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AMERICAN ACADEMY of ACTUARIES

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October 21, 2016

Actuarial Standards Board

Via email to [comments@actuary.org](mailto:comments@actuary.org)

**Re: ASB Comments—Comments on Third Exposure Draft of the Modeling ASOP**

Members of the Actuarial Standards Board:

The Pension Committee of the American Academy of Actuaries<sup>1</sup> is pleased to present the following comments to the Actuarial Standards Board (ASB) regarding the third exposure draft of *Modeling*, a proposed actuarial standard of practice (ASOP). Although we believe much good work has been done to improve the clarity of the proposed ASOP, we still have some concerns.

**Answers to ASB's Questions**

As the ASB requested, following are our responses to the questions posed in the proposed standard:

- 1. Does the proposed standard provide sufficient and appropriate guidance to actuaries working with models? If not, what suggestions do you recommend for improving the guidance?*

In general, we commend the ASB for the overall tone and direction of the proposed ASOP. However, we offer some ideas for potential improvement and clarification so that the proposed ASOP provides sufficiently clear and understandable guidance to pension actuaries.

Although there was significant effort in the proposed ASOP to differentiate among the various actuarial roles, we believe the guidance provided in section 3 is essentially undifferentiated by role, except in section 3.4. As a result, it is very difficult to parse through and find the guidance appropriate to an individual actuary's own role.

In addition, it is not clear how to address a situation where one project includes multiple embedded models, as many projects do (see specific comments on sections 3.6 and 4.2.1 about the potential to require multiple layers of disclosure about various component models, which may cause disclosures material to intended users to be lost in the noise of required but immaterial disclosures about the component models). We also recommend

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<sup>1</sup> The American Academy of Actuaries is an 18,500+ member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

shifting all disclosure guidance into section 4, as is done with other standards of practice, instead of having some disclosure guidance in other sections, such as sections 3.6.2 and 3.6.3. The risk of accidental noncompliance increases when disclosure requirements are not grouped together.

2. *Does the proposed standard provide sufficient and appropriate guidance to actuaries working with all types of models, including financial projection models, predictive models, and statistical models?*

Based on our background as pension actuaries, we believe that the guidance appears appropriate to all types of models with which we work, subject to the comments herein.

3. *The scope of the proposed ASOP excludes “simple” models, which are defined in section 2.13. Is this definition appropriate and sufficiently clear?*

We believe having a definition of a simple model is appropriate and extremely important in limiting the proposed ASOP’s applicability. In particular, we think that it is important and appropriate for the actuary to use professional judgment in determining which models are simple models. However, we believe the definition needs to be more specific, and it would be helpful to include examples of types of models that would fall under the definition.

It is not clear what level of precision is required in order for the actuary to conclude that the model results could be “predicted” without an actual model run. Many models can be generally predicted, within a range, whether they are simple or not. It also appears that a single model could meet the requirements of a simple model for some applications but not for others, depending on the predictability of results. Along similar lines, it seems that a model could meet the requirements of a simple model for some actuaries, but not all, even when the actuaries are on the same modeling team. For example, consider a model used by both more experienced and less experienced actuaries on the same team. In this situation, it is not clear whether one definition would supersede the other, or whether the ASOP would apply to each actuary independently. We request that this predictability using a model run be clarified, and also that the definition be clarified to indicate that a model is not excluded from being a simple model solely because it uses a model run.

The simple model definition excludes models when model results “are readily obtained from an external source” that is not another model. We expect that the results of many simple models could be readily obtained from an external source that is another model. This would result in the exclusion of many models that we would consider simple models. We request that the definition of simple model be expanded to include all models that have results that can be readily obtained from an external source, including another model.

4. *Section 3.2 requires the actuary to make practical efforts to comply with applicable sections of this standard with respect to models designed or built by someone else, such as a vendor or a colleague, when the actuary has a limited ability to obtain information about the model or to understand the underlying workings of the model. Is this guidance appropriate and clear?*

We think this guidance is appropriate, subject to the comments herein. However, it would be helpful to have clarification on the practical efforts that an actuary should make to comply with other applicable sections of the proposed standard when he or she is using a model developed by others, because it is not clear whether or when the other sections apply. We believe examples would be quite helpful.

