the actuary to verify the accuracy of the data, any limitations on the extent or quality of the data and the extent to which the actuary has relied upon the insurer or the insurer's auditor for checking.
56. The assumptions and methods should be stated clearly and their derivation explained. Any qualifications should also be clearly stated. Normally, the report should contain sufficient detail regarding data and methodology that an informed reader be capable of checking the reasonableness of any results included in it.
57. Where the legislation, accounting standards or other rulings require the actuary to use specific assumptions, particularly if they are materially different from those the actuary would otherwise use under this standard, the actuary must clearly state the circumstances, discuss whether or not the assumptions are reasonable and consistent with this standard, and discuss the implications of divergence from this standard.
58. Where the principal requires the actuary to use specific assumptions or the actuary is relying upon an interpretation of legislation, accounting standards or other rulings supplied by the principal or its advisers, the actuary must clearly state the circumstances, discuss whether or not the assumptions are reasonable and consistent with this standard, and discuss the implications of divergence from this standard.
59. If to be used for balance sheet purposes, then sufficient detail of the valuation results should be available in the report or separately to enable the insurer to comply with the disclosure requirements under the accounting standards, and complete Insurance Act and Income Tax returns unless requested otherwise.
60. In some circumstances it may be necessary to prepare a short statement or certificate regarding the valuation. Considerable care is required to ensure that the statement contains the necessary relevant information and will not be

misleading nor quoted out of context. The certificate should include a reference to the actuary's full report and the qualifications stated therein.

H. STATUTORY REQUIREMENTS

61. In certain cases actuaries may be required by legislation or other standards to provide advice regarding liabilities.
62. The provisions of this standard must be considered in the context of the legislation and other standards. Where an apparent conflict exists between this standard and other legislation or standards, the actuary should restrict the application of his/her advice to the context of the legislation or other standards, and refer to the conflict in the advice.

END OF PROFESSIONAL STANDARD 300

INSTITUTE OF ACTUARIES OF AUSTRALIA

GUIDANCE NOTE 353

**EVALUATION OF GENERAL INSURANCE TECHNICAL
LIABILITIES**

INTRODUCTION

Application

This guidance note is issued to supplement Professional Standard 300 (PS 300) and is to be read in conjunction with that standard. It applies to actuaries preparing estimates of technical liabilities for general insurance entities. Its application is mandatory for valuations under Prudential Standard GPS 210, issued by the Australian Prudential Regulation Authority (APRA) for the purposes of the *Insurance Act 1973* as in force from time to time.

First Issued

December 2002

[Note: The IAAust's Technical Guidance Note (Australian Actuarial Journal, 2002, Volume 8, Issue 2, pp365-396) continues to be a useful practical adjunct to PS 300 and GN 353 but without formal endorsement by the IAAust. In due course, it is expected that the Technical Guidance Note will be superseded by IAAust practice notes and educational material.]

DEFINITIONS

1. The definitions included in PS 300 (paragraphs 5 through 14) apply.
2. The following definitions also apply:
 - a) A **valuation unit** is a line of business, a part of a line of business, a group of lines of business or a group of parts of lines of business which is treated as a single entity for the purposes of the actuarial valuation.
 - b) **Standard** inflation is inflation measured by a published index, such as AWE for wages or CPI for prices, where an *a priori* link between such inflation and claim payments is believed to be present.
 - c) **Superimposed** inflation is the difference between total claim escalation and standard inflation.

PRODUCT KNOWLEDGE AND DATA CHECKING

3. The actuary is required to ensure that the data used for a valuation of technical provisions is appropriate and sufficient for the specified purpose of the valuation.
4. The actuary should be familiar with the characteristics of the insurance processes and claim processes that may materially affect the estimation of the insurance liabilities. This may include familiarity with:
 - a) the nature of coverage, including any unusual terms and conditions of contracts;
 - b) the underwriting strategy and the nature and mix of risks underwritten;
 - c) the benefits payable under policy terms or by virtue of legislation, including deductibles and limits;
 - d) the reinsurance arrangements, including any special or unusual features of reinsurance agreements that might affect reinsurance recoveries;
 - e) the claim management philosophies, rules and guidelines, and the company's practices in setting case estimates;
 - f) any monitoring reports that the insurer prepares of its claim and underwriting performance including any reports into compliance with claim and underwriting guidelines.
5. The actuary should also be familiar with economic, technological, medical, environmental, regulatory and social changes and trends within the broader community that may affect the value of the insurance liabilities. The actuary should also be aware that there may be changes in data quality or interpretation when staff turnover affects key positions, where personnel have a central role in the preparation of accounts or other relevant data.
6. It is the actuary's responsibility to ensure that the data gives an appropriate basis for estimating the insurance liabilities. This includes the insurer's own experience and claim experience data, but should extend to industry data, where the insurer's own data is not sufficient to reduce the uncertainty to an acceptable level. Where even industry data is sparse, it may be necessary to rely, to a greater or a lesser extent, on subjective assessment. The appropriate compromise between the cost of better data and the benefit, in terms of more reliable estimation, is a matter for actuarial judgment, which should take into account the materiality of the reduction in uncertainty that might result.
7. The actuary should consider obtaining data at the most basic transactional level, rather than working from data that have already been summarised or

aggregated. This should enable the actuary to better understand the data, and to identify data anomalies and seek appropriate rectification, or allow for errors or anomalies in the calculation of the liabilities.

