



ACTUARIAL STANDARDS BOARD

• EXPOSURE DRAFT •

**Proposed Revision of
Actuarial Standard
of Practice
No. 4**

**Measuring Pension Obligations and
Determining Pension Plan Costs or Contributions**

**Comment Deadline:
July 31, 2018**

**Developed by the
Pension Committee of the
Actuarial Standards Board**

**Approved by the
Actuarial Standards Board
March 2018**

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March 2018

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in Measuring Pension Obligations and Determining Pension Plan Costs or Contributions

FROM: Actuarial Standards Board (ASB)

SUBJ: Proposed Revision of Actuarial Standard of Practice (ASOP) No. 4

This document contains an exposure draft of a proposed revision of ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*. Please review this exposure draft and give the ASB the benefit of your comments and suggestions. Each written comment letter or email received by the comment deadline will receive appropriate consideration by the drafting committee and the ASB.

The ASB accepts comments by either electronic or conventional mail. The preferred form is e-mail as it eases the task of grouping comments by section. However, please feel free to use either form. If you wish to use e-mail, please send a message to comments@actuary.org. You may include your comments either in the body of the message or as an attachment prepared in any commonly used word processing format. **Please do not embed your comments in the exposure draft and do not password-protect any attachments. If the attachment is in the form of a PDF, please do not “copy protect” the PDF.** Include the phrase “ASB COMMENTS” in the subject line of your message. Please note: Any message not containing this exact phrase in the subject line will be deleted by our system’s spam filter. Also, please indicate in the body of the e-mail if your comments are being submitted on your own behalf or on behalf of a company or organization.

If you wish to use conventional mail, please send comments to the following address:

ASOP No. 4 Revision
Actuarial Standards Board
1850 M Street, NW, Suite 300
Washington, DC 20036

The ASB posts all signed comments received by the comment deadline to its website to encourage transparency and dialogue. Anonymous comments will not be considered by the ASB nor posted to the website. Comments will be posted in the order that they are received. All posted comments will be available to the general public on the ASB website. The ASB disclaims any responsibility for the content of the comments, which are solely the responsibility of those who submit them.

For more information on the exposure process, please see the ASB Procedures Manual.

Deadline for receipt of responses in the ASB office: **July 31, 2018**

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Background

The ASB provides guidance for measuring pension and retiree group benefit obligations through the series of ASOPs listed below.

1. ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*;
2. ASOP No. 6, *Measuring Retiree Group Benefits Obligations and Determining Retiree Group Benefits Program Periodic Costs or Actuarially Determined Contributions*;
3. ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
4. ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*;
5. ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*; and
6. ASOP No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*.

The last revision of this standard was issued in December 2013.

In response to specific requests for changes in the Actuarial Standards of Practice and other activity related to public pension plans, in July 2014 the ASB issued a Request for Comments on the topic of *ASOPs and Public Pension Plan Funding and Accounting*. Over 50 comment letters were received covering a wide variety of potential ASB actions. In December 2014, the ASB formed the Pension Task Force and charged it with reviewing these comments and other relevant reports and input to develop recommendations for ASB next steps. In July 2015, the ASB held a public hearing on the proposed actuarial standards of practice applicable to actuarial work regarding public plans. The Pension Task Force provided its report to the ASB in February 2016. The report included suggestions for changes to the ASOPs that would apply to all areas of pension practice. In June 2016, the ASB directed its Pension Committee to draft appropriate modifications to the actuarial standards of practice, in accordance with ASB procedures, to implement the suggestions of the Pension Task Force. The changes in this exposure draft, and in exposure drafts of ASOP No. 27 and ASOP No. 35 issued together with this exposure draft, modify the standards to implement the Pension Task Force suggestions.

Notable Changes from the Existing ASOP

Notable changes from the version of ASOP No. 4 adopted December 2013 include the following:

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1. Section 3.8, Actuarial Assumptions, was expanded to provide additional guidance regarding selection of assumptions.
2. Section 3.11, Investment Risk Defeasement Measure, was added to provide additional guidance when the actuary is performing a funding valuation.
3. Section 3.14, Amortization Methods, was added to provide guidance on the selection of amortization methods.
4. Section 3.16, Output Smoothing Methods, was added to provide guidance on the selection of output smoothing methods.
5. Section 3.17, Allocation Procedure, was expanded to provide additional guidance regarding the selection of a cost allocation procedure or contribution allocation procedure.
6. Section 3.20, Reasonable Actuarially Determined Contribution, was added to provide additional guidance if the actuary is performing a funding valuation that does not include a prescribed assumption or method set by law.
7. Section 3.21, Gain and Loss Analysis, was added to provide additional guidance when the actuary is performing a funding valuation.
8. Section 4.1, Communication Requirements, was expanded to provide additional guidance concerning disclosures and reordered to follow the order of the guidance in section 3.

Request for Comments

The ASB would appreciate comments on all areas of the proposed standard but would like to draw the reader's attention to the following questions in particular:

1. Section 3.11, Investment Risk Defeasement Measure, requires the calculation and disclosure of an investment risk defeasement measure when the actuary is performing a funding valuation. The guidance allows for discount rates to be based upon either U.S. Treasury yields or yields of fixed income debt securities that receive one of the two highest ratings given by a recognized ratings agency. Are these discount rate choices appropriate? If not, what rate choice would you suggest?
2. Under certain circumstances, section 3.20, Reasonable Actuarially Determined Contribution, requires the actuary to calculate and disclose a reasonable actuarially determined contribution. Do the conditions in this section describe an appropriate contribution allocation procedure for this purpose? If not, what changes would you suggest?

The ASB voted in March 2018 to approve this exposure draft.

