

Direct line:

Email:

Your reference:

Our reference:

23 February 2009

The Director  
Board for Actuarial Standards  
5<sup>th</sup> Floor, Aldwych House  
71 – 91 Aldwych  
London  
WC2B 4HN

Dear Sir

## **Consultation Paper on Generic Modelling Standard**

Thank you for the opportunity to comment on this consultation paper. This response has been prepared by the Benefits and Investment Practices of Watson Wyatt and therefore primarily reflects pensions-related issues. Watson Wyatt is a global consulting firm with particular strength in the area of UK pensions. We advise over half of the 100 largest corporate pension schemes, and the firm as a whole employs over 300 qualified actuaries in the UK.

As a background discussion paper, the document is an interesting and readable tour of a wide range of issues relating to the reliability and usefulness of actuarial models. In general, it is difficult to argue with the proposed purpose of the TAS and the underlying principles that the BAS has come up with.

However, the document becomes much more difficult when trying to work out what the detailed implications of the TAS for modelling work would be. While it might be quite easy to get a consensus on a set of broad principles, it is a lot more difficult to achieve a satisfactory balance when incorporating those principles into a mandatory Standard, especially one which is to have generic application.

Arising from this, we would summarise our main comments as follows:

- 1** A lot of the discussion in the paper appears to take place largely with formal computer-based models in mind. However, the concept of ‘modelling’, particularly when viewed as the third key contributor to good actuarial information alongside data and reporting, is potentially very wide – including not just major sophisticated models but also (as paragraphs 2.23 and 3.8 acknowledge) much simpler calculations (some even performed manually), either as particular parts of a standard process or for one-off purposes. Furthermore, paragraphs 2.16 to 2.19 of the paper specifically identify that ‘model’ can be used to describe three separate aspects (theoretical construct, practical implementation and specific realisation). In light of this wide range, it is very difficult to come up with ‘requirements’ for a Standard which are universally appropriate.
- 2** Many models are very complex. For example, a stochastic asset-liability model for projecting pension scheme funding can involve 100 or more economic variables on the asset side, with assumptions required on the distribution of each variable and of their correlations with one

another, and further assumptions as to how these variables translate into asset returns for different classes. Similar complications arise on the liability side, with a variety of demographic assumptions to be made as well as economic ones. Many decisions also have to be made on data grouping, including which assets, members or benefit cashflows should be grouped together. The sheer number of assumptions (and of their permutations and combinations) underlying such models therefore in our opinion renders many of the specific suggested requirements in the consultation paper impractical. For example, the proposals would appear to require, in all cases, the detailed description and documentation of how each of these assumptions was arrived at (including the many judgements made) and analysis of the sensitivity of the results to changes in assumptions each time the model is used. As well as being impractical, excessive analysis like this is likely to obscure the central point(s) that the model is demonstrating.

- 3 As well as regulating the actuarial information that is delivered to the end-user, the proposals impose significant regulation on intermediate stages of the process (in essence regulating the information that is passed from the developer of a model to the actuary who is using the model). While we accept that to deliver reliable actuarial information to the end-user the actuary needs to have confidence in and understanding of the models he is using, we think that many of the proposals regarding documentation are unnecessarily prescriptive.
- 4 It might be easier for the BAS to allay concerns of the type expressed above (regarding the potentially overbearing and impractical nature of the proposals) if the BAS were to provide, in conjunction with a paper such as this or a subsequent Exposure Draft, one or more worked examples as to how it envisages the Standard being applied in practice for a fairly common form of model.

Models cannot model everything, they model some aspect or aspects of the real world. Actuaries have a responsibility to ensure that the end user understands what the model is, and what it is not, able to tell them, and where a combination of models is used to produce a piece of actuarial information how these models have been combined and balanced against each other. However, investigating and measuring every way in which a model could be wrong is not always practical (except perhaps in the simplest cases) or desirable, and actuarial judgement should be used to determine what the key assumptions and limitations that need to be communicated are.

