



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 27**

Selection of Economic Assumptions for Measuring Pension Obligations

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

**Adopted by the
Actuarial Standards Board
December 1996**

(Doc. No. 053)

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February 1997

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in the Selection of Economic Assumptions for Measuring Pension Obligations

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice No. 27

This booklet contains the final version of Actuarial Standard of Practice No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. This standard supersedes ASOP No. 4, *Measuring Pension Obligations*, if a conflict exists. It also provides an alternative way to comply with the disclosure of exceptions requirement in ASOP No. 2, *Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88*, insofar as it pertains to economic assumptions.

Background

Recommendations for Measuring Pension Obligations was promulgated as an actuarial standard of practice (ASOP) in 1988 by the Interim Actuarial Standards Board and the Board of Directors of the American Academy of Actuaries (AAA). It superseded *Pension Plan Recommendations A, B, and C*, which had been adopted and amended by the AAA during the period 1976 to 1983. In 1990, that standard was republished by the ASB and designated ASOP No. 4, *Recommendations for Measuring Pension Obligations*. In October 1993, ASOP No. 4 was reformatted and published in the uniform format adopted by the ASB, with a title change, *Measuring Pension Obligations*.

ASOP No. 4 contains general recommendations for selecting economic and noneconomic assumptions, the actuarial cost method, and the asset valuation method—all key elements in the valuation of pension obligations. The passage of various rules, regulations, and legislation has made it clear that more detailed guidance is needed in these areas.

This detailed guidance will be provided through four separate actuarial standards of practice for measuring pension obligations. This standard is the first of the four to be completed; it deals exclusively with the selection of economic assumptions. The other three standards will cover the following:

1. the selection of demographic and other noneconomic assumptions (including noninvestment-related expenses, the level of future contributions to individual accounts, and other contingent events);

2. liability valuation and actuarial cost methods; and
3. asset valuation methods.

When all four standards have been completed, ASOP No. 4 will be rewritten as an umbrella standard. It will tie these four standards together and also address overall considerations in the selection of assumptions and methods for measuring pension obligations. Until these other standards are adopted, actuaries are encouraged to apply the general principles outlined in this standard to these other areas, as appropriate.

Exposure Drafts

The first exposure draft of a proposed actuarial standard of practice, *Selection of Economic Assumptions for Measuring Pension Obligations*, was issued in July 1992. The product of more than three years of study, discussion, and drafting by the Pension Committee of the ASB, it was the first attempt by the actuarial profession's standards-setting body to provide specific guidance on this aspect of measuring pension obligations. This exposure draft recommended that "each assumption should be individually reasonable"—a modification of the position taken in ASOP No. 4, as republished in 1990, which gave "primary emphasis to the combined impact of all assumptions." In making this new recommendation, the committee recognized that technological developments had made it feasible for the practicing actuary to use individually reasonable assumptions. (As noted above, in October 1993, the board adopted a reformatted version of ASOP No. 4, which placed primary emphasis on individually reasonable assumptions, while still permitting the use of assumptions that are reasonable only in combination with other assumptions.)

Fifty-three comment letters were received on the first exposure draft. Two public hearings were held, one each on October 20 and 28, 1992. The Pension Committee studied the letters and hearing transcripts in detail and, responding to the comments, created a second exposure draft. Comments received on the first exposure draft, and the Pension Committee's responses to such comments, were summarized in appendix 2 of the second exposure draft.

The second exposure draft was issued in a document dated July 1994, with a comment deadline of December 1, 1994, which was subsequently extended to January 1, 1995. The second exposure draft emphasized development of a best-estimate range for each economic assumption, expanding and clarifying the description of recommended methods for developing this range. It also permitted making provision for adverse deviation, if appropriate given the purpose of the measurement and consequences of adverse deviation. Like the first exposure draft, the second exposure draft recommended that each assumption should be individually reasonable (i.e., should be within the actuary's best-estimate range), but added an exception for situations in which a particular economic assumption is prescribed by law, regulation, or another person. Twenty-nine comment letters were received on the second exposure draft. The Pension Committee studied these comment letters, as well as comments received on a proposed first amendment to ASOP No. 4, *Measuring Pension Obligations*, issued in December 1995, and created a

third exposure draft. The third exposure draft was issued in July 1996, with a comment deadline of October 15, 1996. Appendix 3 of the third exposure draft summarizes the significant issues contained in the comment letters on the second exposure draft and the committee's responses to such comments.