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Pension Committee of the ASB

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| | |
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The Actuarial Standards Board (ASB) sets standards for appropriate actuarial practice in the United States through the development and promulgation of Actuarial Standards of Practice (ASOPs). These ASOPs describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.

**PROPOSED REVISION OF
ACTUARIAL STANDARD OF PRACTICE NO. 4
MEASURING PENSION OBLIGATIONS
AND DETERMINING PENSION PLAN COSTS OR CONTRIBUTIONS**

STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date

- 1.1 **Purpose**—This actuarial standard of practice (ASOP or standard) provides guidance to actuaries when performing actuarial services with respect to measuring obligations under a pension plan and determining **periodic costs** or **actuarially determined contributions** for such plans. Throughout this standard, the terms “plan” and “pension plan” refer to a defined benefit pension plan. Other actuarial standards of practice address actuarial assumptions and asset valuation methods. This standard addresses broader measurement issues, including **cost allocation procedures** and **contribution allocation procedures**. This standard provides guidance for coordinating and integrating all of the elements of an **actuarial valuation** of a pension plan.
- 1.2 **Scope**—This standard applies to actuaries when performing actuarial services with respect to the following tasks in connection with a pension plan:
- a. measurement of pension obligations. Examples include determinations of **funded status**, assessments of solvency upon plan termination, market measurements and measurements for use in pricing benefit provisions;
 - b. assignment of the value of plan obligations to time periods. Examples include **actuarially determined contributions**, **periodic costs**, and **actuarially determined contribution** or **periodic cost** estimates for potential plan changes;
 - c. development of a **cost allocation procedure** used to determine **periodic costs** for a plan;
 - d. development of a **contribution allocation procedure** used to determine **actuarially determined contributions** for a plan;
 - e. determination as to the types and levels of benefits supportable by specified cost or contribution levels; and
 - f. projection of pension obligations, **periodic costs** or **actuarially determined contributions**, and other related measurements. Examples include cash flow projections and projections of a plan’s **funded status**.

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Throughout this standard, any reference to selecting actuarial assumptions, **actuarial cost methods**, asset valuation methods, **amortization methods**, and **output smoothing methods** also includes giving advice on selecting actuarial assumptions, **actuarial cost methods**, asset valuation methods, **amortization methods**, and **output smoothing methods**. In addition, any reference to developing or modifying a **cost allocation procedure** or **contribution allocation procedure** includes giving advice on developing or modifying a **cost allocation procedure** or **contribution allocation procedure**.

ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, and ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, provide guidance concerning actuarial assumptions. ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*, provides guidance concerning asset valuation methods. This ASOP addresses broader measurement issues including **cost allocation procedures** and **contribution allocation procedures**, and provides guidance for coordinating and integrating all of these elements of an **actuarial valuation** of a pension plan. In the event of a conflict between the guidance provided in this ASOP and the guidance in any of the aforementioned ASOPs, this standard governs.

This standard does not apply to actuaries when performing services with respect to individual benefit calculations, individual benefit statement estimates, annuity pricing, nondiscrimination testing, and social insurance programs as described in section 1.2, Scope, of ASOP No. 32, *Social Insurance* (unless an ASOP on social insurance explicitly calls for application of this standard).

This standard does not require the actuary to evaluate the ability or willingness of the plan sponsor or other contributing entity to make contributions to the plan when due.

If the actuary departs from the guidance set forth in this standard in order to comply with applicable law (statutes, regulations, and other legally binding authority) or for any other reason the actuary deems appropriate, the actuary should refer to section 4. If a conflict exists between this standard and applicable law, the actuary should comply with applicable law.

- 1.3 Cross References—When this standard refers to the provisions of other documents, the reference includes the referenced documents as they may be amended or restated in the future, and any successor to them, by whatever name called. If any amended or restated document differs materially from the originally referenced document, the actuary should consider the guidance in this standard to the extent it is applicable and appropriate.
- 1.4 Effective Date—This standard will be effective for any actuarial work product with a **measurement date** on or after twelve months after adoption of this standard.

Section 2. Definitions

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The terms below are defined for use in this actuarial standard of practice.

- 2.1 Actuarial Accrued Liability—The portion of the **actuarial present value of projected benefits** (and **expenses**, if applicable), as determined under a particular **actuarial cost method** that is not provided for by future **normal costs**. Under certain **actuarial cost methods**, the **actuarial accrued liability** is dependent upon the actuarial value of assets.
- 2.2 Actuarial Cost Method—A procedure for allocating the **actuarial present value of projected benefits** (and **expenses**, if applicable) to time periods, usually in the form of a **normal cost** and an **actuarial accrued liability**. For purposes of this standard, a pay-as-you-go method is not considered to be an **actuarial cost method**.
- 2.3 Actuarial Present Value—The discounted value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of actuarial assumptions with regard to future events, observations of market or other valuation data, or a combination of assumptions and observations.
- 2.4 Actuarial Present Value of Projected Benefits—The **actuarial present value** of benefits that are expected to be paid in the future, taking into account the effect of such items as future service, advancement in age, and anticipated future compensation (sometimes referred to as the “present value of future benefits”).
- 2.5 Actuarial Valuation—The measurement of relevant pension obligations and, when applicable, the determination of **periodic costs** or **actuarially determined contributions**.
- 2.6 Actuarially Determined Contribution—A potential payment to the plan as determined by the actuary using a **contribution allocation procedure**. It may or may not be the amount actually paid by the plan sponsor or other contributing entity.
- 2.7 Amortization Method—A method under a **contribution allocation procedure** or **cost allocation procedure** for determining the amount, timing, and pattern of recognition of the unfunded **actuarial accrued liability**.
- 2.8 Contribution Allocation Procedure—A procedure that uses an **actuarial cost method**, and may include an asset valuation method, an **amortization method**, and an **output smoothing method**, to determine the **actuarially determined contribution** for a plan. The procedure may produce a single value, such as **normal cost** plus an amortization payment of the unfunded **actuarial accrued liability**, or a range of values, such as the range from the ERISA minimum required contribution to the maximum tax-deductible amount.
- 2.9 Cost Allocation Procedure—A procedure that uses an **actuarial cost method**, and may include an asset valuation method and an **amortization method**, to determine the **periodic cost** for a plan (for example, the procedure to determine the net periodic pension cost under accounting standards).