Therefore, a less prescriptive approach to actuarial standards on modelling, which we believe would be more appropriate, could set out a requirement for the actuary to communicate key assumptions and limitations (as determined by their judgement of materiality and proportionality) to the client and for the models to be documented such that the broad conclusions are reproducible and appropriate for use in the context in which the results are communicated. The actuary may, from time to time, wish to consider some of the methods set out in the consultation paper to illustrate certain sensitivities to assumptions where he/she thinks it necessary, but we don't believe that these would always be useful, practical or desirable for all models in all cases.

We will wait to see how the Exposure Draft of the TAS, when it is issued for consultation, addresses these points. The turning of principles into an actual Standard is a tricky exercise and the BAS should be prepared for the likelihood of significant further feedback at that stage and, we hope, will welcome that feedback in the quest for the appropriate way forward.

Our responses to the specific questions raised by the BAS in the consultation paper are given in the attached Annex.

We would be very happy to discuss with you any of the points raised in this response. If you want to take up this offer, please get in touch.

Yours faithfully

G P Everness

Senior Consultant

## **Modelling Consultation Paper: Responses to specific questions**

### **1. Will the proposed purpose of the modelling TAS as set out in paragraph 2.9 help to ensure that users of actuarial information can place a high degree of reliance on its relevance, transparency of assumptions, completeness and comprehensibility?**

Yes, except that in relation to a) there needs to be recognition of the possibility that some aspects of the real world might have to be omitted from the model because they cannot be accurately reflected in it. In this event, there would be an additional 'limitation' to the model to be recognised under d).

Additionally, the principles will need to bear in mind that in practice actuarial information will sometimes be based on a number of different models – with each model reflecting different aspects of the real world or perhaps different views of certain aspects of the real world, and with the actuary (and client) having to apply judgement as to the weight to place on each model.

### **2. Will the definition of a model given in paragraph 2.13 encompass the full range of models that contribute to actuarial information?**

Yes, to all intents and purposes, although it is possible to envisage models that are not mathematical but qualitative in nature.

### **3. Do respondents have any comments on the proposals in section 3, especially those in paragraphs 3.15, 3.22 and 3.27?**

On documentation (3.15), see question 5 below.

We are happy with the proportionality principle (3.22). Indeed, we would suggest that some of the later proposals in the paper regarding item-by-item analysis and documentation would be in conflict with this principle.

We are happy with much of the judgement principle (3.27), but are concerned by the middle sentence (regarding documentation of reasoning) which we think will often be impractical.

### **4. Do respondents have any views on the definition of materiality that is proposed in paragraph 3.5?**

There may be a large number of data items, assumptions etc that may have a material effect on the output of a model. It is unlikely to be practical to provide documentation (along the lines suggested elsewhere in the document) on all these assumptions. (See the comments made in the 'letter' part of the response about the number of assumptions and correlations in an asset-liability model.)

### **5. Should the modelling TAS include principles concerning the need for documentation as discussed in paragraphs 3.9 to 3.18?**

We agree with the distinction (in 3.9) between documentation for internal purposes and explanations provided to the end-user.

We agree that, in practice, high internal documentation standards are desirable for risk management and efficiency purposes, albeit that it is not always necessary for everything (such as the reasoning behind all judgements made) to be written down for subsequent users of a model to be able to interpret the model adequately. But, in general, we are concerned at proposals to introduce some prescriptive requirements in this area into this Standard. We think that, from an actuarial standards point of view, the onus should be on the professional, who is using a model to deliver actuarial information to a client, to be satisfied that he understands the model sufficiently to be able to provide reliable information, rather than a heavy onus being on the developer of the model to ensure that sufficient information for this purpose is always available to the professional using the model. Many (although not all) of our concerns as to the practicality of the proposals in the consultation paper stem from the ‘internal’ documentation aspects.

To pick on one particular detail, the principle of 3.15 appears to assume that the ‘model’ in question is a widely-used one, developed by someone other than the professional delivering the actuarial information to the end user. However, the Standard will also (we assume) encompass ‘mini-models’ developed by the client consultant himself for a one-off purpose, in which case the ‘good documentation’ considerations are different.

#### **6. Do respondents have any comments on the proposals concerning relevance and parsimony that are presented in section 4, especially those in paragraphs 4.12 and 4.17?**

Paragraphs 4.7 and 4.9 explain well that it is unrealistic to suppose that, at the time a model is developed and used, all relevant factors should always have been allowed for, and indicate an acceptance by the BAS that the benefit of hindsight should not generally be employed to determine whether it was reasonable at the time the actuarial information was produced for a particular model to have been used. However, the draft principle in 4.12 appears to overlook this practical point.