8. The actuary should take reasonable steps to verify the consistency, completeness and reliability of the data collated, against the company's financial records. The actuary should discuss the completeness, accuracy and reliability of the data with the company's auditor (refer to GN 551 'Actuaries and Auditors'). The actuary should include in the written report on the valuation of the liabilities a description of the measures taken to investigate the validity of the data, and should outline the results of those data checks.
9. The degree to which the actuary relies upon the data provided by the company or upon earlier or later testing of the data by the company's auditors, and the resulting limitations that this places on the reliability of the actuary's conclusions, should be commented on in the report.
10. In order to meet reporting deadlines, the actuary may be asked to value insurance liabilities as at a valuation date prior to the reporting date. In such circumstances, the following approaches are considered to be acceptable:
 - a) The valuation may be undertaken at an earlier date, and the resulting estimates subsequently updated to the valuation date.
 - b) The valuation models may be derived from data at an earlier date, and subsequently applied to data at the valuation date.

In either case, the actuary must consider experience between the earlier date and the valuation date, and make such adjustments as considered necessary. In particular, for calculations made in accordance with accounting standards AASB1023/AAS26 the rate of discount adopted in the calculations must be appropriate to market values at the valuation date. The actuary should refer in the report on the extent of any additional uncertainty created by the approach adopted.

GLOBAL ASSUMPTIONS

Claim Inflation

Standard and superimposed inflation

11. For many classes of business, the amount of a claim will depend on money values at the time of payment. This occurs particularly in personal injury claims, where claim amounts are often defined by statute to reflect inflation between date of injury and date of payment. Amounts paid for medical, rehabilitation benefits, etc., will also reflect money values at the time of payment.

12. Even where there is no direct link between the amount of claim and money values at the time, claim inflation can still occur, as a result of legal decisions, for example.
13. Claim inflation may be incorporated into the estimates of outstanding liabilities either implicitly or explicitly. If this is done explicitly, then it is usual to convert past historical payments into values as at the date of calculation. Allowance must then be made for future claim inflation. In doing this, it may be useful to separate claim escalation into standard inflation and superimposed inflation.
14. Analysis of past claim escalation should form a basis for the assumptions regarding future claim escalation. Whatever the source of such escalation, the actuary should allow for all expected escalation in estimating the amount of outstanding claims.

Sources of estimates of standard inflation

15. Standard inflation is not specific to an insurer's portfolio. It is an external factor operating in the economy at large. As such, it is appropriate to refer to publicly available information. Histories of past wage and price inflation are available from the Australian Bureau of Statistics (ABS). However, there are a number of alternative indices and care should be taken to choose the one which is most appropriate to class of business being considered (for example, State-specific, gender-specific, ordinary wages or total earnings, wage cost index, CPI (overall or segment)).
16. In forming an assumption for future standard inflation, the actuary may consider:
 - a) estimates made by economic forecasting groups. Economists would often be expected to have greater expertise in this area than actuaries, and most will have highly developed econometric models;
 - b) an econometric model derived from past experience;
 - c) The returns available on Government CPI-indexed bonds. These can be used to give an indication of the market's assessment of price inflation, which can then be used to determine a corresponding assessment of wage inflation. When using this method the actuary should ensure that they fully understand all of the factors that impact the yield on CPI-indexed bonds before deriving an inflation forecast.
17. Different approaches may be taken to short-term and medium to long-term standard inflation. For example, estimates from economic forecasting groups rarely extend beyond 3-5 years. The returns from CPI-indexed bonds may be a more appropriate basis for medium to long-term assumptions.

Sources of estimates of superimposed inflation

18. Unlike standard inflation, superimposed inflation is specific to an insurer's portfolio. Furthermore, it is specific to the claim statistics being analysed for modelling purposes. Superimposed inflation may be present in one statistic and not another.
19. It follows that an assessment of superimposed inflation should derive ideally from analyses of the insurers' own claim statistics.
20. However, it is often the case that, in smaller portfolios, it is difficult to be definitive as to the existence of superimposed inflation, let alone its absolute level. In such cases, it is reasonable to give some recognition to wider industry analyses, or to generally accepted views adopted by other actuaries.
21. Superimposed inflation may not operate in the same manner as standard inflation. In particular, it may not emerge as a uniform addition to standard inflation. Several years of experience without any superimposed inflation may be followed by a sudden and extreme burst of superimposed inflation, which may persist for some years, and then cease. This feature makes it very difficult to form a view on future superimposed inflation, and there is always a high degree of uncertainty.
22. The sources of superimposed inflation are many and varied, but it tends to be present (at some point) in most classes which cover personal injury claims and which are influenced by judicial decisions.
23. If the sources of superimposed inflation can be identified and quantified, then they should be formally incorporated in the modelling process. For example, payments per claim incurred may be increasing due to an acceleration in the rate of finalisation of claims. This can be explicitly modelled by methods incorporating operational time, such as the payments per claim finalised model in operational time. In many instances, however, it is not possible to identify and quantify the precise causes of superimposed inflation. In such cases, a broad allowance may be made through an addition to the rate of future claims escalation.