The third exposure draft again emphasized development of a best-estimate range for each assumption, and the definition of *best-estimate range* was clarified. However, the provision for adverse deviation was eliminated; instead, new measurement-specific factors were included, reflecting potential sources of adverse deviation that the actuary should consider in developing the best-estimate range.

Consistent with the two prior exposure drafts, the third exposure draft recommended that the actuary select each assumption from within the best-estimate range. Furthermore, the exception contained in the second exposure draft for situations in which a particular assumption is prescribed by law, regulation, or another person was removed.

Several changes in the third exposure draft related to prescribed assumptions. For example, the scope was modified so that the standard would not apply to the selection of a prescribed assumption (including the selection of an assumption from within a prescribed range). The definition of *prescribed assumption* was also added. The consistency requirement was modified to apply only to those economic assumptions selected by the actuary; hence, economic assumptions selected by the actuary were not required to be consistent with prescribed economic assumptions. Further, a new section titled *Prescribed Assumption(s)* provided that economic assumptions selected by the actuary should satisfy the standard without regard to prescribed assumptions. And the requirement that the actuary's communication state when a prescribed assumption is inconsistent with the requirements of the standard was removed.

Other significant changes in the third exposure draft were as follows:

1. two new types of economic assumptions were added: *growth of individual account balances* and *variable conversion factors*;
2. the terms *measurement date* and *measurement period* were defined; and
3. new language on materiality was added to clarify that the actuary need not employ an assumption if the effect on the measurement is immaterial.

Editorial changes were made throughout the draft to improve clarity and consistency. The third exposure draft was also reformatted to conform to the revised format adopted by the ASB on May 1, 1996, for all future actuarial standards of practice. (For a detailed explanation of these changes, please see the transmittal memorandum of the third exposure draft, available from the ASB office.)

The ASB received sixteen comment letters on the third exposure draft. All comments were considered by the Pension Committee as it developed and revised the standard of practice. The

significant issues and questions contained in the comment letters and the committee's responses to such are summarized in appendix 3 of this text.

The Pension Committee would like to thank all those who made significant contributions to this work, including the following former committee members: Mary Hardiman Adams, Steven I. Alin, Lall Bachan, Robert S. Byrne Jr., Anthony C. Deutsch, Silvio Ingui, Judith E. Latta, James R. Laws, Kenneth W. Porter, Harry S. Purnell III, and Richard G. Roeder. Further, the Pension Committee expresses its gratitude to everyone who took the time to comment on the exposure drafts; these comments were helpful in developing the standard.

The ASB voted in December 1996 to adopt the final standard.

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ACTUARIAL STANDARD OF PRACTICE NO. 27

SELECTION OF ECONOMIC ASSUMPTIONS FOR MEASURING PENSION OBLIGATIONS

STANDARD OF PRACTICE

Section 1. Purpose, Scope, and Effective Date

1.1 Purpose—This standard does the following:

- a. provides guidance to actuaries in selecting (including giving advice on selecting) economic assumptions—primarily investment return, discount rate, and compensation scale—for measuring obligations under defined benefit pension plans;
- b. amplifies those provisions of Actuarial Standard of Practice (ASOP) No. 4, *Measuring Pension Obligations*, that relate to the selection and use of economic assumptions; and
- c. provides information to enhance non-actuaries' understanding of the process by which actuaries select economic assumptions for measuring the obligations of defined benefit pension plans.

1.2 Scope—This standard applies to the selection of economic assumptions to measure obligations under any defined benefit pension plan that is not a social insurance program (unless ASOPs on social insurance explicitly call for application of this standard). Measurements of defined benefit pension plan obligations include calculations such as funding valuations or other assignment of plan costs to time periods, liability measurements or other actuarial present value calculations, and cash flow projections or other estimates of the magnitude of future plan obligations. Measurements of pension obligations do not generally include individual benefit calculations or individual benefit statement estimates.

