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Dear Madam

Modelling: Consultation paper

Following the above Consultation Paper, issued in September 2008, we are pleased to enclose our response. This represents the views of the actuarial practices within our UK firm.

We wish to highlight two particular areas of concern, which in our view require significant reconsideration before any draft Standard is produced.

- 1 *Definition of model.* We strongly believe that the BAS has attempted too broad a definition (see our response to Question 2). Although we appreciate the difficulty in drawing the line between what is a model, and what is a set calculation based on assumptions, the current proposals will encompass virtually every actuarial calculation, with potentially huge process and cost implications.
- 2 *Documentation.* We agree that users of actuarial information need to be given all appropriate disclosures about the information presented to them. However, if all the proposals in the Paper are implemented, without a more holistic approach taken to the subject, many users will be overwhelmed, and some processes will see much-increased costs. We have drawn together all the disclosure proposals from the Paper at the end of our response, to show the accumulated effects.

If you have any questions regarding our response, please contact Gordon Sharp, whose details are at the top of this letter.

Yours faithfully

Alastair McLeish
Partner

Tim Roff
Partner

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

INVITATION TO COMMENT - QUESTIONS

The BAS invites the views of those stakeholders and other parties interested in actuarial information who wish to comment on the content of this document. In particular the BAS would welcome views on the following issues:

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?

- a) Subject to our comments on definitions in 2) below, we agree that the proposed purpose of the modelling TAS should be as above for users of actuarial information. However we would add important caveats to what is suggested:

Documenting fully the limitations of a model in such a form that all users of actuarial information can understand them could be prohibitively time consuming and expensive in some circumstances. Therefore, 2.9 b) should state “include relevant explanations”, to incorporate proportionality into the standard.

A further problem with 2.9 b) is that, taken literally as currently drafted, it would require an explanation of the construction of each mortality table used in any other actuarial model – again, proportionality of explanation needs to be factored in.

The statement in 2.9 c) is possibly too strong. It may not be possible to know how well an innovative new model works in practice, although such models should be accompanied by appropriate explanation and (where necessary) warnings. Furthermore, error in the choice of model may be impossible to detect, let alone eliminate.

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

- a) We answer “yes” the question as put. But we strongly believe that the BAS has attempted too broad a definition, in that modelling involves not just a present “representation of some aspect of the real world”, but also a movement forward from a present position to one or more future positions. (Otherwise, why use a representation when you could use the real thing?)

For instance, we are surprised at the implications in paragraphs 2.27 that prescribed pension scheme valuations (PPF and accounting valuations) would come under the definition of a “model”. We would regard such exercises as calculations, not models, since they do not have the essential characteristic of modelling the future in any sense – they simply provide present numbers for present purposes, on prescribed bases.

A further important consideration is that, in future, the BAS standard will need to be used in conjunction with Solvency II. This is alluded to in paragraph 2.14. Under Solvency II Internal Models, the definition of “the Model” is much wider than the software / computer / mathematical processes themselves, and it encompasses many management processes. These risk management processes would not always be within the responsibility of the actuarial function. Additionally, Internal Models under Solvency II are mainly designed for capital management, whereas actuarial models can have many other applications, such as pricing or reserving. These two reasons may justify the difference in the definitions. If the BAS standard definition of a model is not consistent with the Solvency II internal model definition, it needs to be made very clear as to what the differences are. Inconsistent model definitions could possibly result in unintended consequences for Solvency II internal model approval.

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

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

a) Taking the principles in turn:

3.15 - documentation should be written its intended audience in mind. This will clearly lead to different types of documentation, as hinted at in paragraph 3.13, depending on whether it is for a technical or non-technical audience.

3.22 – the inclusion of scope is welcome, and indeed essential. However we are somewhat baffled by the second half of what is said here, as in many cases the payers and the users will be the same.

3.27 – we do not think that this proposal will meet its intention. Rather, is not the point that there should always be a judgement at the start of a modelling exercise, as to the applicability of the model for the exercise in hand? It follows that the amount of consideration, and documentation, involved in such judgement will vary according to whether or not the model is being used for the same purpose as originally, whether a significant amount of time has passed since it was last judged to be appropriate, the sensitivity of the model to elapsed time, and whether or not there have been any unexpected relevant events since it was last so used.

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

- a) The definition is a suitable starting point, but some further items need to be considered, e.g. the importance of the decision being made. This could be measured for example by the seniority of the person / body making the decision, or by the impact of the decision on the financial position of the company. If the materiality of an item is measured by the impact of the decision on the financial position of the company, individual firms should consider and define appropriate criteria within the suggested framework, e.g. the range of percentage changes above / below which changes are considered material. Otherwise, if these ranges are not specified, a scenario may arise where some model changes result in output changes of e.g. 0.5% and it may not be obvious whether this would change decisions or not.