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- 2.10 Expenses—Administrative or investment fees or other payments borne or expected to be borne by the plan.
- 2.11 Funded Status—Any comparison of a particular measure of plan assets to a particular measure of plan obligations.
- 2.12 Funding Valuation— A measurement of pension obligations or projection of cash flows performed by the actuary intended to be used by the principal to determine plan contributions or to evaluate the adequacy of specified contribution levels to support benefit provisions.
- 2.13 Gain and Loss Analysis—An analysis of the effect on the plan’s **funded status** between two **measurement dates** resulting from the difference between expected experience based upon a set of actuarial assumptions and actual experience.
- 2.14 Immediate Gain Actuarial Cost Method—An **actuarial cost method** under which actuarial gains and losses are included as part of the unfunded **actuarial accrued liability** of the pension plan, rather than as part of the **normal cost** of the plan.
- 2.15 Market-Consistent Present Value—An **actuarial present value** that is estimated to be consistent with the price at which benefits that are expected to be paid in the future would trade in an open market between a knowledgeable seller and a knowledgeable buyer. The existence of a deep and liquid market for pension cash flows or for entire pension plans is not a prerequisite for this present value measurement.
- 2.16 Measurement Date—The date as of which the values of the pension obligations and, if applicable, assets are determined (sometimes referred to as the “valuation date”).
- 2.17 Normal Cost—The portion of the **actuarial present value of projected benefits** (and **expenses**, if applicable) that is allocated to a period, typically twelve months, under the **actuarial cost method**. Under certain **actuarial cost methods**, the **normal cost** is dependent upon the actuarial value of assets.
- 2.18 Output Smoothing Method—A method to reduce volatility of the results of a **contribution allocation procedure**. The **output smoothing method** may be a component of the **contribution allocation procedure** or may be applied to the results of a **contribution allocation procedure**. **Output smoothing methods** include techniques such as 1) phasing in the impact of assumption changes on contributions, 2) blending a prior valuation with a subsequent valuation to determine contributions, or 3) placing a corridor around changes in the dollar amount, contribution rate, or percentage change in contributions from year to year.
- 2.19 Participant—An individual who satisfies the requirements for participation in the plan.

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- 2.20 Periodic Cost—The amount assigned to a period using a **cost allocation procedure** for purposes other than funding. This may be a function of plan obligations, **normal cost, expenses**, or assets. In many situations, **periodic cost** is determined for accounting purposes.
- 2.21 Plan Provisions—The relevant terms of the plan document and any relevant administrative practices known to the actuary.
- 2.22 Prescribed Assumption or Method Set by Another Party—A specific assumption or method that is selected by another party, to the extent that law, regulation, or accounting standards gives the other party responsibility for selecting such an assumption or method. For this purpose, an assumption or method set by a governmental entity for a plan that such governmental entity or a political subdivision of that entity directly or indirectly sponsors is deemed to be a **prescribed assumption or method set by another party**.
- 2.23 Prescribed Assumption or Method Set by Law—A specific assumption or method that is mandated or that is selected from a specified range or set of assumptions or methods that is deemed to be acceptable by applicable law (statutes, regulations, or other legally binding authority). For this purpose, an assumption or method set by a governmental entity for a plan that such governmental entity or a political subdivision of that entity directly or indirectly sponsors is not deemed to be a **prescribed assumption or method set by law**.
- 2.24 Spread Gain Actuarial Cost Method—An **actuarial cost method** under which actuarial gains and losses are included as part of the current and future **normal costs** of the plan.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—Measuring pension obligations and determining **periodic costs** or **actuarially determined contributions** are processes in which the actuary may be required to make judgments or recommendations on the choice of actuarial assumptions, **actuarial cost methods**, asset valuation methods, **amortization methods**, and **output smoothing methods**.

The actuary may have the responsibility and authority to select some or all actuarial assumptions, **actuarial cost methods**, asset valuation methods, **amortization methods**, and **output smoothing methods**. In other circumstances, the actuary may be asked to advise the individuals who have that responsibility and authority. In yet other circumstances, the actuary may perform actuarial calculations using **prescribed assumptions or methods set by another party** or **prescribed assumptions or methods set by law**.

- 3.2 General Procedures—When measuring pension obligations and determining **periodic costs** or **actuarially determined contributions**, the actuary should perform the following general procedures:

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- a. identify the purpose of the measurement (section 3.3);
- b. identify the **measurement date** (section 3.4);
- c. identify **plan provisions** applicable to the measurement and any associated valuation issues (section 3.5);
- d. gather data necessary for the measurement (section 3.6);
- e. obtain from the principal other information necessary for the purpose of the measurement (section 3.7);
- f. select actuarial assumptions (section 3.8);
- g. consider how to measure accrued or vested benefits, if applicable (section 3.9);
- h. consider how to measure **market-consistent present values**, if applicable (section 3.10);
- i. calculate an investment risk defeasement measure, if applicable (section 3.11);
- j. reflect how plan or plan sponsor assets as of the **measurement date** are reported, if applicable (section 3.12);
- k. select an **actuarial cost method**, if applicable (section 3.13);
- l. select an **amortization method**, if applicable (section 3.14);
- m. select an asset valuation method, if applicable (section 3.15);
- n. select an **output smoothing method**, if applicable (section 3.16);
- o. select a **cost allocation procedure** or **contribution allocation procedure**, if applicable (sections 3.17 and 3.18);
- p. assess the implications of the **contribution allocation procedure** or plan sponsor's funding policy (section 3.19);
- q. calculate a reasonable **actuarially determined contribution**, if applicable (section 3.20);
- r. perform a **gain and loss analysis**, if applicable (section 3.21);
- s. consider the use of approximations and estimates (section 3.22);