To the extent that the guidance in this standard may conflict with ASOP No. 4, this standard will govern. Furthermore, compliance with section 4.2 of this standard is deemed to fully satisfy the disclosure of exceptions requirement of ASOP No. 2, *Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88*, insofar as it pertains to economic assumptions. If a conflict exists between this standard and applicable laws or regulations, the actuary is obligated to comply with the laws or regulations.

This standard does not apply to the selection of an assumption where the actuary is precluded from exercising independent judgment by an applicable law, regulation, or

other binding authority (i.e., when a specific assumption is mandated or when only a specified range of assumptions is deemed to be acceptable). For example, the standard does not apply to the selection of a current liability interest rate range under Internal Revenue Code (IRC) section 412, because the determination of such a range is governed by the IRC. In addition, the standard does not apply to the selection of the current liability interest rate within the specified range if, as is the case at the date this standard was published, the Internal Revenue Service deems any rate within the range to be acceptable.

Throughout this standard, any reference to *selecting* economic assumptions also includes *giving advice on selecting* economic assumptions. For instance, the actuary may *advise* the plan sponsor on selecting economic assumptions for Statement of Financial Accounting Standards (SFAS) Nos. 87 and 88 or Governmental Accounting Standards Board (GASB) Statement Nos. 25 and 27, but the plan sponsor is ultimately responsible for selecting these assumptions. This standard applies to the actuarial advice given in such situations, within the constraints imposed by the relevant accounting standards.

- 1.3 Effective Date—This standard will be effective for any measurement of obligations with a measurement date on or after July 15, 1997.

Section 2. Definitions

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

- 2.1 Best-Estimate Range—For each economic assumption, the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall.
- 2.2 Inflation—General economic inflation, defined as price changes over the whole of the economy.
- 2.3 Measurement Date—The date as of which the value of the pension obligation is determined (sometimes referred to as the *valuation date*).
- 2.4 Measurement Period—The period subsequent to the measurement date during which a particular economic assumption will apply in a given measurement.
- 2.5 Merit Scale—The rates of change in an individual's compensation attributable to personal performance, promotion, seniority, or other individual factors.
- 2.6 Prescribed Assumption—A specific assumption that is mandated or that is selected from a specified range that is deemed to be acceptable by law, regulation, or other binding authority.
- 2.7 Productivity Growth—The rates of change in a group's compensation attributable to the change in the real value of goods or services per unit of work.

- 2.8 Real Return—The sum of the risk premium and the real risk-free return. It can also be expressed as the nominal return less inflation.
- 2.9 Real Risk-Free Return—The return on an investment that is completely secure as to principal and yield in an environment with no inflation.
- 2.10 Risk Premium—The portion of real return that reflects uncertainties of future payments and appreciation.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—Because no one knows what the future holds with respect to economic and other contingencies, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes based on past experience and future expectations, and to select assumptions based upon that application of professional judgment. Therefore, an actuary's best-estimate assumption is generally represented by a *range* rather than one specific assumption. The actuary should determine the best-estimate range for each economic assumption, and select a specific point from within that range. In some instances, the actuary may present alternative results by selecting different points within the best-estimate range.

The remainder of section 3 provides guidance for identifying which types of economic assumptions to use and for selecting the economic assumptions (i.e., the values) that will be used.

- 3.2 Identifying Types of Economic Assumptions—The types of economic assumptions used to measure obligations under a defined benefit pension plan may include the following:
- a. inflation;
 - b. investment return (sometimes referred to as the *valuation interest rate*);
 - c. discount rate;
 - d. compensation scale; and
 - e. other economic factors (e.g., Social Security, cost-of-living adjustments, growth of individual account balances, and variable conversion factors).
- 3.3 General Considerations—The actuary should consider the following factors when identifying which types of economic assumptions to use for a specific measurement and when selecting those economic assumptions that will be used:
- a. the purpose and nature of the measurement;

- b. the characteristics of the obligation to be measured (measurement period, pattern of plan payments over time, open/closed group, materiality, volatility, etc.);
- c. materiality of the assumption to the measurement (see section 3.14.1); and
- d. appropriate recent and long-term historical economic data.