Discount Rates

Discounting principles

24. There are a variety of approaches to the derivation of an investment return assumption for discounting insurance liabilities. These include:
 - a) the rate of return expected to be earned on the assets supporting the liabilities;
 - b) the rate of return on a hypothetical matched portfolio of sovereign fixed-interest securities;

- c) the time value of money;
 - d) financial economic theory.
25. Specific assets or pools of assets are seldom identified as supporting general insurance liabilities. If the expected return approach is used, a distinction can be drawn between assets which earn an identifiable investment return (such as investments) and those which do not (for example, creditors, fixed assets). Under this approach, it is sometimes presumed that, as far as possible, the insurance liabilities are considered to be supported by fixed interest investments, and that equity investments are considered as supporting shareholders' funds or free reserves/capital. It is also important to recognise that the apparent rate of return on assets includes an allowance for any default risk and, to that extent, is greater than the expected rate of return.
 26. One way of allowing for the default risk is to assume that this is the only reason for market rates of return on commercial fixed interest securities in excess of the rate of return on sovereign fixed interest securities. In Australia, these are Commonwealth Government Bonds. This leads to the hypothetical matched portfolio approach.
 27. The time value of money is usually assumed to be embodied in the yield curve on sovereign fixed interest securities. This is commonly referred to as 'the risk-free rate', even though it is neither totally free of risk nor a single rate.
 28. The financial economics approach starts with the principle that the economic value of a sequence of cash flows is their discounted value, and that the appropriate discount rate is determined by the nature of those cash flows. Under this approach, the discount rate is dependent upon the rates of return available in the investment market, and the relationship of the insurance cash flows to that market. The discount rate is therefore independent of an insurer's own asset portfolio.
 29. In Australia, there is as yet no consensus on the preferred approach. The actuary should consider the relative merits of the various approaches, and if in doubt consult with professional colleagues.
 30. In practice the choice of discount rate is very often strongly influenced by, and sometimes determined by, the regulatory environment in which the actuary is reporting (see paragraph 37).
 31. The actuary must consider the taxation environment in which the valuation results are to be reported. For most general insurance operations, the movement in the liability for outstanding claims is tax-deductible and it is appropriate to use a discount rate assumption which is gross of income tax. However, there may be instances where this is not the case (for example, at one stage such liabilities for self-insurers were not tax deductible).

32. As with all other assumptions underlying the valuation of outstanding claims, the actuary must consider the uncertainty in the discount rate assumption when advising on the overall level of uncertainty.
33. For a comprehensive discussion on the principles of discounting, the actuary should refer to 'A Coherent Framework for Discount Rates' by the IAAust Discount Rate Taskforce (Australian Actuarial Journal, 2001, Volume 7, Issue 3, pp435-572).

Liability betas

34. In the financial economics approach, it is necessary to consider the relationship between the insurance claim experience and the investment returns available in the market. The Capital Asset Pricing Model (CAPM) formula underlying this theory introduces the notion of a *liability beta*, which quantifies this relationship. (While the theoretical derivation of CAPM is mathematically sound, there is by no means universal agreement as to the assumptions on which this structure is based. In particular, the *efficient market hypothesis*, which is central to the conclusion that the market does not charge for diversifiable risk, is widely questioned.)
35. So far, the work carried out on this aspect suggests that, for many insurance classes, there is little correlation between the two factors. This would imply a liability beta close to zero, and hence the use of a risk-free rate of discount.
36. However, in some classes, there is an *a priori* reason to believe that such a correlation does exist. For example, there are some classes, such as workers' compensation and professional indemnity, where it might be expected that claim experience deteriorates in times of poor market performance. This implies a negative liability beta and hence a discount rate which is less than risk-free. The effect of such a reduction from the risk-free rate would usually be considered as forming part of the risk margin on central estimates.

The regulatory environment

37. The two most important regulatory regimes for actuaries working in general insurance are those of Accounting Standards, particularly AASB1023/AAS26 (and subsequently supplemented in AAG13), and the *Insurance Act 1973*, particularly APRA Prudential Standard GPS 210. Other regulatory regimes, such as state based workers compensation and CTP, may also be relevant.
38. At present, Australian Accounting Standards provide a choice of discount rate between:
 - a) a rate derived from the insurer's own assets, and which is 'sustainable' over the claim runoff period (as noted in paragraph 25 above, this rate

should be adjusted for default risk, although this is not clear from AAGN13); or

- b) the risk-free rate of return, derived from the market values of Commonwealth Government fixed-interest securities of duration similar to the claim runoff.
39. APRA Prudential Standard GPS 210 is more prescriptive. It requires actuaries to use the risk-free rate.
 40. With respect to risk-free rates, it is acceptable to use either an average rate weighted by cash flows or a series of discount rates taken from the corresponding yield curve.
 41. There are usually gaps in the maturity dates available and the longest dated security may not be long enough. It is appropriate to smooth, interpolate and extrapolate from the observed yields. When extrapolating, the reasonableness of the resulting rates for use in long-term discounting must be considered.
 42. For liabilities in other currencies, the risk-free rate is derived from the corresponding yields on sovereign fixed interest securities in those currencies. Any foreign exchange risk should be considered in setting the risk margin for addition to central estimates.