5. *Does any guidance in this exposure draft conflict with the guidance in the proposed working draft of ASOP No. 38, Catastrophe Modeling (for All Practice Areas)?*

We note that the cross-reference in section 1.2 of the proposed working draft of ASOP No. 38 to the proposed modeling ASOP does not indicate that the proposed modeling ASOP would apply when an actuary reviews or evaluates a catastrophe model, and our understanding is that the proposed modeling ASOP would apply in such cases.

The definition of “intended purpose” in section 2.6 of the proposed modeling ASOP appears to encapsulate the proposed working draft of ASOP No. 38’s definition of “project’s objective” in section 2.7 without using that specific terminology. For clarity, consistent wording should be used by both ASOPs where possible.

The definition of “parameters” in section 2.11 of the proposed modeling ASOP appears to conflict with the definition of the same word in section 2.5 of the proposed working draft of ASOP No. 38, because only the former includes contractual or scientific inputs to models.

## Specific Comments

In addition, we have specific comments on various sections of the proposed ASOP:

- Sections 1.2 and 3.1: Both of these sections refer to “intended user(s)” relying heavily on the results. We are not sure whether “principal” or “intended user” is more appropriate but believe that if the phrase “intended user” is retained within the ASOP, then either it should be defined or there should be a cross-reference to the definition of “intended user” in ASOP No. 41, *Actuarial Communications*.

In the second paragraph of section 1.2 and the first paragraph of section 3.1, we suggest not limiting the application of this proposed ASOP to situations where the material effect is financial in nature. For example, the results of a model may be the basis of a decision that will be made by the intended user. The model may then have a material impact on that decision-making process. It may or may not also later have a material financial effect on the intended user. Furthermore, the material financial effect, if any, may be on a third party. In addition, because it not always known by the actuary in advance that a model will have a material effect, we suggest changing the section 1.2 wording to “...or is not reasonably expected by the actuary to have a material effect...” and the section 3.1 wording be changed to “...and the use of the results of the model is reasonably expected by the actuary to have a material effect for the intended user.”

- Section 1.4: Application of the effective date is not clear for a model that has been selected and used prior to the effective date but to which a minor change or other update is made after the effective date. It is not clear, therefore, whether that means that all of the

provisions of the proposed ASOP need to be applied retroactively to the beginning of the process, which predates the effective date. Alternately, the ASB may consider whether there is there some transition compliance for the model update that can be applied in this circumstance. Clarification would be helpful because many actuaries use models that were selected, initially set up, and reviewed in the past and that will be used to produce a new model run after the effective date.

- Section 2.4: “Implementation” is used inconsistently within the proposed draft. While it is defined as an “executable form of a model” in Section 2.4, it is used as an adjective in 2.7 describing the life cycle of the model: “the implementation phase.” This use of the word “implementation” as a noun to define the executable form of the model and as an adjective to describe a process is confusing and should be reconsidered. “Construction” might be a better substitute, for example referring to “the construction phase of the model.”
- Section 2.6: This section would be clearer if the definition is rewritten (perhaps into a subsection (a) for the “planned uses” piece and a subsection (b) for the “specific goal or question addressed” piece) to explain which definition applies to the role an actuary is playing with regard to each model. This change might also help clarify the ties between these types and the guidance in section 3.4.3.
- Section 2.7: We have several comments on the definition of model and suggest clarifications:
  - We find it difficult to determine how to address a project in which several models are linked together to generate results. Examples include:
    - a liability generator model that feeds a second model performing a complex set of funding calculations and regulation-prescribed tests, and
    - a stochastic model fed by a liability generator model and a set of forward-looking capital market assumptions that were also initially generated through modeling.
  - In the first sentence of the section, consider adding “actuarial” to the list of concepts and equations that are used in a model. Because the models covered by this proposed ASOP are those used in connection with actuarial services, we expect actuarial concepts and equations will be included in many of the models covered by this proposed ASOP.
  - The description of the third component of a model—the output component—refers to it as the component that “translates the estimates into useful business information.” Some models do not necessarily have an output component that satisfies that definition. They may create the estimate in the processing component, which is then an input to another model (see examples noted under the first comment on this section). The initial pension valuation model doesn’t have an output component that creates information that is immediately “useful business information” without going through the components of another model to make it useful.
  - Although the three phases in the life cycle of a model are listed, the words that are used are not necessarily clear. For example, the third phase is defined as the production phase, which consists of model run(s)—similar to the descriptions used earlier in the definition of a model’s components. However, it is not clear whether this is the phase where one executes the model runs (which would appear to be the implementation phase) or the phase where one receives, reviews, or does

something with the output of the model runs. It would be helpful if the definition of model were updated to clarify what defines or happens in each of the three phases. For example:

“A model evolves through a life cycle as follows: (1) a development phase, where the specifications are identified and developed for use in the model; (2) an implementation phase, where one or more model runs are executed; and (3) a production phase, which consists of the output of one or more model runs.”

