Comment #4 – 1/15/15 – 4:26 p.m.

Dear reviewers:

I continue to believe that "modeling" as applied to all practice areas and all forms of models is too broad a subject to be addressed in an ASOP. "Modeling" arguably encompasses essentially all actuarial work, as noted on page (v) of the second exposure draft. For that reason trying to create a useful standard on "modeling" is akin to trying to create a useful standard on "use of mathematics" or "application of statistics." To the extent that it is not vague to the point of meaninglessness, and does not overlap with other standards of practice on more specific topics, such a standard can contain only commonsense truisms. In other words it cannot offer useful guidance to the practicing actuary.

My *strong* preference would be to have no such standard, and instead address particular aspects of model creation and application with much narrower standards – as we have had to date. Every existing ASOP other than ASOP #1 addresses some aspect of "modeling" (even the filing, reporting, and testimony standards address specific types of communication of modeled results).

My specific comments are given below. Thank you for your consideration.

Request For Comments:

1. Section 3.1.1 is clear in that it distinguishes those situations in which there is no material financial effect or little reliance from situations in which the proposed guidance would have full applicability.
2. Section 3.1.3 is unclear because it is unclear what "modeling team" means. Is this a model *development* team? A team of people that *uses* models? Either?
3. The use of both "intended application" and "project objective" is a symptom of the over-broadness of the proposed standard. "Intended application" is relevant in the construction of models, and "project objective" is relevant in the application of models. A standard that attempts to cover both – which as noted in my opening comments, means it attempts to cover essentially all actuarial work – finds itself forced to make this distinction. I do believe that using the single term "intended purpose" would be less confusing as far as the rest of the text, because it would compress all related confusion into the definition of "intended purpose." But the intrinsically confusing nature of that definition re-emphasizes the inappropriately broad scope of the proposed standard.
4. I do not believe it is possible to have a single standard that offers appropriate guidance to actuaries on the topic of "modeling", i.e. the on the topic of all actuarial work.

Specific comments on the text of the proposed standard:

1.2 – The use of bolding of defined terms is not consistent. For example the word "model" should be bolded throughout.

2.1 – This definition of "assumptions" is not appropriate. Assumptions are not always inputs to a model. Assumptions may govern the paradigm or structure of the model, or the actuary may assume that certain conditions hold (and therefore the model is applicable). If assumptions are to be defined to be "inputs," remove the term "assumptions" throughout the standard and just use the term "inputs" with qualification as necessary.

2.2 – This definition of "data" is not appropriate. Not all data are input, as the draft itself recognizes in 3.3.1a (which says validation could include reconciliation of relevant input values to actual data). A more appropriate definition of "data" would be "facts or information that comprise or inform the selection of model input; data may be collected from sources such as records, experience, experiments, surveys, or observations."

2.4 – The term "executable" is not defined but seems to imply that any "implementation" must be a piece of software. Is that the intention? The definition of "model" is not that narrow.

2.7 – The definition of "intended purpose" is confusing because this over-broad proposed standard is attempting to address both the *construction* of models (where "intended application" is relevant), and the *application* of models (where "project objective" is relevant).

2.12 – This defines parameters as a type of model input. That is simply not appropriate. Parameters need not be inputs; in predictive modeling, parameters are the output. I find no need for this definition – just eliminate the term "parameter" from the standard (as above with "assumption") and simply refer to "input." The examples are also confusing. Is "coefficients of variables" meant to say "coefficients of variation"? Are these examples meant to clarify what types of "model input" are meant by the term "parameter"? A close parsing of the sentence yields: "parameters are… input… that, when varied, result in different output". I fail to see how this is a useful definition.

3.1.3 – Unclear what "modeling team" means. Is this a model *development* team? A team of people that *uses* models? Either?

3.2.5 b – What does this mean? Is it the same as (c), i.e. does "grouping model inputs" refer to reducing the level of granularity? Is this consideration asking the actuary to verify that the level of granularity is appropriate (that's 3.2.5c) or is it asking the actuary to do some sort of sensitivity test to streamline the model as much as possible (which, much as I prefer a model to be no more complex than necessary, would seem to be too onerous a requirement for an ASOP)?

3.2.5 e – What is the actuary supposed to do if the entity, its members, or its counterparties have choices / options that could have a material influence? That is almost

always the case! That doesn't mean that a model that does not attempt to include such choices / options is inappropriate. Every model is only an approximation to reality. How is this consideration helpful?

3.2.7 should be combined with 3.2.6 and only address "inputs" – remove the terms "assumptions" and "parameters."

3.2.7d – For complex models, it may be extremely difficult and/or time consuming to ascertain that there is no inconsistency across all the inputs. This section should require the actuary to take "reasonable and appropriate steps" to ensure consistency to the extent possible.

3.3.1.a – In 2.2, "data" is defined to be a type of "input," but here the actuary is advised to consider reconciliation of "input" with "actual data" in a context that makes clear that "other inputs" is not what is meant by "actual data" – illustrating that the definition of "data" given in 2.2 is inappropriate.

3.4 – This section is overly onerous. Requiring the actuary to explain methodology, assumptions and parameters (i.e. inputs), limitations, and material changes WHENEVER the actuary presents model results is simply unrealistic. This may be a model that is used frequently. It may be one that the principal or other users are quite familiar with. It may be an in-house standard. It's not appropriate to require this level of exposition WHENEVER results are presented – even if there is reliance with potential for material financial effect (and therefore the actuary, by 3.1.1, would be required to apply the full guidance). Is this meant only to apply to formal actuarial reports as per ASOP 41 (as the sub-points seem to indicate)? I question why this section is even necessary – why are section 3.4 and section 4 not already covered by ASOP 41?

3.7 – This section seems to acknowledge my main point, that meaningful guidance on modeling is already provided in numerous other ASOPs and the actuary is bound to follow them… and 3.7 clearly states that those other ASOPs take precedence over this proposed one. Why, then, is this one necessary? What does it add? How does it benefit the practicing actuary?

4.1.2 – as noted above in the comment on 3.2.7d, it may not be feasible to completely eliminate any possibility of inconsistency among inputs. The actuary should only be required to disclose any material inconsistencies revealed through "reasonable and appropriate steps" taken to ensure consistency.

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