Policy and Claim Administration Expenses

43. A separate allowance for policy and claim administration expenses will be necessary where such expenses are not included elsewhere in the data being analysed for outstanding claim and premium liabilities.
44. As with all assumptions, the actuary should attempt to analyse historical levels of expenses. However, it is often the case that internal insurer expense analyses do not properly allocate expenses between policy issue, ongoing policy administration, claim establishment and claim management. In such cases, it is acceptable to have regard to allowances made elsewhere in the market, with a comment to this effect included in the actuary's report. The actuary should always ensure that the allowances seem reasonable when considered in the context of the insurer's total administration expenses.
45. The accounting standards require expense allowances to be made on a going-concern basis. They should include appropriate proportions of general overheads, senior management costs, etc.
46. It is conventional to express the allowance for claim administration expenses as a percentage of gross payments. However, where there are unusually large gross outstanding claims, it may be appropriate to make an allowance based on a more usual mix of claims.

47. Claim administration expenses vary by portfolio and by the type and age of claims within a portfolio. For a stable, active portfolio it is usually reasonable to adopt an average rate for all claims. More detailed approaches are also possible, but are unlikely to result in a materially better estimate for a stable portfolio. However, in a closed portfolio, an increasing expense allowance may be needed.
48. While it is possible to develop complex approaches to the question of claim administration expenses, the actuary should be conscious of the materiality of the allowance within the context of the overall estimate of outstanding claims.

METHODOLOGY

APRA Valuation Process

49. The approved actuary undertaking a statutory valuation under APRA Prudential Standard GPS 210 is required to determine a central estimate of the liability and to recommend a valuation margin which, when added to the central estimate, gives a provision intended to secure a 75% probability of adequacy (but not less than half a standard deviation above the mean).
50. Initially, this must be done separately for outstanding claims and unexpired risks for each valuation unit, taken in isolation. In a separate step, the central estimates and valuation margins are added together and the sum of the valuation margins is reduced, by a 'diversification benefit', so that the overall margin, for the reporting entity, meets the 75% adequacy test, but is not less than half of the combined standard deviation.
51. Paragraph 17 of APRA GPS 210 specifies that the central estimate must be intended to be the mean of the underlying probability distribution. Paragraph 12 of IAAust PS 300 extends this requirement to all actuarial valuations of general insurance liabilities.
52. While many actuaries may find it helpful to do so, it is not necessary to form an explicit view as to the shape of an underlying probability distribution, either for a particular valuation unit or of the aggregate liability. What is required is a view as to the mean and 75th percentile, separately for outstanding claims and unexpired risks for each valuation unit, and in aggregate and, in cases where the overall uncertainty is likely to be highly skew, the standard deviation. (The phrase 'intended to secure' covers the situation where these quantities cannot be reliably estimated from an explicit probability distribution.)
53. Where an explicit probability distribution is not used, it is important to recognise that many general insurance probability distributions are positively skewed. That is, there is often a wider spread of larger (absolute) values than of smaller values. As a result, the mean is usually greater (in absolute value) than either the mode or the median. There is a natural

tendency, in informal estimation, to use the most probable value. This can lead to underestimation.

54. When an explicit probability distribution is used, it is important to ensure that it appropriately reflects any material skewness and that the central estimate incorporates any corrections for skewness, appropriate to the distribution. Again, failure to observe these steps can lead to underestimation.
55. The estimated uncertainty for each valuation unit should normally make appropriate allowance for reinsurance, including both the reduction in uncertainty inherent in the reinsurance terms and the diminution in this reduction, on account of the risk that these terms will not be observed.
56. Where a reinsurer is in default, or known to be at serious risk of default, however, such reinsurances should be reported on explicitly, rather than as a component of the net liability. Other asset risks should not be allowed for in determining the liability risk margin for APRA valuations, since they are reported on and allowed for elsewhere.
57. The purpose of the diversification allowance required under paragraph 14 of GPS 210 is to recognise that, when two or more classes of insurance are combined, the risk margin required to meet APRA's criterion may be less than the sum of the risk margins required to meet that criterion for each class taken in isolation. The uncertainties, which give rise to the need for a risk margin, can be crudely classified as either independent or systemic. Independent variation is, by definition, not correlated to anything and always gives rise to a diversification benefit. Systemic uncertainty can be correlated to varying degrees between classes. Some sources of systemic uncertainty are only relevant to a single class, but most affect more than one class. Caution should be exercised in assuming a low degree of correlation, in the absence of experiential evidence.
58. It is also important to draw a distinction between correlations between the uncertainties in different classes, which should form the basis of the diversification calculation, and correlations arising because of trends in the experience. Trends should be recognised in the central estimate, rather than in the margin for uncertainty.
59. The calculation of the diversification benefit can proceed from the top down, starting from an estimate of uncertainty based on Dynamic Financial Analysis (DFA) or similar modelling techniques, or from the bottom up, by combining the uncertainties of the separate valuation units, with due allowance for correlations between them. In either case, once the global risk margin is determined, it (or, equivalently, the diversification benefit) must be apportioned between the APRA lines of business. The actuary performing such tasks is expected to be familiar with the appropriate techniques.
60. It should be noted that, under at least one theoretical approach, this process can result in negative risk margins for one or more lines of business. Such

results are not acceptable to APRA. If such results are to be reported for other purposes, extreme care is needed to ensure that they are reported in such a way that users are not misled.