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- t. consider the sources of significant volatility, if applicable (section 3.23); and
 - u. assess assumptions and methods not selected by the actuary, if applicable (section 3.24).
- 3.3 **Purpose of the Measurement**—The actuary should reflect the purpose of the measurement. Examples of measurement purposes include the following:
- a. determining **periodic costs** or **actuarially determined contributions**;
 - b. assessing **funded status**;
 - c. pricing benefit provisions;
 - d. comparing benefit provisions between plans;
 - e. determining withdrawal liabilities or benefit plan settlements; and
 - f. measuring pension obligations for plan sponsor mergers and acquisitions.
- 3.3.1 **Projection or Point-in-Time**—The actuary should consider whether assumptions or methods need to change for measurements projected into the future compared to point-in-time measurements.
- 3.3.2 **Uncertainty or Risk**—In conjunction with the related guidance in ASOP No. 41, *Actuarial Communications*, and ASOP No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions*, the actuary should consider the uncertainty or risk inherent in the measurement assumptions and methods and how the actuary’s measurement treats such uncertainty or risk.
- 3.4 **Measurement Date Considerations**—The actuary should address the following **measurement date** considerations:
- 3.4.1 **Information as of a Different Date**—The actuary may estimate asset and **participant** information at the **measurement date** on the basis of information as of a different date. In these circumstances, the actuary should make appropriate adjustments to the data. Alternatively, the actuary may calculate the obligations as of a different date and then adjust the obligations to the **measurement date** (see section 3.4.3 for additional guidance). In either case, the actuary should determine that any such adjustments are reasonable in the actuary’s professional judgment, given the purpose of the measurement.
 - 3.4.2 **Events after the Measurement Date**—Events known to the actuary that occur subsequent to the **measurement date** and prior to the date of the actuarial communication should be treated appropriately for the purpose of the

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measurement. Unless the purpose of the measurement requires the inclusion of such events, the actuary is not required to reflect these events in the measurement.

3.4.3 Adjustment of Prior Measurement—The actuary may adjust the results from a prior measurement in lieu of performing a new detailed measurement if, in the actuary’s professional judgment, such an adjustment would produce a reasonable result for purposes of the measurement. To determine whether such an adjustment would produce a reasonable result, the actuary should consider items such as the following, if known to the actuary:

- a. changes in the number of **participants** or the demographic characteristics of that group;
- b. length of time since the prior measurement;
- c. differences between actual and expected contributions, benefit payments, **expenses**, and investment performance;
- d. changes in economic and demographic expectations; and
- e. changes in **plan provisions**.

When adjusting obligations from a prior **measurement date**, the actuary should consider whether the assumptions used to determine the obligations should be revised.

3.5 Plan Provisions—When measuring pension obligations and determining **periodic costs** or **actuarially determined contributions**, the actuary should reflect all significant **plan provisions** known to the actuary, as appropriate for the purpose of the measurement. However, if in the actuary’s professional judgment, omitting a significant **plan provision** is appropriate for the purpose of the measurement, the actuary should disclose the omission in accordance with section 4.1(e).

3.5.1 Adopted Changes in Plan Provisions—Unless contrary to applicable law, the actuary should reflect **plan provisions** adopted on or before the **measurement date** for at least the portion of the period during which those provisions are in effect. The actuary is not required to reflect **plan provisions** adopted after the **measurement date**.

3.5.2 Proposed Changes in Plan Provisions—The actuary should reflect proposed changes in **plan provisions** as appropriate for the purpose of the measurement.

3.5.3 Plan Provisions that are Difficult to Measure—Some **plan provisions** may create pension obligations that are difficult to appropriately measure using traditional valuation procedures. Examples of such **plan provisions** include the following:

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- a. gain sharing provisions that trigger benefit increases when investment returns are favorable but do not trigger benefit decreases when investment returns are unfavorable;
- b. floor-offset provisions that provide a minimum defined benefit in the event a **participant's** account balance in a separate plan falls below some threshold;
- c. benefit provisions that are tied to an external index, but subject to a floor or ceiling, such as certain cost of living adjustment provisions and cash balance crediting provisions; and
- d. benefit provisions that may be triggered by an event such as a plant shutdown or a change in control of the plan sponsor.

For such **plan provisions**, the actuary should consider using alternative valuation procedures, such as stochastic modeling, option-pricing techniques, or deterministic procedures in conjunction with assumptions that are adjusted to reflect the impact of variations in experience from year to year. When selecting alternative valuation procedures for such **plan provisions**, the actuary should use professional judgment based on the purpose of the measurement and other relevant factors.

The actuary should disclose the valuation procedures used to value any significant **plan provisions** of the type described in this section 3.5.3, in accordance with section 4.1(f).