As stated above, the actuary should consider recent economic data. However, the actuary should not give undue weight to recent experience. For example, if the recent investment return was largely attributable to a significant change in bond yields or inflation, it may be unreasonable to assume that such investment returns will continue over the measurement period.

3.4 General Selection Process—The general process for selecting economic assumptions for a specific measurement should include the following steps:

- a. identify components, if any, of each assumption and evaluate relevant data;
- b. develop a best-estimate range for each economic assumption required for the measurement, reflecting appropriate measurement-specific factors; and
- c. further evaluate measurement-specific factors and select a specific point within the best-estimate range.

With respect to some (or all) of the components of an economic assumption, the actuary is not required to identify the explicit best-estimate range before selecting the specific point, provided that the actuary is satisfied that the selected point would be within the best-estimate range had such range been explicitly identified.

After completing steps (a) through (c) for each economic assumption, the actuary should review the set of economic assumptions for consistency (see section 3.10).

3.5 Selecting an Inflation Assumption—If the actuary is using an approach that treats inflation as an explicit component of other economic assumptions, or as an independent assumption, the actuary should follow the general process set forth in section 3.4 to select an inflation assumption. The following are two matters for consideration:

- 3.5.1 Data—The actuary should review appropriate inflation data. These data may include consumer price indexes, the implicit price deflator, forecasts of inflation, and yields on government securities of various maturities.
- 3.5.2 Select and Ultimate Inflation Rates—The actuary may assume select and ultimate inflation rates in lieu of a single inflation rate. Select and ultimate inflation rates vary by period from the measurement date (e.g., inflation of 3% for the first 5 years following the measurement date, and 4% thereafter).

3.6 Selecting an Investment Return Assumption and a Discount Rate—The investment return assumption reflects anticipated returns on the plan’s current and future assets.

The discount rate is used to determine the present value of expected future plan payments. Generally, the appropriate discount rate is the same as the investment return assumption. But for some purposes, such as SFAS No. 87 or unfunded plan valuations, the discount rate may be selected independently of the plan’s investment return assumption, if any. In such cases, the discount rate reflects anticipated returns on a hypothetical asset portfolio, rather than on the plan’s expected investments.

For brevity, the remainder of section 3.6 refers only to the investment return assumption. The same selection process applies to the discount rate, except where necessary the hypothetical portfolio is substituted for the plan’s expected investments.

3.6.1 Data—The actuary should review appropriate investment data. These data may include the following:

- a. current yields to maturity of fixed income securities such as government securities and corporate bonds;
- b. forecasts of inflation and of total returns for each asset class;
- c. historical investment data, including real risk-free returns, the inflation component of the return, and the real return or risk premium for each asset class; and
- d. historical plan performance.

The actuary may also consider historical statistical data showing standard deviations, correlations, and other statistical measures related to historical returns of each asset class and to inflation. Stochastic simulation models may be used to develop expected investment return ranges from this statistical data.

3.6.2 Constructing the Investment Return Range—The best-estimate investment return range can be constructed using various methods consistent with the principles set forth in this standard. Two examples of acceptable methods are provided below:

- a. Building-Block Method—Under the building-block method, the expected future investment return of each asset class is the combination of the components of investment return. These components include factors such as inflation and real return for the class.

The best-estimate investment return range is determined as follows: (i) derive a best-estimate range of expected future real returns (either directly or as the combination of best-estimate ranges for the components of real

return) for each broad asset class applicable to the plan, such as cash and cash equivalents, fixed income securities (government and corporate bonds), and equities; (ii) compute an average, weighted real-return range reflecting the plan's expected asset class mix; and (iii) combine the range determined by step (ii) with the expected inflation range.

For purposes of step (iii), it is not generally appropriate to simply combine the low endpoints and combine the high endpoints of the inflation and real-return ranges, since this approach is likely to produce an overly broad best-estimate investment return range. Stochastic simulation models that take into account correlations among returns of different asset classes and inflation may be used to develop a best-estimate range with explicit confidence levels.