Changes in Valuation Model

61. The valuation model and assumptions need to reflect the actuary's interpretation of the data available at the current valuation date. The impact of any changes in assumptions should not be smoothed over future periods but should be reflected entirely in the central estimate.
62. Where the actuary has a prior valuation as a starting point, the actuary needs to comment on the new data that has emerged between the valuations in the context of the previous valuation model/assumptions. This could be by reference, for example, to an analysis of expected versus actual outcomes.
63. Where the new data available at the current valuation date suggests a change in approach and/or assumptions from the previous valuation, the actuary needs to discuss the impact on the valuation model/assumptions adopted.
64. New data should be given weight appropriate to the credibility of that new data. The actuary should explain the basis of arriving at the level of credibility and the impact on valuation outcomes. The actuary should take into account the statistical significance of the new data compared to the existing data when determining the level of credibility to give to new data.
65. The actuary should also consider external issues that may change the credibility such as:
 - a) changes to the mix of business of the insurer;
 - b) changes in processing claims or premiums (for example, administrative delays, changes to case estimation procedures);
 - c) identified systems issues (new systems or changes to systems).

Gross and Net Liabilities

66. Both outstanding claims and premium liabilities are to be estimated on both gross and net bases, and separately for each line of business. Under AASB1023/AAS26, amounts recoverable must be split between GST, reinsurance and other recoveries.
67. The gross and net liabilities should be estimated on a consistent basis. The economic assumptions for the gross portfolio and the reinsured business should be the same, except in unusual circumstances (for example, there is convincing evidence that superimposed inflation has had a different impact on large claims than small claims). The actuarial models, for the gross

portfolio and for reinsurance recoveries, should not contain unjustifiable inconsistencies. For example, where the reinsurance is on a simple quota share proportional reinsurance basis, the net liability should be the retained proportion of the gross liability.

68. In many circumstances, it may be appropriate to use the model for estimating the gross liabilities as the starting point for development of the model for estimating reinsurance recoveries.
69. Some reinsurance arrangements embrace risks from more than one class of reinsurance (for example, 'whole account' covers). In this case, there may be no obvious natural basis for the allocation of the adjustment to either premium liabilities or outstanding claim liabilities between classes. Consideration of the basis of accounting for whole account covers or other multi-line covers should be given before the first actuarial valuation and the basis of accounting, once determined, should normally be observed consistently over future years.
70. For premium liabilities, the unearned premium approach may be applied to produce either a gross or a net value. Where a net value is to be calculated and the reinsurance is written on an events occurring basis, it would normally be appropriate to include an allowance for future reinsurance premiums in respect of that part of the unexpired period after current reinsurances expire. To get the corresponding gross value, it is necessary to add back the expected cost of claims under both current and future reinsurances and to add an allowance for other recoveries, including sharing, salvage, subrogation, third party recoveries and Input Tax Credits (ITC) and Decreasing Adjustment Method (DAM) recoveries.
71. For proportional reinsurance and recoveries under sharing agreements, the adjustment is simply a matter of inverting the average fraction retained. A similar approach should suffice for ITC and DAM recoveries and, unless the amounts are large, salvage and subrogation.
72. For non-proportional reinsurance, the simplest approach is to add back a fraction of the unearned non-proportional reinsurance premium. This requires an assessment of the expense and profit margins contained in those premiums, which in principle, would involve the same considerations as that assessment for direct premiums. In practice, unless these premiums are a substantial fraction of the direct premiums, it is acceptable to make a reasonable assumption.

Use of Case Estimates

73. Where case estimates are used as the basis for liabilities, they need careful interpretation. It is necessary to understand how they are set and how they relate to what is likely to be paid out.

74. Given sufficient historical data, standard actuarial techniques can be used to quantify this relationship, provided that the basis of estimation has not been changed.
75. In the absence of such data, it may be possible to form a view as to the relationship on the basis of discussions with those responsible for the estimates. Care, however, is needed in interpreting such information.
76. Case estimates are often based on what the estimator thinks the claim is most likely to cost. If the potential range is small, this may be close to the mean. Where the potential range is large, however, the probability distribution is likely to be highly skew and the most probable value could be well below the expected value. Even greater bias may result, if the estimates are based on a best case or worst case scenario.
77. Case estimates seldom take account of how long it might take to settle a claim, and do not often incorporate a suitable allowance for either inflation or discounting, where these may be material.
78. For most short-tail lines of business, the estimate will be based on physical examination of the damage or on records of purchase, and can be a reliable estimate of the gross cost. The principal uncertainties may relate to salvage and subrogation, which are not always estimated. Other approaches to case estimation should be considered on their merits.
79. If estimation practices have changed, it may be necessary to make a subjective estimate of the impact of the change, until experience emerges. It should be noted that, even if estimation rules are unchanged, a change in personnel could have a material impact on the case estimates.
80. If the financial reporting deadlines allow, hindsight can be a very useful tool in assessing short-tail case estimates. Even two weeks can show a considerable turnover of estimates into paid claims and conversion of reports into considered estimates.
81. For long-tail lines of business, it is substantially more difficult to derive suitable valuation estimates from case estimates. If there is sufficient data for a proper actuarial analysis, this should be undertaken. If actuarial analysis of case estimates is undertaken, it is important for the actuary to have an understanding of the current and historical case estimation process, as changes in this process can have a material impact. It may sometimes be appropriate for the actuary to obtain independent expert advice on the insurer's case estimation procedures, particularly where large reported claims make up a significant proportion of the liabilities.
82. If the numbers of long-tail claims are too small for meaningful analysis of historical data, then it becomes even more important to understand the nature of the case estimates. It may be possible to draw analogies with other lines of business or with other insurers, or to draw on industry data.