- 3.6 Data—With respect to the data used for measurements, including data supplied by others, the actuary should refer to ASOP No. 23, *Data Quality*, for guidance.
 - 3.6.1 Participants—The actuary should include in the measurement all **participants** reported to the actuary, except in appropriate circumstances where the actuary may exclude persons such as those below a minimum age/service level. When appropriate, the actuary may include employees who might become **participants** in the future.
 - 3.6.2 Hypothetical Data—When appropriate, the actuary may prepare measurements based on assumed demographic characteristics of current or future plan **participants**.
- 3.7 Other Information from the Principal—The actuary should obtain from the principal other information, such as accounting policies or funding elections, necessary for the purpose of the measurement.
- 3.8 Actuarial Assumptions—The actuary should refer to ASOP Nos. 27 and 35 for guidance on the selection and assessment of actuarial assumptions. The actuary should select

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assumptions such that the combined effect of the assumptions selected by the actuary has no significant bias (i.e., it is not significantly optimistic or pessimistic) except when provisions for adverse deviation are included. For example, the actuary may have decided not to make any assumption with regard to four different types of future events, each of which alone is immaterial. However, the effect of omitting assumptions for all four types of future events may be a material understatement or overstatement of the measurement results. In these circumstances, the actuary should revise the assumptions.

3.9 Measuring the Value of Accrued or Vested Benefits—Depending on the scope of the assignment, the actuary may measure the value of any accrued or vested benefits as of a **measurement date**. The actuary should consider the following when making such measurements:

- a. relevant **plan provisions** and applicable law;
- b. the status of the plan (for example, whether the plan is assumed to continue to exist or be terminated);
- c. the contingencies upon which benefits become payable, which may differ for ongoing-basis and termination-basis measurements;
- d. the extent to which **participants** have satisfied relevant eligibility requirements for accrued or vested benefits and the extent to which future service or advancement in age may satisfy those requirements;
- e. whether or the extent to which death, disability, or other ancillary benefits are accrued or vested;
- f. whether the **plan provisions** regarding accrued benefits provide an appropriate attribution pattern for the purpose of the measurement (for example, following the attribution pattern of the **plan provisions** may not be appropriate if the plan's benefit accruals are significantly back-loaded); and
- g. if the measurement reflects the impact of a special event (such as a plant shutdown or plan termination), factors such as the following:
 1. the effect of the special event on continued employment;
 2. the impact of the special event on **participant** behavior due to factors such as subsidized payment options;
 3. **expenses** associated with a potential plan termination, including transaction costs to liquidate plan assets; and
 4. changes in investment policy.

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3.10 Market-Consistent Present Values—If the actuary calculates a **market-consistent present value**, the actuary should do the following:

- a. select assumptions based on the actuary’s observation of the estimates inherent in market data in accordance with the guidance in ASOP Nos. 27 and 35, depending on the purpose of the measurement; and
- b. reflect benefits earned as of the **measurement date**.

In addition, the actuary may consider how benefit payment default risk or the financial health of the plan sponsor affects the calculation.

3.11 Investment Risk Defeasement Measure—If the actuary is performing a **funding valuation**, the actuary should calculate and disclose an obligation measure to reflect the cost of effectively defeasing the investment risk of the plan. The actuary should calculate the investment risk defeasement measure using the following:

- a. benefits accrued as of the **measurement date**;
- b. the unit credit **actuarial cost method**;
- c. discount rates consistent with market yields for a hypothetical bond portfolio whose cash flows reasonably match the pattern of benefits expected to be paid in the future. For this purpose, the actuary should use either of the following:
 1. U.S. Treasury yields; or
 2. rates at which the pension obligation can be effectively settled. The actuary may use yields of fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency; and
- d. assumptions other than discount rates used in the **funding valuation** or other reasonable assumptions based on estimates inherent in market data, in accordance with ASOP Nos. 27 and 35.

3.12 Relationship Between Asset and Obligation Measurement—The actuary should reflect how plan or plan sponsor assets as of the **measurement date** are reported. For example, if the plan or plan sponsor assets have been reduced to reflect a lump sum paid, the lump sum or the related annuity value is excluded from the obligation.

3.13 Actuarial Cost Method—When assigning **periodic costs** or **actuarially determined contributions** to time periods in advance of the time benefit payments are due, the actuary should select an **actuarial cost method** that meets the following criteria:

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- a. the period over which **normal costs** are allocated for a **participant** should begin no earlier than the date of employment and should not extend beyond the last assumed retirement age. The period may be applied to each individual **participant** or to groups of **participants** on an aggregate basis.

When a plan has no active **participants** and no **participants** are accruing benefits, a reasonable **actuarial cost method** will not produce a **normal cost** for benefits. For purposes of this standard, an employee does not cease to be an active **participant** merely because he or she is no longer accruing benefits under the plan;

- b. the attribution of **normal costs** should bear a reasonable relationship to some element of the plan's benefit formula or the **participant's** compensation or service. The attribution basis may be applied on an individual or group basis. For example, the **actuarial present value of projected benefits** for each **participant** may be allocated by that **participant's** own compensation or may be allocated by the aggregated compensation for a group of **participants**;
- c. **expenses** should be considered when assigning **periodic costs** or **actuarially determined contributions** to time periods. For example, the **expenses** for a period may be added to the **normal cost** for benefits or **expenses** may be reflected as an adjustment to the investment return assumption or the discount rate. As another example, **expenses** may be reflected as a percentage of pension obligation or **normal cost**; and
- d. the sum of the **actuarial accrued liability** and the **actuarial present value** of future **normal costs** should equal the **actuarial present value of projected benefits** and **expenses**, to the extent **expenses** are included in the **actuarial accrued liability** and **normal cost**. For purposes of this criterion, under a **spread gain actuarial cost method**, the sum of the actuarial value of assets and the unfunded **actuarial accrued liability**, if any, shall be considered to be the **actuarial accrued liability**.