- b. **Cash Flow Matching Method**—Under the cash flow matching method, the expected future investment return range is viewed as the combination of (i) the internal rate of return on a bond portfolio with interest and principal payments approximately matching the plan's expected disbursements, and (ii) a risk adjustment range.

The best-estimate investment return range is determined as follows: (i) project the plan's benefit and expense disbursements to be valued in the measurement; (ii) identify a highly diversified portfolio available as of the measurement date of noncallable, high-quality corporate or U.S. government bonds with interest and principal payments approximately matching the projected disbursements; (iii) compute the bond portfolio's internal rate of return; (iv) establish a risk adjustment range for the plan that reflects the following: uncertainties in the projected benefits and expenses, expected returns on future contributions, reinvestment of interest and principal payments not fully needed to pay current benefits, any mismatches between the benefit disbursement stream and the high-quality bond portfolio's interest and principal payment stream, and current and expected future plan investments in equities or other asset classes besides high-quality bonds; and (v) combine the figures derived in steps (iii) and (iv).

Acceptable variations exist concerning constructing the bond portfolio in step (ii). For example, the portfolio may be limited to U.S. government securities, or the portfolio may include callable securities with adjustments for the value of the call feature. Alternatively, a hypothetical yield curve may be created based on average yields of high-quality corporate bonds at numerous maturities; this yield curve may then be used to create a hypothetical matching bond portfolio, without identifying specific bonds.

It is not generally possible to construct an appropriate portfolio by choosing those bonds with the highest yield at each maturity, because this

method typically produces a nondiversified portfolio or one with bonds that are incorrectly classified or have unusual risk characteristics.

The cash flow matching method does not identify an explicit inflation component of investment return. The actuary using this method will generally need to estimate the inflation rate implicit in the bond portfolio's internal rate of return to test for consistency with other economic assumptions, such as the compensation scale used to project plan disbursements. If these inflation rates are not consistent, additional iterations of the cash flow matching method may be required.

3.6.3 Measurement-Specific Factors—There are factors specific to each measurement that should be considered in constructing the best-estimate investment return range derived in section 3.6.2 and/or in selecting an investment return assumption within the range. Examples of such factors are as follows:

- a. **Purpose of the Measurement**—The purpose of the measurement is a primary factor. For example, an actuary measuring a plan's termination liability may use an investment return rate reflecting interest rates implicit in current or anticipated future annuity purchase rates. This investment return assumption may differ from an investment return assumption used to measure the same plan's present value of accumulated benefits on an ongoing basis. This latter assumption may reflect a longer time horizon and a diversified investment portfolio.
- b. **Investment Policy**—The plan's investment policy may include the following: (i) the current allocation of the plan's assets; (ii) types of securities eligible to be held (diversification, marketability, social investing philosophy, etc.); (iii) risk tolerance; (iv) a target allocation of plan assets among different classes of securities; and (v) permissible ranges for each asset class within which the investment manager is authorized to make strategic asset allocation decisions.
- c. **Reinvestment Risk**—Two reinvestment risks are associated with traditional, fixed income securities: (i) reinvestment of interest and normal maturity values not immediately required to pay plan benefits, and (ii) reinvestment of the entire proceeds of a security that has been called by the issuer.
- d. **Investment Volatility**—Plans investing heavily in those asset classes characterized by high variability of returns may be required to liquidate those assets at depressed values to meet benefit obligations. Other investment risks may also be present, such as default risk or the risk of bankruptcy of the issuer.