- It is not clear what differences are intended between the definition of “implementation” and “model run,” since they appear to be similar. The definition of “model run” appears to be a better definition for what happens during the implementation phase, rather than the definition of “implementation” (as we noted in our comments on section 2.4).
  - There are several places in the proposed ASOP where the phrase “model results” is used. However, this phrase is not used in the definition of model and is not defined. The proposed ASOP should clarify the differences between “model results” and the output component of a model. Consistent wording should be used throughout the proposed ASOP and consideration should be given to defining the phrase “model results” if the proposed ASOP continues to use it.
- Section 3.1: The example of a “corporate financial planning model” typically being covered by the proposed ASOP is not clear. For pension actuaries, our annual valuation models sometimes result in outputs that may be entered on a corporation’s financial statements, which sometimes (but not always) involves planning. It is not clear whether these models—which we do not think are generally simple models—will be subject to the proposed ASOP. For some intended users, the outputs are material to their financial statements, while for others they are not. If this example is intended to refer to something specific in the insurance industry, consideration should be given to clarifying the wording (for example, to “corporate financial planning for an insurance company.”)

In addition, the term “modeling team” in this section (and in section 3.3) is not defined. It would be helpful to define this term. For example, the extent to which the term “modeling team” includes non-actuarial but technical staff, administrative assistants helping with the useful business information, investment professionals, programmers, etc. should be clarified.

- Section 3.2: We suggest the ASB consider removing the words “continue to” in the phrase “...the actuary should *continue to* make a reasonable attempt to have a basic understanding...” [emphasis added]. The use of the italicized words implies that the actuary already has a basic understanding, which may not be true when the actuary first uses the model developed by others.
- Section 3.3: In some circumstances, an actuary is responsible for a general review of the overall process for development and communication of useful business information for the intended user, but relies entirely on other actuaries (and/or non-actuaries) for all components of the model. In this situation, the responsibilities of the actuary under this proposed ASOP are not clear. It is clear that the reviewing actuary must comply with

section 3.3, and maybe with section 4.2.1 if the actuary is signing an actuarial report (see comment below on section 4.2.1). Clarification of what, if any, other sections with which the actuary must personally comply would be helpful.

- Section 3.4: We agree with the phrase “reasonably meets the intended purpose” in the opening paragraph of this section and recommend adding the word “reasonably” to the subsections of this section to confirm the level of effort that the actuary should extend to meet these requirements.
- Section 3.4.1: We request clarification on the phrase “relationships recognized,” as it is not clear to which relationships this refers. The word “dependencies” used in section 3.2 is clearer, and we suggest using that term consistently if it reflects what was meant (or something more clear, if not).

Also, the example in the last sentence of this section is not appropriate for this section; we suggest it instead be included in the examples of model governance and controls in Appendix 1.

- Section 3.4.2: We suggest that the phrasing “efforts to revise the inputs” be changed to “revisions to inputs” for additional clarity.
- Section 3.4.3: We suggest the title of this subsection be changed to “Reviewing, Evaluating or Modifying the Model for the Intended Purpose” and “planned uses” changed to “intended purpose” in the first sentence to be consistent with the other subsections.

In addition, we suggest rewording the last sentence as follows to be more consistent with the current definition of “model”:

“When reviewing or evaluating a model for a specific use, or when modifying a model to improve the information input, processing, or output components to meet the specific goal or question being addressed by the model, the actuary should be guided by section 3.4.2.”

- Section 3.4.4: We request clarification of the phrase “important relationships” in subsection (a), as it is not clear to which relationships this refers. As noted previously, the word “dependencies” used in section 3.2 is clearer and we offer a similar suggestion as noted above in our comments on section 3.4.1.
- Section 3.4.5: In the first paragraph, it is not clear what is meant by the term “the structure of the model.” Please clarify whether the ASB is simply talking about the model itself, the platform used to create it, the way inputs are handled, or something else. If there is a difference between the model itself and the model structure, we suggest the ASB add a definition for “model structure.”