Such comparisons need to take into account any discernible differences between the portfolio being valued and the base portfolio, with particular reference to the case estimation process.

83. It is also important to note that even a large portfolio can contain too few large claims to allow credible statistical analysis: for example, a major environmental disaster in the context of a liability portfolio where most claims are for minor personal injuries. In such cases, there is a danger of 'outlier' claims that cannot easily be dealt with using conventional statistical methods. In such cases, the actuary needs to exercise professional judgment and should take great care in so doing. Very large claims are a lesser concern for a direct insurer with suitable reinsurance, where the main interest is the net liability, which can be estimated from the retention.
84. Case estimates may be particularly useful for identifying the presence (or absence) of large claims or events and in the estimation of amounts recoverable under non-proportional reinsurances. However, the actuary needs to be aware if there are any classes or types of claim for which the company inserts a purely nominal case estimate when a claim is reported.

Reliance on Other Actuaries' Work

85. Larger insurers, underwriting numerous and sizeable classes of business, are likely to require the services of more than one actuary to assess the value of outstanding claim liabilities and premium liabilities, as well as the risk margins. In these circumstances, the Approved Actuary has the responsibility for coordinating the valuations and summarising the results into one opinion for delivery to the insurer's Board and senior management.
86. In such cases, the Approved Actuary should be satisfied that the actuary responsible for each valuation unit has the appropriate experience and competence to carry out a valuation of that particular part of the portfolio. In preparing the summary of the results for the insurer, the Approved Actuary should be satisfied as to the suitability of central estimates, risk margins and diversification benefits prepared by other actuaries for inclusion in the results.
87. In preparing the opinion summarising the insurance liabilities of the insurer, the Approved Actuary should be satisfied that the central estimates, risk margins and diversification allowances are suitable, for each valuation unit. There is no need to repeat the calculations performed by the other actuary, but the Approved Actuary must review the results to ensure that the methods and results are fully understood.
88. The Approved Actuary should discuss the results with the other actuary to ensure the assignment was understood and to resolve any matters of interpretation of the other actuary's results.

89. Where the Approved Actuary is not satisfied as to the suitability of a particular item for inclusion in the overall valuation, then an alternative figure must be provided. The summary report must include the reasons for varying the original figure, and state the difference.
90. While the assessment of the central estimate, uncertainty and independent risk margin for the outstanding claim and premium liabilities for each valuation unit is a relatively independent exercise, capable of delegation to separate actuaries, the assessment of diversification benefits for the company is unlikely to be. The Approved Actuary must ensure that the diversification benefit is assessed on a holistic basis.
91. Some forms of reinsurance may be dependent upon the aggregate claim experience of a number of classes of business. Where an actuary is responsible for the valuation of a group of valuation units which completely encompass such a reinsurance arrangement, then the impact of the reinsurance on the central estimate and risk margins should be considered and included as part of the report. Where different actuaries are responsible for valuation units within such a reinsurance arrangement, the Approved Actuary must ensure that the impact of the reinsurance arrangement on the central estimates and risk margins is appropriately assessed and documented.
92. In order to meet reporting deadlines for published accounts, it may be necessary to invert the natural sequence and determine diversification adjustments before the individual valuation unit valuations are completed. It will normally be acceptable for individual valuation unit reports to show risk margins based on analysis of diversification benefits at the most recent previous valuation. If this is done, the continued appropriateness of those adjustments should be discussed.

Materiality

93. In accounting terms, an amount or difference is material if it is large enough to '... affect the decision making about the allocation of scarce resources by the users of general purpose financial reports...' (AASB SAC3).
94. This test requires a judgment as to how such users might react to a change in the reported amounts. Observation suggests that many users do not have a good grasp of the uncertainties of general insurance. As a result, they are likely to respond on the basis of what seems to be a substantial number, rather than on any concept of statistical significance. A further factor is that, for long tail lines of business, even small percentage changes in the liabilities can give rise to large percentage changes in profit. It is usually possible to assess the threshold of materiality in discussions with management and auditors.
95. It also should be noted that materiality depends on context. What is material in the context of an income or profit and loss statement may not be material

in the context of a statement of assets or balance sheet, or in an assessment of solvency, particularly for long tail classes of business. The converse is also possible, particularly for short-tail classes. In considering materiality, the actuary should consider the purpose for which the provisions or estimates are required, but should also bear in mind the other uses to which they may be put.

96. While it is reasonable to omit individual items on the grounds of materiality, thought should be given to the cumulative impact. It is not acceptable to make such omissions if the overall result would be materially affected.
97. When, as is usual in general insurance, the threshold of materiality is below that of significance, it is vitally important for the actuary to communicate the uncertainty of the results. This can be particularly difficult, if not impossible, where those results are communicated at second hand.

Reasonableness of Major Results

98. Before signing off on the actuarial report, the actuary should ensure that the results obtained from the actuarial valuation are reasonable, both in aggregate and for each valuation unit within the insurer's total portfolio.
99. Reasonableness should be assessed in relation to:
 - a) comparable results for that valuation unit in the previous year;
 - b) development in the valuation unit over the inter-valuation period;
 - c) the experience of the valuation unit since the previous valuation;
 - d) changes in economic assumptions, particularly investment and inflation assumptions (including, where appropriate, superimposed inflation);
 - e) changes to the actuarial model; and
 - f) any industry results or benchmarks.
100. The movement in the actuarial valuation reserves since the previous valuation should be analysed into its components. The actuary should be satisfied that differences between the previous valuation result and the present result can be explained in terms of the experience in the intervening period and changes in the valuation assumptions.
101. If during the performance of this analysis, the valuation of any particular material class appears to be inconsistent with the value of the class at the previous valuation, or the differences cannot be satisfactorily explained, the actuary needs to further investigate the reasons why the unexpected differences arise in order to be satisfied that the cause is not an error in the valuation calculations.