Our other concern with 4.12 is that all (known) materially relevant phenomena (e.g. a Government or other regime change) are not always modellable. Nevertheless, a model that does not include these can still be useful as long as its limitations are understood and communicated. We would also draw attention here to the point made under question 1 above that different phenomena might be covered through different models rather than a single model.

Regarding paragraph 4.17, we agree that unnecessary complexity for its own sake is not useful. However, there is a danger that this principle as drafted would not permit use of a previously-produced model that is more detailed than necessary for the new proposed purpose, but is nevertheless still the best available tool.

#### **7. Do respondents have any comments on the proposals concerning inputs and outputs that are presented in section 5, especially those in paragraphs 5.17, 5.28, 5.29, 5.35, 5.42 and 5.51?**

We are happy with the general principle in 5.17, but are unclear why it is necessary to include this in the Modelling Standard (rather than the Data and Reporting Standards) – see also response to question 8.

We are concerned that the data grouping principles in 5.28 and 5.29 would create an excessive requirement in some cases.

We do not think that the consistency principle as drafted in 5.35 adequately captures the sense of 5.34, but other than that are happy with the general idea.

We are happy with 5.42, provided that this information does not have to be repeated every time.

We do not disagree with the general sentiment of 5.51 but are not convinced that it should appear as a principle in the Standard – see response to question 10.

**8. Should the modelling TAS include:**

**a) any requirements relating to the disclosure of known or suspected shortcomings in data, over and above those expected to be included in the reporting TAS?**

If the modeller knows or suspects that there are shortcomings in the data and that these are materially relevant they should make it known to the end-user, but we believe that this should be adequately covered by the Data and Reporting Standards (and, if appropriate, subject-specific Standards) rather than being added also to the Modelling Standard.

**b) requirements to provide an estimate of the effects of any data shortcomings, and that any compensating adjustments should avoid bias?**

No. We think that the former would be unlikely to produce useful information, and that the latter would be an unnecessary constraint.

**9. Should the modelling TAS include a requirement that, if data is grouped, the effects of the grouping should be quantified?**

No, we agree with the BAS (5.30) that this would be excessive.

**10. Do respondents agree that best estimates (and other similar estimates) should be independent of the use to which they will be put?**

Yes, in general, but we would not include this as an explicit principle as we think that would be unnecessary and could have dangers. The important point is that the nature of ‘estimates’ should be made clear to the client. There is also the danger that the principle as drafted could be contravened by best estimates that differ according to the purpose for which they are used because different materially criteria apply to those purposes.

**11. Do respondents have any views on:**

**a) whether biased estimates such as those concerning prudence depend on context?**

Yes, prudence is an estimate whose relationship to ‘best estimate’ depends on context. It is possible that a ‘best estimate’ can meet a definition of prudence, although in practice this would be rare – a prudent estimate normally includes a bias towards a cautious view of the future but the extent and nature of this ‘bias’ depends on the particular circumstances.

**b) the practicality or otherwise of requiring that the equivalent best estimate be presented alongside every prudent estimate, and the benefits to users of actuarial information of doing so?**

In making a prudent estimate it is usually necessary to consider also the ‘best estimate’. However, this is not always the case – for pension schemes’ technical provisions, the assumption on future mortality improvements must be based on prudent principles but it would be overstating one’s ability to predict future mortality to claim that the assumption thereby chosen was “X% more cautious than a best estimate” or whatever. For reasons such as this, we are against a requirement along the lines discussed in 5.67.

**12. Do respondents have any views on the practicality or otherwise of requiring the use of a range in conjunction with every single point estimate?**

We agree with the BAS (5.80) that it would be impractical to have this as a requirement. It could introduce substantial costs for little or no gain and in some circumstances it might not actually be possible to define a useful range.

The essential fact that the point estimate output of a model is not *the* answer can often be best communicated qualitatively.