In subsection (d), please clarify what is meant by the new phrase “entity or its counterparties.”

Additionally, we suggest adding the phrase “be expected to” before “have a material effect.” Sometimes a material effect can only be definitely determined by actually modeling all of the other options, which could be onerous without producing commensurate value. We suggest that options “expected to have a material effect” is a more appropriate standard than “could have a material effect,” and can be reasonably accomplished without significant additional effort.

- Section 3.4.7(b): We suggest that any margin that is used under this section be disclosed along with other assumptions or parameters. A disclosure requirement should be added to section 4 of this proposed ASOP to address any use of a margin (including the rationale for selecting the margin used) so the intended user can understand how to appropriately use the output of the model.
- Section 3.4.7(c): It is not always appropriate to reflect a range of assumptions in a model. For example, when determining accounting costs for a pension plan, the model must be run using the specific assumptions selected by the plan sponsor. Therefore, we suggest that the section begin with the words “Where appropriate, the actuary...”
- Section 3.4.7(d): The second paragraph of this section should refer to section 4.2.3 instead of section 4.1.3.
- Section 3.5.1(a)(1): It is not clear what actual information is being reconciled to the inputs in this subsection. Is the ASB able to provide an example to help us understand what is being suggested here? We understand that an actuary may want to check that the inputs are correctly entered into the model, and that they are running through the model run correctly. However, it is not clear what is meant by reconciling those inputs to “actual information,” especially because section 3.5.1(a)(3) refers to testing “against historical actual results.”
- Section 3.5.1(a): The final phrase refers to “the residual risk that may remain after the model integrity efforts.” It is not clear how that differs from assessing the overall appropriateness for the intended purpose or how one is to evaluate the residual risk in the context of this section, which addresses validating whether the model reasonably represents that which is being modeled.
- Section 3.5.1(c): We understand that the topic of peer review has not been addressed in any ASOP to date. It is a very complex topic that can mean different things to actuaries working in different organizations and practice areas. In addition, there is often confusion about the differences between “peer review” and “review by a peer,” and we do not believe the associated roles and responsibilities for each have been clarified in this proposed ASOP. We understand that there is a current project being undertaken by the Council on Professionalism (COP) of the American Academy of Actuaries to address peer review. We suggest that the ASB wait for the completion of this COP project and, based on the results, decide how to address the topic of peer review in a general ASOP that covers all actuarial work (e.g., ASOP No. 1), instead of in an ASOP that covers just modeling. Therefore, we believe the discussion of peer review should be removed from this proposed ASOP.

However, if the ASB decides that it is important to cover the topic of peer review in this particular area of actuarial practice, we suggest changes to the current wording in the proposed ASOP. The list of items that might be subject to a peer review in the second sentence of this section is a mixture of the components of a model and phases of a model. We suggest that all three components and all three phases could be the subject of a peer review. We also see that there may also be value from a peer review of communications that are being sent to a principal that include a discussion of the results of a model. Therefore, if peer review is not removed from the proposed ASOP, we suggest adjusting the second sentence of this section as follows:

“Such peer review, if obtained, may include the review of the reasonableness of any or all of the three components of a model and any or all of the phases in a model life cycle and the communication of the model output to the principal.”

As noted above in our comment on section 3.3, the proposed ASOP is not clear about the responsibilities of the actuary who is doing this peer review of the work done by the modeling team (e.g., documentation, communication, etc.). The proposed ASOP is also not clear about the difference between this peer review and the discussion of reviewing elsewhere in the document (e.g., section 3.4.3). We request that these responsibilities be clarified if peer review is not removed from the proposed ASOP.