TECHNICAL REQUIREMENTS

Relationship Between Outstanding Claims and Premium Liabilities

102. Different approaches may be taken to the assessment of premium liabilities. The choice depends on many factors, including the nature of the business, past experience, the maturity of the insurer or valuation unit, and changes to underwriting, pricing, claim management and marketing over the previous few years. Whatever approach is taken to the assessment of premium liabilities, the consistency of assumptions and methods between outstanding claims and premium liabilities needs to be considered.

Consistency Between Outstanding Claims and Premium Liabilities

103. In a stable environment there is an expectation that the assumptions and methods for outstanding claims and premium liabilities will be consistent, after adjusting for trends, claim inflation and investment earnings. However the environment, whether internal or external to the insurer, is typically not static.
104. Some approaches to premium liabilities are based on the outstanding claim assumptions, adjusted for changes in matters considered in paragraphs 107 to 109.
105. If premium liability assumptions are arrived at independently of outstanding claim assumptions then the assumptions and valuation results for the outstanding claim and premium liabilities should be compared. Significant differences between the assumptions and methods should be explained on the basis of the available information and data.
106. Changes to the matters considered in paragraphs 107 to 109 may result in a significant difference, from past experience to future experience. The timing and extent of change is important, in assessing the consistency between outstanding claim and premium liability assumptions.
107. In forming a view of appropriate premium liability valuation methods and assumptions, an understanding of changes within an insurer's business needs to be considered. The following matters may affect the actuary's choice of assumptions for claim frequency, gross average claim size and gross loss ratios for premium liabilities and their consistency with the assumptions for outstanding claim liabilities. Many of the matters need to be investigated, so the actuary understands changes and trends in exposure and the related changes in premium adequacy. The timing of changes in these matters should be understood.
108. In forming a view of appropriate valuation methods and assumptions for premium liabilities and their consistency with outstanding claims, many other matters may need to be considered by the actuary. The timing of the changes in these matters should be understood.

109. In both outstanding claims and premium liabilities, explicit allowance for reinsurance and other recoveries, such as third party recoveries, salvage, subrogation, sharing and input tax credits, needs to be made. Appropriate adjustment to this allowance for the risk of non-recovery of these assets is required.

Central Estimates - Reporting

110. The valuation report should contain a description of the following:
- a) changes (if any) to the valuation model adopted, with an explanation for the changes.
 - b) changes to key valuation assumptions. The content of this will vary according to the valuation model adopted. However, the principle is to provide a commentary of whether an assumption has been strengthened (i.e. results in a higher valuation outcome) or weakened (i.e. results in a lower valuation outcome) as a result of observation of the updated claim experience.
 - c) key assumptions. For outstanding claims, these will depend on the method adopted but will usually include the number of claims incurred, finalisation and payment patterns, average claim size, future inflation (normal and superimposed), discount rate and, where applicable, case estimate development patterns. For premium liabilities, additional key assumptions may include loss ratios, seasonality and allowances for large claims.
 - d) the overall change to the net central estimate should be quantified and the key reasons for that change analysed. This should include:
 - i) previous central estimate plus interest to new valuation date, less
 - ii) payments from prior accident periods in the inter valuation period plus interest to new valuation date, compared with
 - iii) new central estimate for prior accident periods at valuation date, plus
 - iv) separate quantification of any material impact on the new central estimate of changes to the valuation model adopted and key assumptions, plus
 - v) the impact of new claims and exposure.

Detailed quantification is normally provided at the valuation unit level. There should, however, be an overall quantification of the impact of changes to the valuation model and assumptions at the whole company level.

Risk Margins

Fundamentals

111. A technical provision may exceed the expected value of the present value of future payments in respect of the associated liability, which is its central estimate. This will result in a higher degree of confidence in the adequacy of the provision than would be the case if just the central estimate were chosen. The excess over the central estimate is often referred to as a risk margin.
112. A risk margin sometimes comprises an addition of a percentage of some quantity considered relevant to the risk associated with the liability concerned. For example, the risk margin contained in a provision for outstanding claims might consist of $p\%$ of the central estimate.
113. Alternatively, the risk margin may be determined by means of specified level of confidence, for example, such that the provision is adequate to meet the associated liability with $q\%$ confidence. In this case, the formulation of the risk margin is manifestly stochastic, and its determination will require a stochastic model of the claim experience to which the technical provision relates.
114. It will usually be necessary to formulate such stochastic models in two distinct parts:
 - a) a model of the claim experience specific to the portfolio under consideration, with external influences factored out;
 - b) a model of those external influences, which would usually include at least rate of inflation (possibly excluding superimposed inflation) and discount rates.
115. There may be circumstances in which a risk margin may be reasonably determined without reference to a stochastic model, though these would probably not be of the confidence level type mentioned above. The following sub-sections would not apply to such cases.
116. Even where a stochastic model is required, its derivation may be by means other than set out in those sub-sections. They should be regarded as advisory rather than mandatory.
117. Provisions may also be determined by adjusting the discount rate or the probability distributions involved in the valuation, in accordance with financial economic theories such as CAPM or option pricing. Following this approach, it is possible to characterise the risk margin, which is the difference between the adjusted and unadjusted values, as the value of the uncertainty of the liability.