3.14 Amortization Method—If the actuary selects an **amortization method**, the actuary should select an **amortization method** that produces amortization payments that exceed nominal interest on the unfunded **actuarial accrued liability** or that satisfy the following conditions:

- a. the payments do not increase or do not increase more rapidly than expected covered payroll; and
- b. the payments fully amortize the unfunded **actuarial accrued liability** within a reasonable time period. For purposes of determining a reasonable time period, the actuary should consider factors such as the following:

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- i. the length of time until amortization payments exceed nominal interest on the unfunded **actuarial accrued liability**;
 - ii. duration of the **actuarial accrued liability**;
 - iii. the source of the unfunded **actuarial accrued liability** or change in the unfunded **actuarial accrued liability**; and
 - iv. the **funded status** of the plan or period to plan insolvency, if applicable.
- 3.15 Asset Valuation Method—The actuary should refer to ASOP No. 44 for guidance on the selection and use of an asset valuation method.
- 3.16 Output Smoothing Method—If the actuary selects an **output smoothing method**, the actuary should select an **output smoothing method** that results in a reasonable relationship between the smoothed contribution and the **actuarially determined contribution** without output smoothing. A reasonable relationship includes the following:
- a. the **output smoothing method** produces a value that falls within a reasonable range around the corresponding **actuarially determined contribution**;
 - b. any differences between the smoothed contribution and the **actuarially determined contribution** without output smoothing are recognized within a reasonable period of time; and
 - c. the **output smoothing method** is not expected to systematically produce contributions less than the **actuarially determined contribution**.
- 3.17 Allocation Procedure—When selecting a **cost allocation procedure** or **contribution allocation procedure**, the actuary should consider the following:
- a. benefit security;
 - b. intergenerational equity;
 - c. stability or predictability of **periodic costs** or **actuarially determined contributions**;
 - d. the balance among a, b, and c;
 - e. the timing and duration of expected benefit payments;
 - f. the nature and frequency of plan amendments; and
 - g. relevant input from the principal.

- 3.18 **Consistency Between Contribution Allocation Procedure and the Payment of Benefits**—When selecting a **contribution allocation procedure**, the actuary should select a **contribution allocation procedure** that, in the actuary’s professional judgment, is consistent with the plan accumulating adequate assets to make benefit payments when due, assuming that all actuarial assumptions will be realized and that the plan sponsor or other contributing entity will make **actuarially determined contributions** when due. In some circumstances, a **contribution allocation procedure** may not be expected to produce adequate assets to make benefit payments when they are due even if the actuary uses a combination of assumptions selected in accordance with ASOP Nos. 27 and 35, an **actuarial cost method** selected in accordance with section 3.13 of this standard, and an asset valuation method selected in accordance with ASOP No. 44.

Examples of such circumstances include the following:

- a. a plan covering a sole proprietor with funding that continues past an expected retirement date with payment due in a lump sum;
 - b. using the aggregate **actuarial cost method** for a plan covering three employees, in which the principal is near retirement and the other employees are relatively young; and
 - c. a plan amendment with an amortization period so long that overall plan **actuarially determined contributions** would be scheduled to occur too late to make plan benefit payments when due.
- 3.19 **Implications of Contribution Allocation Procedure or Funding Policy**— If the actuary is performing a **funding valuation** that does not include a **prescribed assumption or method set by law**, the actuary should qualitatively assess the implications of the **contribution allocation procedure** or plan sponsor’s funding policy on the plan’s expected future contributions and **funded status**. For purposes of this section, contributions set by law or by a contract, such as a collective bargaining agreement, constitute a funding policy. In making this assessment, the actuary may presume that all actuarial assumptions will be realized and the plan sponsor (or other contributing entity) will make contributions anticipated by the **contribution allocation procedure** or funding policy. The actuary’s assessment should be disclosed in accordance with section 4.1(y).
- If, in the actuary’s professional judgment, such a **contribution allocation procedure** or funding policy is significantly inconsistent with the plan accumulating adequate assets to make benefit payments when due, assuming that all actuarial assumptions will be realized and that the plan sponsor (or other contributing entity) will make contributions when due, the actuary should disclose this as well as an estimate of the approximate time until assets are depleted, in accordance with section 4.1(z).
- 3.20 **Reasonable Actuarially Determined Contribution**—If the actuary is performing a **funding valuation** that does not include a **prescribed assumption or method set by law**, the

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actuary should calculate and disclose an **actuarially determined contribution** using a **contribution allocation procedure** that satisfies the following conditions:

- a. all significant assumptions are reasonable, in accordance with ASOP Nos. 27 and 35, and the combined effect of the assumptions has no significant bias (i.e., it is not significantly optimistic or pessimistic) except when provisions for adverse deviation are included;
- b. if an **actuarial cost method** is used, it should be consistent with section 3.13. If an **actuarial cost method** with individual attribution is used, each **participant's normal cost** should be based on the **plan provisions** applicable to that **participant**;
- c. if an **amortization method** is used, it should be consistent with section 3.14;
- d. if an asset valuation method is used, it should be consistent with section 3.15;
- e. if an **output smoothing method** is used, it should be consistent with section 3.16;
- f. the **contribution allocation procedure** should be, in the actuary's professional judgment, consistent with the plan accumulating adequate assets to make benefit payments when due, assuming that all actuarial assumptions will be realized and that the plan sponsor or other contributing entity will make **actuarially determined contributions** when due; and
- g. the **contribution allocation procedure** takes into consideration the time between the **measurement date** and the contribution date.

3.21 Gain and Loss Analysis—If the scope of the actuary's assignment includes a **funding valuation**, the actuary should perform a **gain and loss analysis** for the period between the prior **measurement date** and the current **measurement date**, unless in the actuary's professional judgment, successive **gain and loss analyses** would not be appropriate for assessing the reasonableness of the actuarial assumptions. For example, successive **gain and loss analyses** may not provide decision-useful information about the reasonableness of the actuarial assumptions for a small plan in which a single individual accounts for most of the **actuarial accrued liability**. If a **gain and loss analysis** is performed, the actuary should at least separate the total gain or loss into investment gain or loss and other gain or loss.