Also, consideration needs to be given to whether the producer of actuarial information would have knowledge of the decision making process, i.e. to determine whether a particular change would result in a change in decisions. If this is not taken into account, a scenario may arise where a model change is considered immaterial by the producer of the actuarial information where in fact it is material or vice versa. The way to get around this is possibly for the intended recipients of the model to specify ranges of percentage changes of model outputs which would be considered (im)material. Sometimes the purpose of a model is to produce results for reporting purposes, and there it may not be possible for the producers of the actuarial information to determine whether a model change is material.

It is not obvious whether the reference to materiality is suitable given the definition of materiality, for example in the following paragraphs: 4.3; 4.9; 4.17 and 5.77.

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

- a) Yes. Paragraph 3.15 already covers this appropriately.

**Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP**

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?

- a) We most certainly agree that unnecessary complexity should be eschewed. However paragraph 4.12 needs a qualification, such as “all *known* materially relevant phenomena”, to avoid accusations of failure with hindsight. Paragraph 4.17 also needs qualification, such as “... *for the purpose to which it is being put.*”

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?

- a) In turn, we would comment as follows:

5.17 – this is appropriate.

5.18 – we agree that reporting uncertainty of data should be covered under the Data TAS, rather than under the Modelling TAS. However it would be useful in the Modelling TAS to make reference to the relevant parts of the Data TAS.

5.28 – this is appropriate, except that it should say “the effects *where known* of using grouped data”, e.g. to cover circumstances where only grouped data is available.

5.29 – again, this should refer to “the effects *where known* of the grouping”.

5.35 – we would rephrase this as “taking into account the purpose *and scope* ... “.

5.42 – this appears to be sensible, but we wonder if it needs some practical modification. For anything other than a very simple model, taking 5.42 literally could result in a very lengthy, and expensive, piece of documentation.

5.51 – sometimes it is not possible or practical to derive parameters other than by using the model itself in an iterative process, so it may not be possible fully to satisfy an independence test. Separately, we assume that the outputs or assumptions should also be documented as in paragraph 5.42.

5.67 – the practicality of providing best estimates alongside prudent estimates will vary enormously, dependant on scope and purpose, so we would argue against such a blanket requirement. However this could be considered in more specific cases, so would better be included where appropriate in practice-specific TASs.

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?

- a) See our comments in section 7) above, regarding paragraphs 5.28 and 5.29.

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

- b) As already noted, this is a data issue and so should be included in the Data TAS, not the Modelling TAS.

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

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

- a) Not always – too often this will not be practical. However where it is practical and indeed helpful, we agree that the impact of grouping should be quantified. It may be appropriate to estimate the impact by making use of the calculation at a different point in time on a different data set. In this case there should be a requirement that quantification needs to be re-performed when the business mix used to produce the grouping (which should be monitored at each calculation point) has changed. If the impact cannot be quantified, disclosures could be required as to why the grouped data would be a representative of the ungrouped data.

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

- a) Ideally yes, but this may not always be possible or practical.

11) Do respondents have any views on:

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

- a) Yes, most certainly.

(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?

- a) We agree that this should be provided where practical, and useful. However it is not always appropriate for inclusion in reports. Further, it would normally only be worthwhile (in a value for money sense) for key assumptions only.

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?

- a) We agree with the comments in paragraph 5.80. This would be impractical, difficult to report on, and in most cases very costly.

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?

- a) Our detailed comments are as follows:

6.8 – we agree that checking is an essential part of the use of any model, and that checks should be recorded and documented. But we wonder if also documenting the objectives of each test every time a model is used is practical – as we go through this consultation, we can see the accumulated volume of documentation easily becoming overwhelming.

6.12 – we agree that model outputs should be reproducible, within reason. A materiality clause needs to be included with this, when comparing stochastic outputs, rather than using wording which implies that absolutely exact reproducibility is required.

6.20 – we are uncomfortable with this wording. There is of course no way of knowing what future reality is to be. A more appropriate wording would be “The reasons for believing that the theoretical construct of a model is fit for its purpose should be documented.”

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

6.28 – this is appropriate.

6.33 – this is appropriate.

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

- a) See our comments regarding paragraph 6.12. This depends on whether the aim is reasonable reproducibility (in which case we cannot think of any exceptions) or absolutely exact reproducibility (in which case this is a practically impossible task with at least some stochastic models).

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

(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?

- a) Back testing is a good practice and probably appropriate in many circumstances. However it should be handled with great care. While back testing, model parameters should be refitted using only the historic data available at the chosen calculation date. Otherwise “future” data is being used to test future results, and so it can be difficult to maintain objectivity and consistency.

One area of difficulty is if suitable historic data at the chosen calculation date are not available. Further, the amount of backtesting will depend on scope and purpose, otherwise it could be too much of a development burden.

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.

- a) It will simply not be possible in all such cases for the user to complete such full documentation. Users should be able to rely on appropriate documentation from providers who are believed to be suitably professional. We would recommend that vendors need to document implied assumptions made within their models, e.g. assumptions as a result of the way a particular calculation is performed of the model is implemented. We would recommend that the producers of actuarial information should be able to demonstrate that they understand and accept the inputs, outputs, and limitations etc. of such third party models.

