LEGAL & GENERAL'S COMMENTS ON BAS'S PAPER 'ACTUARIAL MORTALITY ASSUMPTIONS: DISCSSION PAPER'

We set out below our comments on the above paper using the numbering in the paper:

2.8 Is this suggesting that BAS Guidance does not apply to actuaries working for the public sector? Some clarification would be useful.

2.18 An additional consequence is that defined contribution members and personal pension plan policyholders will pay too much for annuities.

3.6 The correlation of historical rates of mortality improvement with year of birth is well known. However, in deciding whether or not to assume it continues in future a causal mechanism needs to be identified. The recent SIAS paper 'Drivers of Longevity in Particular with reference to Smoking' by Humble and Wilson considers this with reference to changes in smoking prevalence. The paper cast doubt on the appropriateness of assuming a continuation of long-term cohort effects. We consider that placing a strong emphasis on cohort effects continuing in future without a causal mechanism carries considerable risks for the actuarial profession. In particular, it risks giving rise to projections which are specified in great detail and have the appearance of accuracy, but which may be completely the wrong shape. It may, therefore, give actuaries' clients the impression that the actuarial profession has greater knowledge in this area than it, in fact, has, and create the impression that cohort based projections are necessarily 'safe' or 'prudent'.

4.7 In the light of the comments on 3.6, we consider that BAS should consider amending GN44 so as to remove or modify the statement that the use of a birth-year cohort approach will normally be appropriate when considering future mortality improvements for annuitants.

5.8 Adjustments at high ages tend to more applicable to future improvements than to the base mortality table. We are not convinced that it is normal practice to apply special treatment *to the base mortality table* at the very oldest ages.

5.26 Many offices would examine their mortality experience carefully to find the mortality table that gives the best fit. It sometimes happens that this is an old table with a large adjustment; and we take this case as an example to consider the implications of a standard prohibiting its use. The paper argues that use of this table would be inappropriate as the recipients of the advice would be asked to *'rely on patterns of mortality dating from many years ago'.* However, in this example, the whole point of selecting this particular table is that it exhibits the same shape of mortality as the office's most recent experience. It surely cannot be reasonable that a desire to reassure users that the pattern of mortality is appropriate leads to actuaries being required to use tables that are a worse reflection of the pattern of observed mortality experience. As an example, Legal & General used a(55) – 3 years until 2004, because this gave a better fit to the experience than more recent tables.

5.26 (further comments). As regards the perception of users, this will vary considerably between organisations – the board of a major life office may have a clear understanding of why an older table is being used. It surely should be for the actuary to know his or her client and to consider what is reasonable in terms of their understanding. In Legal & General's case we published our use of a(55) – 3 in the FSA returns up to 2004. Any challenge to its use would have been answered by pointing out that it gave a better fit to the experience than more recent tables.

5.41(c). This requirement could give rise to considerable practical problems. For example, an actuary could decide to use the CMI's P-Spline software for smoothing. However, this would seem to require him or her to explain to the Board or the Trustees the reasons for selecting knot spacing and positioning and the choice of λ. As regards graduation, the discussions of graduation that take place at the Institute can be very technical. It is important that requirements in this area are appropriate, having regards to the expertise of actuaries and of their clients

5.53 See comments on 5.26

5.57 and the box below 5.57. See comments on 5.26.

6.63 What constitutes *'actual past rates of change'* is not at all well defined. Should this be the most recently available annual rate? Mortality at ages above 65 can vary very significantly from one year to the next as a result of hot summers, 'flu epidemics etc. P-Spline projections on ONS data at the end of 2003 compared to the end of 2004 gives an example of the potential consequences of such variations. Alternatively, to avoid large year-to-year fluctuations, should the average rate of improvement over a number of years be used? If so, how many years? And should this average be calculated on an age-period or an age-cohort basis?

Page 47 – box, first paragraph and Page 48 - box, first paragraph. There could be reasons why small groups of lives may exhibit different behaviour from large groups. For example, impaired and enhanced annuities are very likely to exhibit this behaviour, as is the standard purchased annuity market as a result of anti-selection resulting from the existence of the impaired and enhanced market. One may wish to call this 'run-off of selection' rather than 'differential improvement', what is important is that legitimate allowance for such factors does not unintentionally fall foul of standards on improvers.

7.1 5(a) See comments on 5.26

7.1 6(a) See comments on Page 48 box first paragraph

NOTE ON BAS FORMULA

Reference: Discussion paper: Actuarial Mortality Assumptions

Paragraph 6.11 has the following example of a stochastic formula:

$x_t = a+(b+ \varepsilon)t$

This formula results in the stochastic volatility from one year to the next increasing over time, which is a rather unlikely scenario. More stable volatility would be produced by:

$y_t = y_{t-1}+b+ \varepsilon$
with $y_1 = a$

The following graph illustrates this where:

a=100%
b= -1.5%
ε is a random number between 0 and 1%

This could e.g. correspond to percentages of the current mortality table if improvements fluctuate around 2 % p.a.