- e. **Investment Manager Performance**—Anticipating superior (or inferior) investment manager performance may be unduly optimistic (or pessimistic). Few investment managers consistently achieve significant above-market returns net of expenses over long periods. The plan sponsor may replace managers who consistently underperform market indexes. However, in some situations an investment manager who consistently underperforms under varying market conditions is unlikely to be replaced (e.g., when the plan sponsor is the investment manager), so continued underperformance may be expected.
- f. **Investment Expenses**—Transaction, custodian, and management fees may be paid from plan assets. Such investment expenses expected to be paid from plan assets may be reflected by a reduction in the investment return assumption.
- g. **Cash Flow Timing**—The timing of expected contributions and benefit payments may affect the plan's liquidity needs and investment opportunities.
- h. **Benefit Volatility**—Benefit volatility may be a primary factor for small plans with unpredictable benefit payment patterns. It may also be an important factor for a plan of any size that provides highly subsidized early-retirement benefits, lump-sum benefits, or supplemental benefits triggered by corporate restructuring or financial distress. In such plans, the untimely liquidation of securities at depressed values may be required to meet benefit obligations.
- i. **Expected Plan Termination**—In some situations, the actuary may expect the plan to be terminated at a determinable date. For example, the actuary may expect a plan to terminate when the owner retires, or a frozen plan to terminate when assets are sufficient to provide all accumulated plan benefits. In these situations, the investment return assumption may reflect a shortened measurement period that ends at the expected termination date. The form of benefit (see section 3.6.5) may reflect anticipated annuity purchase rates or lump-sum distribution interest rates at the expected plan termination date, where these forms are payable.
- j. **Tax Status of the Funding Vehicle**—If the plan's assets are not kept in a tax-exempt fund, income taxes may reduce the plan's investment return. Taxes may be reflected by an explicit reduction in the total investment return assumption and/or by a separately identified assumption.

3.6.4 **Multiple Investment Return Rates**—The actuary may assume multiple investment return rates in lieu of a single investment return rate. Two examples are as follows:

- a. **Select and Ultimate Investment Return Rates**—Assumed investment return rates vary by period from the measurement date (e.g., returns of 8% for the first 10 years following the measurement date, and 6% thereafter). When assuming select and ultimate investment return rates, the actuary should consider the relationships among inflation, interest rates, and market appreciation (depreciation).
- b. **Obligations Covered by Designated Current Assets**—One investment return rate is assumed for obligations covered by designated current plan assets on the measurement date, and a different investment return rate is assumed for the balance of the obligations and assets.

3.6.5 **Form of Benefit**—The amounts of some benefit forms, such as lump-sum benefits and early-retirement benefits, may be based on interest rates defined by the plan that are unrelated to the assumed investment return. The actuary should reflect such required interest rates in determining the amount of benefits expected to be paid, rather than as an adjustment to the investment return rate used to measure the obligation. (See section 3.8.4 regarding variable conversion factors.) Similarly, if the actuary expects the plan to purchase annuities when participants retire or upon expected plan termination, the interest rates implicit in expected annuity purchase rates should be reflected in determining the expected annuity purchase price rather than as an adjustment to the investment return rate.

3.7 **Selecting a Compensation Scale**—Compensation is a factor in determining participants' benefits in many pension plans. Also, some actuarial cost methods take into account the present value of future compensation. Generally, a participant's compensation will change over the long term in accordance with inflation, productivity growth, and merit scale. The assumption used to measure the anticipated year-to-year change in compensation is referred to as the *compensation scale*. It may be a single rate; alternatively, it may vary by age and/or service, consistent with the merit scale component; or it may vary over future years, consistent with the inflation component.

3.7.1 **Data**—The actuary should review available compensation data. These data may include the following:

- a. the plan sponsor's current compensation practice and any anticipated changes in this practice;
- b. current compensation distributions by age and/or service;
- c. historical compensation increases and practices of the plan sponsor and other plan sponsors in the same industry or geographic area; and
- d. historical national wage and productivity increases.

The actuary should consider available plan-sponsor-specific compensation data, but the actuary must carefully weigh the credibility of these data when selecting the compensation scale. For small plans or recently formed plan sponsors, industry or national data may provide a more appropriate basis for developing the compensation scale.

3.7.2 Constructing the Compensation Scale Range—The best-estimate compensation scale range is generally constructed using a building-block method, which combines the best-estimate ranges for the components of compensation scale. These components include factors such as inflation, productivity growth, and merit scale. When the actuary combines these ranges, it is not generally appropriate to simply combine the low endpoints and combine the high endpoints of the ranges, since this is likely to produce an overly broad best-estimate compensation scale range.