3.22 Approximations and Estimates—The actuary should use professional judgment to establish a balance between the degree of refinement of methodology and materiality. The actuary may use approximations and estimates where circumstances warrant. Following are some examples of such circumstances:

- a. situations in which the actuary reasonably expects the results to be substantially the same as the results of detailed calculations;

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- b. situations in which the actuary's assignment requires informal or rough estimates; and
- c. situations in which the actuary reasonably expects the amounts being approximated or estimated to represent only a minor part of the overall pension obligation, **periodic cost**, or **actuarially determined contribution**.

3.23 Volatility—If the scope of the actuary's assignment includes an analysis of the potential range of future pension obligations, **periodic costs**, **actuarially determined contributions**, or **funded status**, the actuary should consider sources of volatility that, in the actuary's professional judgment, are significant. Examples of potential sources of volatility include the following:

- a. plan experience differing from that anticipated by the economic or demographic assumptions, as well as the effect of new entrants;
- b. changes in economic or demographic assumptions;
- c. the effect of discontinuities in applicable law or accounting standards, such as full funding limitations, the end of amortization periods, or liability recognition triggers;
- d. the delayed effect of smoothing techniques, such as the pending recognition of prior experience losses; and
- e. patterns of rising or falling **periodic cost** expected when using a particular **actuarial cost method** for the plan population.

When analyzing potential variations in economic and demographic experience or assumptions, the actuary should exercise professional judgment in selecting a range of variation in these assumptions (while maintaining internal consistency among these assumptions, as appropriate) and in selecting a methodology by which to analyze them, consistent with the scope of the assignment.

3.24 Assessment of Assumptions and Methods—An actuarial communication should identify the party responsible for each material assumption and method. Where the communication is silent about such responsibility, the actuary who issued the communication will be assumed to have taken responsibility for that assumption or method.

3.24.1 Assumptions or Methods Not Selected by the Actuary—The actuary should assess whether an assumption or method not selected by the actuary is reasonable for the purpose of the measurement, except as provided in section 3.24.2. For purposes of this assessment, reasonable assumptions or methods are not necessarily limited to those the actuary would have selected for the measurement. In this assessment,

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the actuary should determine whether the assumption or method significantly conflicts with what, in the actuary's professional judgment, would be reasonable for the purpose of the measurement. If, in the actuary's professional judgment, there is a significant conflict, the actuary should disclose this conflict in accordance with section 4.2(a). This section does not apply to a **prescribed assumption or method set by law**.

3.24.2 Inability to Assess An Assumption or Method Not Selected by the Actuary—If the actuary is unable to assess an assumption or method not selected by the actuary without performing a substantial amount of additional work beyond the scope of the assignment, the actuary should disclose this in accordance with section 4.2(b).

Section 4. Communications and Disclosures

- 4.1 Communication Requirements—Any actuarial communication prepared to communicate the results of work subject to this standard should comply with the requirements of ASOP Nos. 23, 27, 35, 41, 44, and 51. In addition, such communication should contain the following disclosures when relevant and material. An actuarial communication can comply with some, or all, of the specific requirements of this section by making reference to information contained in other actuarial communications available to the intended users (as defined in ASOP No. 41), such as an annual **actuarial valuation** report.
- a. a statement of the intended purpose of the measurement and a statement to the effect that the measurement may not be applicable for other purposes;
 - b. the **measurement date**;
 - c. a description of adjustments made for events after the **measurement date** under section 3.4.2;
 - d. a description of adjustments of prior measurements used under section 3.4.3;
 - e. an outline or summary of the **plan provisions** reflected in the **actuarial valuation**, a description of known changes in significant **plan provisions** reflected in the **actuarial valuation** from those used in the immediately preceding measurement prepared for a similar purpose, and a description of any significant **plan provisions** not reflected in the **actuarial valuation**, along with the rationale for not reflecting such significant **plan provisions**;
 - f. a description of the valuation procedures used to value any significant **plan provisions** of the type described in section 3.5.3 such that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuarial report;

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- g. the date(s) as of which the **participant** and financial information were compiled;
- h. a summary of the **participant** information;
- i. if hypothetical data are used, a description of the data;
- j. a description of any accounting policies or funding elections made by the principal that are pertinent to the measurement;
- k. a description of known changes in assumptions and methods from those used in the immediately preceding measurement prepared for a similar purpose. For assumption and method changes that are not the result of a **prescribed assumption or method set by another party** or a **prescribed assumption or method set by law**, the actuary should include an explanation of the information and analysis that led to those changes. The explanation may be brief but should be pertinent to the plan's circumstances;
- l. a statement indicating whether, in the actuary's professional judgment, the assumptions other than **prescribed assumptions or methods set by law** and assumptions identified in section 4.2(b), are consistent and reasonable individually and in aggregate, in accordance with section 3.8;
- m. a description of the types of benefits regarded as accrued or vested if the actuary measured the value of accrued or vested benefits, and, to the extent the attribution pattern of accrued benefits differs from or is not described by the **plan provisions**, a description of the attribution pattern;
- n. a description of whether and how benefit payment default risk or the financial health of the plan sponsor was included, if a **market-consistent present value** measurement was performed;
- o. if applicable, an investment risk defeasement measure determined in accordance with section 3.11, and a description of the significant assumptions used;
- p. a description of the **actuarial cost method** and the manner in which **normal costs** are allocated, in sufficient detail such that another actuary qualified in the same practice area would be able to understand the significant characteristics of the method (for example, how the **actuarial cost method** is applied to multiple benefit formulas, compound benefit formulas, or benefit formula changes, where such **plan provisions** are significant);
- q. if applicable, a description of the particular measures of plan assets and plan obligations that are included in the actuary's disclosure of the plan's **funded status**. For **funded status** measurements that are not prescribed by federal law or regulation, the actuary should accompany this description with each of the following additional disclosures:

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1. whether the **funded status** measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations;
 2. whether the **funded status** measure is appropriate for assessing the need for or the amount of future contributions; and
 3. if applicable, a statement that the **funded status** measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets;
- r. **funded status** based on an **immediate gain actuarial cost method** if the actuary discloses a **funded status** based on a **spread gain actuarial cost method**. The **immediate gain actuarial cost method** used for this purpose should be disclosed in accordance with section 4.1(p);
- s. the remaining balance to be amortized, the remaining amortization period, and the amortization payment included in the **periodic cost** or **actuarially determined contribution** for each amortization base along with a disclosure if the unfunded **actuarial accrued liability** is not expected to be fully amortized;
- t. a description of the **cost allocation procedure** or **contribution allocation procedure** including a description of the **amortization method** and any pay-as-you-go funding (i.e., the intended payment by the plan sponsor of some or all benefits when due);
- u. if applicable, that the **contribution allocation procedure** results in an **actuarially determined contribution** that is less than the **normal cost** plus interest on the unfunded **actuarial accrued liability** and, in that case, how long before the **actuarially determined contribution** is expected to exceed that amount.

For purposes of this section, the actuary should assume that all actuarial assumptions will be realized and **actuarially determined contributions** will be made when due;

- v. if contributions are set by law or by a contract (such as a collective bargaining agreement), an estimate of the period over which the unfunded **actuarial accrued liability** is expected to be fully amortized.

For purposes of this section, the actuary should assume that all actuarial assumptions will be realized and contributions set by law or by a contract will be made when due;

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- w. a description of how the considerations in section 3.17 have been taken into account in selecting each method of the **contribution allocation procedure** used to determine the reasonable **actuarially determined contribution** satisfying the requirements of section 3.20. The disclosure may be brief but should be pertinent to the plan's circumstances. This section is not applicable to methods not selected by the actuary;
- x. a description of all changes in **cost allocation procedures** or **contribution allocation procedures** that are not a result of a **prescribed assumption or method set by law**, including the resetting of an actuarial asset value. The actuary should disclose the reason for the change and the general effects of the change on relevant **periodic cost, actuarially determined contribution, funded status**, or other measures, by words or numerical data, as appropriate. The disclosure of the reason for the change and the general effects of the change may be brief but should be pertinent to the plan's circumstances;
- y. a qualitative description of the implications of the **contribution allocation procedure** or plan sponsor's funding policy on future expected plan contributions and **funded status** in accordance with section 3.19. The actuary should disclose the significant characteristics of the **contribution allocation procedure** or plan sponsor's funding policy, and the significant assumptions used in the assessment.

For purposes of this section, the actuary should assume that all actuarial assumptions will be realized and contributions set by law or by a contract will be made when due;

- z. if applicable, a statement indicating that the **contribution allocation procedure** is significantly inconsistent with the plan accumulating adequate assets to make benefit payments when due, as well as an estimate of the approximate time until assets are depleted, in accordance with section 3.19.

For purposes of this section, the actuary should assume that all actuarial assumptions will be realized and contributions set by law or by a contract will be made when due;

- aa. if applicable, a reasonable **actuarially determined contribution**, in accordance with section 3.20, and the corresponding **funded status**;
- bb. if applicable, the results of the **gain and loss analysis** performed in accordance with section 3.21, separating the total gain or loss into investment gain or loss and other gain or loss. The actuary may meet the disclosure requirements of this section by providing more detailed results of the **gain and loss analysis**. For example, the actuary could separate the non-investment gain or loss into demographic and economic gains or losses, or could identify gains or losses caused by individual decrements (for example, withdrawal, retirement, mortality) and other economic factors (for example, salary growth, inflation);

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- cc. if, in the actuary’s professional judgment, the actuary’s use of approximations and estimates could produce results that differ materially from results based on a detailed calculation, a statement to this effect; and
- dd. a statement, appropriate for the intended users, indicating that future measurements (for example, of pension obligations, **periodic costs**, **actuarially determined contributions**, or **funded status** as applicable) may differ significantly from the current measurement. For example, a statement such as the following could be applicable: “Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan’s **funded status**); and changes in **plan provisions** or applicable law.”

In addition, the actuarial communication should include one of the following:

- 1. if the scope of the actuary’s assignment included an analysis of the range of such future measurements, disclosure of the results of such analysis together with a description of the factors considered in determining such range; or
- 2. a statement indicating that, due to the limited scope of the actuary’s assignment, the actuary did not perform an analysis of the potential range of such future measurements.

- 4.2 Disclosure about Assumptions or Methods Not Selected by the Actuary—The actuary’s communication should state the source of any assumption or method that the actuary has not selected.

With respect to any assumption or method that the actuary has not selected, other than **prescribed assumptions or methods set by law**, the actuary’s communication should identify the following, if applicable:

- a. any assumption or method that the actuary has not selected that, individually or in combination with other assumptions or methods, significantly conflicts with what, in the actuary’s professional judgment, is reasonable for the purpose of the measurement; or
- b. any assumption or method that the actuary has not selected that the actuary is unable to assess for reasonableness for the purpose of the measurement.

- 4.3 Additional Disclosures—The actuary should also include the following, as applicable, in

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an actuarial communication:

- a. the disclosure in ASOP No. 41, section 4.3, if the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method set by a party other than the actuary; and
 - b. the disclosure in ASOP No. 41, section 4.4, if, in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.
- 4.4 Confidential Information—Nothing in this standard is intended to require the actuary to disclose confidential information.