- Section 3.6: We have a concern about not differentiating between the individual component models that form the complex model and the complex model itself used to produce the results shared with the ultimate intended user. The proposed ASOP as drafted has the potential to require multiple layers of disclosure about various component models to the ultimate intended user, which may cause disclosures material to intended users to be lost in the noise of required but immaterial disclosures about the component models. This same concern applies to section 4.1 of the proposed ASOP.
- Section 3.6.1: It appears there is an incorrect reference at the end of this section; “section 4.1” should be updated to subsection “4.2.2.”
- Section 3.6.4: In the second paragraph of this section, wording referring to “(statutes, regulations, or other legally binding authority)” should be added back, to be consistent with the usage in section 1.2.
- Section 3.7: It is not clear when an actuary is subject to the requirements in section 3.2 (“Models Developed By Others”), those in section 3.3 (“Reliance On Another Actuary On A Modeling Team”) and/or those in section 3.7 (“Reliance On Data Or Other Information Supplied By Others”) when relying on outputs from other models supplied by others. If these requirements are meant to apply in different circumstances, then those circumstances need to be better defined. It may also be helpful to describe in one section or adjacent sections to avoid confusion.
- Section 3.8: It is not clear whether the anticipated documentation under the first paragraph should be in the actuarial communication/report (the likely intent) or in internal work papers. It is also not clear whether “subsequent users” are limited to “intended users.” Because disclosure in actuarial reports is discussed elsewhere in the proposed ASOP, we might assume that this section refers to internal documentation.

However, we request that this be clarified if that is what was intended. And if it is not internal documentation, the provisions of this section should be moved to Section 4 with the other disclosure requirements. Finally, it is not clear why a distinction is made between what must be documented in an actuarial communication as opposed to what must be documented in an actuarial report. ASOP No. 41 provides that “the actuary should complete an actuarial report if the actuary intends the actuarial findings to be relied upon by any intended user.” Section 3.1 in the proposed ASOP provides that the guidance applies “when, in the actuary’s professional judgment, intended users of the model rely heavily on the results.” Therefore, it appears that if subject to this standard, the actuary should complete an actuarial report.

- Section 3.9: We continue to be concerned about issues addressed in more specific pension ASOPs that conflict with this proposed ASOP. We request that the proposed ASOP be updated to specifically state that, to the extent there is any conflict with ASOP Nos. 4, 6, 27, 35, and 44, then ASOP Nos. 4, 6, 27, 35, and 44 shall govern.<sup>2</sup> The current language only refers to the more general ASOP Nos. 23 and 41, so it may not be clear that the more specific pension ASOPs also apply in this section.
- Section 4.2: It appears as if this is a restatement of items specific to the proposed ASOP that were mentioned earlier, which may be used by the actuary as an easy-to-find, consolidated list of potential additional disclosures for models. If so, we suggest the ASB add the disclosure mentioned at the end of the second paragraph of section 3.1 when the actuary has deemed the model not subject to this proposed ASOP (as well as our proposed disclosure of the use of margins mentioned above in our comments on section 3.4.7(b)).
- Section 4.2.1: Often in large projects involving pension actuaries, many actuaries on the modeling team may be responsible for multiple different pieces of the models that result in the final set of useful business information. However, only a few of those actuaries sign the actuarial report. We request clarification that actuaries who were on the modeling team but who are not signing the actuarial report do not need to be identified in the actuarial report. Those actuaries who are signing the report should be identified with their associated scope of responsibilities as noted in section 3.1 (including reliance on other actuaries and members of the team). Otherwise, a formal listing of individuals and responsibilities for each piece of a set of models can be quite significant (e.g., several pages) and provide no important information to the principal.
- Section 4.2.2: Section 3.6.2(a) indicates that in actuarial reports that discuss models, the intended purpose should be explained. ASOP No. 41 also requires disclosure of the purpose of the engagement or assignment in any actuarial report. The second sentence is therefore redundant and not needed.

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<sup>2</sup> For example, ASOP No. 27 refers to two types of prescribed assumptions or methods with different requirements for each: (1) prescribed assumptions or methods set by law, and (2) prescribed assumptions or methods set by another party. However, for the purposes of ASOP No. 27, “an assumption or method selected by a governmental entity for a plan that such governmental entity or a political subdivision of that entity directly or indirectly sponsors is a prescribed assumption or method set by another party.” This treatment may conflict with the requirements in the proposed modeling ASOP at the end of section 3.4.7(d). Also, the pension ASOPs are currently being redrafted as a result of the recent Pension Task Force’s decisions (see June 30, 2016 report) and future conflicts may arise.

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We appreciate the ASB giving consideration to these comments. Please contact Ted Goldman, the Academy's senior pension fellow ([goldman@actuary.org](mailto:goldman@actuary.org); 202-223-8196), if you have any questions or would like to arrange a convenient time to discuss this matter further.

Respectfully submitted,

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American Academy of Actuaries