3.7.3 Measurement-Specific Factors—The actuary should consider factors specific to each measurement in constructing the compensation scale range derived in section 3.7.2 and/or in selecting a specific compensation scale assumption within the range. Examples of such factors are as follows:

- a. Compensation Practice—The plan sponsor’s current compensation practice and any contemplated changes may affect the compensation scale, at least in the short term. For example, if pension benefits are a function of base compensation and the plan sponsor is changing its compensation practice to put greater emphasis on incentive compensation, future growth in base compensation may differ from historical patterns.
- b. Competitive Factors—The level and pattern of future compensation changes may be affected by competitive factors, including competition for employees both within the plan sponsor’s industry and within the geographical areas in which the plan sponsor operates, and global price competition. Unless the measurement period is short, the actuary should not give undue weight to short-term patterns.
- c. Collective Bargaining—The collective bargaining process impacts the level and pattern of compensation changes. However, it may not be appropriate to assume that future contracts will provide the same level of compensation changes as the current or recent contracts. For example, if the current contract provides for a compensation freeze, it would generally be inappropriate to assume that such a policy would continue indefinitely after the contract expires.
- d. Compensation Volatility—If certain elements of compensation, such as bonuses and overtime, tend to vary materially from year to year, or if aberrations exist in recent compensation amounts, then volatility should be taken into account. This may be accomplished by adjusting the base

amount from which future compensation elements are projected (e.g., the current bonus might be replaced by the average of bonuses over the last 3 years).

- e. Expected Plan Termination—In some situations, as stated in section 3.6.3(i), the actuary may expect the plan to be terminated at a determinable date. In these situations, the compensation scale may reflect a shortened measurement period that ends at the expected termination date.

3.7.4 Multiple Compensation Scales—The actuary may use multiple compensation scales in lieu of a single compensation scale. Three examples are as follows:

- a. Select and Ultimate Scale—Assumed compensation increases vary by period from the measurement date (e.g., 4% increases for the first 5 years following the measurement date, and 5% thereafter) or by age and/or service.
- b. Separate Scales for Different Employee Groups—Different compensation scales are assumed for two or more employee groups that are expected to receive different levels or patterns of compensation increases.
- c. Separate Scales for Different Compensation Elements—Different compensation scales are assumed for two or more compensation elements that are expected to change at different rates (e.g., 5% bonus increases and 3% increases in other compensation elements).

3.8 Selecting Other Economic Assumptions—In addition to inflation, investment return, discount rate, and compensation scale assumptions, the following are some of the other types of economic assumptions that may be required for measuring certain pension obligations. The actuary should follow the general process described in section 3.4 to select these assumptions. The selected assumptions should also satisfy the consistency requirement of section 3.10.

3.8.1 Social Security—Social Security benefits are based on an individual's covered earnings, the OASDI contribution and benefit base, and changes in the cost of living. Changes in the OASDI contribution and benefit base are determined from changes in national average wages, which reflect the change in national productivity and inflation.

3.8.2 Cost-of-Living Adjustments—Plan benefits or limits affecting plan benefits (including the IRC section 401(a)(17) compensation limit and section 415(b) maximum annuity) may be automatically adjusted for inflation or assumed to be adjusted for inflation in some manner (e.g., through regular plan amendments). However, for some purposes (such as qualified pension plan funding valuations),

the actuary may be precluded by applicable laws or regulations from anticipating future plan amendments or future cost-of-living adjustments in IRC limits.

- 3.8.3 Growth of Individual Account Balances—Certain plan benefits have components directly related to the accumulation of real or hypothetical individual account balances (e.g., so-called floor-offset arrangements and cash balance plans).
- 3.8.4 Variable Conversion Factors—Measuring certain pension plan obligations may require converting from one payment form to another, such as converting a projected individual account balance to an annuity, converting an annuity to a lump sum, or converting from one annuity form to a different annuity form. The conversion factors may be variable (e.g., recalculated each year based on a stated mortality table and interest rate equal to the yield on 30-year Treasury bonds).
- 3.9 Individual Assumptions—Each economic assumption selected by the actuary should individually satisfy this standard.
- 3.10 Consistency among Economic Assumptions Selected by the Actuary—With respect to any particular measurement, each economic assumption selected by the actuary should be consistent with every other economic assumption selected by the actuary over the measurement period, unless the assumption, considered individually, is not material, as provided in section 3.14.1. Often this requirement can be met by using the same inflation component in each of the economic assumptions selected by the actuary. For example, if the actuary has chosen to use select and ultimate inflation rates, the actuary should ordinarily choose select and ultimate investment return rates, discount rates, and compensation scales, and both the periods and levels of select and ultimate inflation rates should be consistent within each assumption. If different inflation components are used (or implicitly included) in two or more economic assumptions selected by the actuary for a particular measurement, the actuary should be satisfied that such assumptions are consistent.