**13. Do respondents have any comments on the proposals concerning the fitness for purpose of models that are presented in section 6, especially those in paragraphs 6.8, 6.12, 6.20, 6.28 and 6.33?**

Many of these principles reflect good practice, in terms of checks and documentation. However, it is unclear to us why they should necessarily appear as mandatory requirements in a Standard, given that they are largely about the ‘internal processes’ of the provider of the actuarial information rather than about the actuarial information itself.

Paragraph 6.7 illustrates a point made in the ‘letter’ part of this response about the majority of the consultation paper appearing to be directed at large, frequently-used models rather than at smaller and one-off models.

In 6.8, a requirement for these checks on each use of the model would be excessive. A proven model framework need only be shown to be fit for a standard purpose initially (and periodically thereafter). Although the specifics of each set-up/run should be checked for fitness for purpose, this does not require a fully-documented process; each case is different and judgement will be needed to determine if a particular set-up/run is fit for purpose.

On 6.20, a statement of beliefs about the theoretical construct should normally be available to (if not specifically agreed with) the client. Models are imperfect representations of reality or specified aspects of reality and (as mentioned earlier) can still be useful even if certain aspects of reality are, of necessity, excluded.

On 6.33, while deletion of outliers should be able to be justified and should be disclosed, it will not always be proportionate to explain the implications to the end user (even if the impact on the results cannot be concluded to be ‘immaterial’).

**14. Are there any types of model that cannot be implemented in such a way that they exhibit reproducibility?**

Monte Carlo models or other models using random inputs or parameters cannot be reproduced exactly. However, if they are run a sufficient number of times, they should be reproducible to within a reasonable statistical tolerance.

**15. Should the modelling TAS include a principle concerning back testing?**

No. Although back testing is often a useful check, there should be no mandatory requirement for it as it will not always be relevant (where modelling fundamentally ‘new’ situations or scenarios) and might be disproportionate for smaller and one-off models. It is not clear how any meaningful back-testing could be carried out on models such as those mentioned in the infamous Columbia space shuttle example (paragraph 1.21), where an attempt is being made to ‘push back the boundaries’.

**a) Are there any models for which back testing is impossible?**

**b) Are there any practical difficulties that might arise if back testing were to be a requirement?**

Yes – see above. Also, back-testing can be a particular problem for stochastic models which explore outcomes over a large number of possible future scenarios; for any past event there will be only one actual outcome so there will rarely be sufficient past event data on which to back-test such a model.

**16. Would it be desirable and practical for users of external models to document the judgements they make, the checks that they perform and other relevant matters, and include explanations of the inputs, outputs and limitations in the same way as they would for models that they themselves have developed? Respondents who believe that this would not be practical should suggest alternative ways in which the objective set out in paragraph 2.9 could be met by users of external models.**

We would agree that there is no reason for an external model to be treated differently from an internal model as regards the user’s understanding of it, and it needs similar testing and checking to ensure that it produces reasonable output for the purpose in hand. However, the same comment applies here as we have made in response to various other questions as to the impracticability for sophisticated models of some of the documentation proposals in the paper.

**17. Do respondents agree that requirements for robustness and reasonableness would not be enforceable and could have undesirable consequences?**

Yes.

**18. Do respondents have any comments on the proposals concerning the limitations of models that are presented in section 7, especially those in paragraphs 7.29 and 7.41?**

Regarding 7.29, where sensitivity tests are not performed it may be excessive to document (for all of the assumptions in question) why they are not considered necessary.

We agree with the comments in 7.32 about the particular limitations of models that are focussed on tail scenarios. This does not of course mean that no such models should ever be used, but does mean that the limitations need to be accepted by all parties (and adequately communicated).

**19. Does the discussion in paragraphs 7.7 to 7.24 include all the major sources of limitations in models?**

There are no others that come to mind.

**20. Do respondents have any comments on the advantages and disadvantages of the options set out in paragraphs 7.38 to 7.42?**

We agree that the suggested requirement (in 7.41) is the best option. It is important that the actuary is able to use judgement as to the way in which the benefits and limitations are explained.

**21. Should the modelling TAS identify specific types of limitation that should be explained in actuarial information?**

No, we agree that the limitations that should be explained will vary from situation to situation and it would be counter-productive for the BAS to try to specify these in a generic Standard.