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

- a) Yes – we do not see how such requirements could be practically implemented.

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

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?

a) We would comment as follows:

7.14 and 7.15 - It is not clear whether these paragraphs relate to modelling error as a result of a specific realisation not reflecting the theoretical construct. Some further examples could perhaps be added to clarify what this would mean in practice.

7.29 – the principle is a good one, but we think that in practice it is too all-encompassing. To follow this literally could result in pages of documentation which to which users would pay little or no attention (and we note that the general point about documentation overload is finally recognised at this point in the Paper, albeit in the area of limitations only) in paragraphs 7.33 to 7.37.

7.41 – In some cases it should be patently obvious as to why a model meets the needs of the user. But in other cases the user has no interest in whatever models are used by the actuary – they are concerned only with the advice that is given, i.e. how the actuary uses and describes the outputs. Further, in the case of the use of externally provided modelling tools, documentation on limitations could come from the provider.

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

a) This is a very comprehensive discussion.

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

a) Of the three options, we agree that the third one (in paragraph 7.41) is preferable. However again we are concerned about the possibility of information overload.

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

a) No, given the wide variety and scopes of models. However a library of limitations would be useful.

22) Are there any matters not covered in this consultation paper that should be addressed in the BAS's modelling TAS?

a) As indicated in a number of areas above, the scope of a model or a modelling exercise is a key consideration. For example, a model being used to provide indicative advice only, in advance of full calculations, will probably fail to comply with a good proportion of this TAS as it stands, even though it would be fit for its purpose. Nor would the recipients of the results of such a model appreciate pages of documentation which obscured the real messages being given.

**Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP**

In addition to the specific questions listed above, the BAS invites respondents' views on any other aspects of the proposed generic TAS on modelling. To ensure that the significance of their point is fully appreciated by the BAS, respondents are asked to indicate how their comments would address the BAS's aim of increasing the reliance that users of actuarial information can place on it.

As noted above, we are concerned at the accumulated effect of the various proposed disclosure requirements – which total **fourteen** in all. We list these below, to show just how much of a burden these could become, and to suggest that they could be so long and detailed as to impact very negatively on (some) users of actuarial information.

Paragraph	Disclosure
2.9 b)	include explanations of how the inputs to models are derived and what the outputs from models are intended to represent;
2.9 d)	include explanations of the significant limitations of the models.
3.15	Documentation of a model should state both its purpose and its intended readership, and be complete for that purpose and clear and unambiguous for that readership. It should contain enough detail for a technically competent person with no previous involvement to understand the matters to which the documentation is relevant and assess the judgements that have been made.
3.27	Judgements about matters concerning models should be exercised in a reasoned and justifiable manner, taking into account the purpose of the model or models in question. The reasoning behind such judgements should be documented. Judgements should be reconsidered when the models are used for purposes other than those originally intended, after a period of time has passed, or after a previously unexpected event.
5.17	Data that is used in models should, as far as possible, be complete, accurate and relevant. Where data is, or is thought to be, incomplete, inaccurate or irrelevant, the approaches used to estimate the effects of its shortcomings or to make compensating adjustments to parameters or outputs should be documented, together with reasons for adopting them.
5.28	If grouped data is used, the approach that has been taken to the grouping, the reasons for choosing it and the effects of using grouped data rather than the ungrouped data from which it is derived should be documented.
5.29	If data has been grouped and it is not possible to demonstrate that the grouping has no material effect, an explanation of the possible effects of the grouping, and that a different grouping (whether more or less detailed, or using different criteria) could give different outputs, should be included in the actuarial information.
5.42	All estimates derived from model outputs, or used as assumptions in models, should be given statistical definitions and those definitions should be documented. Actuarial information should include explanations of the estimates and of their implications.

Board for Actuarial Standards – Modelling: Consultation paper
Response from KPMG LLP

- 6.8 A set of checks should be constructed and performed whenever a model is used in order to determine the fitness for purpose of the theoretical construct, practical implementation and specific realisations. The checks that have been performed on a model should be recorded and documented. The documentation should include the objectives of the checks.
- 6.20 The reasons for believing that the theoretical construct of a model is a satisfactory representation of reality should be documented.
- 6.28 The definitions of all items of data that are used in models should be documented.
- 6.33 If outliers are removed from the data used for a specific realisation other than because they are erroneous, the reasons for their removal should be documented, and the actuarial information should include an explanation of the implications.
- 7.29 The sensitivity tests that have been performed, and the reasons for performing them, should be documented. The reasons for believing those assumptions (or classes of assumptions) for which sensitivity tests have not been performed to be immaterial or otherwise inappropriate for sensitivity testing should also be documented.
- 7.41 Actuarial information should include an explanation of why the models on which it is based address the needs of the user. It should also include explanations of the material limitations of the models that have been used and their implications.