Stochastic claim experience models

118. The actuarial literature contains a number of stochastic claim experience models. Those most likely to be useful in the quantification of risk margins include:

- a) Stochastic forms of the chain ladder;
- b) Generalised Linear Models (GLM);
- c) Credibility models;
- d) Other Bayesian models;
- e) Adaptive filters, such as the Kalman filter.

This list, while reasonably comprehensive, is not intended to be exhaustive.

119. Some of these models (for example, Mack's stochastic chain ladder) explicitly produce estimates of no more than the first two moments of liability. Others (for example, GLM based models), are conceptually able to give the distribution in full detail, may require prohibitively extensive computation to produce this level of detail.

120. In cases where only the first two moments of liability are estimated, it will be necessary to supplement these with an assumption as to the form of the probability distribution of liability, if the estimates are to be converted into the confidence limit required to produce a risk margin.

Stochastic economic models

121. Models of external economic parameters can be found in the actuarial and economic literature. In the former case, they may be well known to actuaries (for example, the Wilkie model). Models from the economic literature (for example, Cox-Ingersoll-Ross, Heath-Jarrow-Morton) may be just as valid but are less well known to actuaries.

122. Some of these models have been implemented as the economic scenario generators in DFA systems.

123. It is usually desirable to apply a model which generates all of the economic time series required in the liability estimation, in order to recognise the stochastic dependencies between them. For example, it is usually unwise to adopt models which treat future inflation and interest rates as stochastically independent.

Full distribution of outstanding claim liability

124. Where it is desired to produce an explicit estimate of the entire distribution of the relevant liability, the following procedures may be helpful:

- a) Bootstrap;

b) Markov Chain Monte Carlo (MCMC) sampling.

The former is well embedded in the actuarial literature and well understood. The latter, which is perhaps ultimately just as useful, is newer and, at present, more experimental.

Practical Considerations

125. It is necessary to base estimates of uncertainty on an insurer's own data as much as possible. However, not all insurers, especially relatively new insurers or smaller insurers, have data that is adequate for this. Consequently, it may be necessary to rely, at least in part, and sometimes wholly, on industry research studies. Such studies should not be used blindly. Most insurers have features which suggest that industry parameters should be modified.
126. If a published industry study is used as a basis for estimates of uncertainty, it is important that the actuary should take note of the context of the study and modify the results of the study if special features of a specific insurer indicate this. Examples include:
 - a) Risks concentrated in a particular geographical area or industry, relative to the data on which the study was based.
 - b) The insurer's type of business being different from the industry average. Examples include a portfolio of small commercial business compared to industry data dominated by more volatile large corporate business; and excess business compared to primary business.
 - c) Differences in reinsurance arrangements, such as lower or higher retention levels, or different types of reinsurance.
 - d) Variation in the reliance placed on intermediaries in underwriting.
 - e) Changes in underwriting conditions, such as a change in the legislation governing a line of business.
127. It is also essential to ensure that, if parameters drawn from different studies are combined, they are compatible.
128. Allowance for diversification benefits need to be carefully considered by the actuary as, in many situations, it may not be possible to support an allowance for diversification from empirical evidence. Some industry studies may not use empirical evidence to justify an allowance for diversification, but rather present their view of appropriate allowances. The actuary needs to justify the allowance for diversification. The extent of the diversification benefit depends on many factors. In particular, the way that the line of business margins are determined is important.

129. Uncertainty can be broadly divided into:
- a) Independent variation, which operates at the individual claim level and is uncorrelated; and
 - b) Systemic (also called systematic) variation, which operates at the valuation unit level and affects all claims similarly. Typical sources of systemic variation are economic, social and climatic factors
130. There is always a diversification benefit when the independent variation from different valuation units is combined. The situation for systemic variation is more complex. The extent of any diversification benefit depends on the extent to which the same sources of systemic variation apply across different valuation units. If the dominant source of systemic variation is the same then, in the absence of empirical evidence to the contrary, no benefit from systemic variation should be assumed. Caution should be exercised in assuming low correlation (which implies higher diversification benefits) between even apparently unrelated sources of systemic variation.

Risk Margins – Reporting

131. Where the actuary calculates risk margins by reference to a particular notional distribution, this should be described in the report, along with the reasons why it is considered appropriate. Where this is not done, the actuary should discuss the reasoning behind the figure chosen. Material changes in the probability distribution of insurance liability outcomes by class of business since the previous valuation must be disclosed in the report.
132. The actuary's report should include discussion of the suitability of any industry study, as a basis for estimating uncertainty, for the particular insurer and present reasons for any adjustments that are made.
133. The actuary's report should include discussion of reasons why the adopted allowance for diversification is appropriate.
134. The approach adopted by the actuary who adjusts the risk margins for diversification and reinsurance should be clearly documented. While the apportionment of the diversification benefit between classes of business may be essentially arbitrary, the approach adopted should also be documented.
135. Changes to the model or models since the previous report should also be summarised.

END OF GUIDANCE NOTE.