Consistency is not necessarily achieved by maintaining a constant difference between one economic assumption and another. If one particular economic assumption changes from one measurement to another (e.g., from year to year or from funding to financial accounting) due to a change in the inflation component, the actuary should review the impact of inflation on all other economic assumptions and make appropriate adjustments. But if an assumption change is due to a factor that is unique to that assumption (e.g., a change in the investment return rate reflecting a change in investment policy), modifying other economic assumptions merely to maintain constant differences would not be appropriate.

Assumptions selected by the actuary need not be consistent with prescribed assumptions, which are discussed in section 3.11 below.

- 3.11 Prescribed Assumption(s)—When an assumption is prescribed, the actuary is obligated to use it. Examples of prescribed economic assumptions include the required interest rate

for determining the present value of vested benefits for Pension Benefit Guaranty Corporation (PBGC) variable-rate premiums, the current liability interest rate, and economic assumptions selected by the plan sponsor for purposes of compliance with SFAS No. 87. As indicated in section 1.2, Scope, this standard does not apply to the selection of prescribed economic assumptions, although it does apply to advice given to the party responsible for selecting the prescribed assumption.

All nonprescribed economic assumptions should nonetheless satisfy this standard. That is, each economic assumption selected by the actuary should be within the actuary's best-estimate range, should reflect relevant measurement-specific factors, and should be consistent with every other economic assumption selected by the actuary for the measurement. Selection of economic assumptions that do not satisfy this standard in order to accommodate the prescribed assumption(s) is a deviation from the standard subject to the requirements of section 4.3.

- 3.12 Changing Assumptions—An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experience. The actuary might change one or more economic assumptions frequently in certain situations (e.g., annually), even if the best-estimate range has not changed materially. The actuary might change assumptions infrequently in other situations (e.g., only when the best-estimate range changes materially or when the specific assumption is no longer within the updated best-estimate range). Even if assumptions are not changed, the actuary should be satisfied that each of the economic assumptions selected for a particular measurement complies with this standard.
- 3.13 Sources of Economic Data—Appendix 2 lists some generally available sources of economic data and analyses the actuary may wish to consider in selecting economic assumptions. The actuary should consider the possibility that some historical economic data may not be applicable for the future because of changes in the underlying environment.
- 3.14 Other Considerations—The following issues may also be considered when selecting economic assumptions:
 - 3.14.1 Materiality—The actuary needs to establish a balance between refined methodology and materiality. The actuary is not required to use a type of economic assumption or to select a more refined economic assumption when it is not expected to produce materially different results. For example, the actuary is not required to use an assumption regarding future compensation increases in an ERISA funding valuation when such an assumption is immaterial because the bulk of the obligation relates to participants whose current compensation exceeds the IRC section 401(a)(17) limit.
 - 3.14.2 Cost Effectiveness—The actuary also needs to establish a balance between refined methodology and cost effectiveness. While all material economic assumptions must be reflected, more refined methodology is not required when it

is not expected to produce materially different results. For example, actuaries working with small plans may prefer to emphasize the results of general research to comply with this standard. However, they are not precluded from using relevant plan-specific facts.

- 3.14.3 Knowledge Base—The economic assumptions selected to measure pension obligations should reflect the actuary’s knowledge base as of the measurement date. However, the actuary may learn of an event that is unique to a plan or plan sponsor (e.g., plan termination or death of the principal owner) occurring after the measurement date that would change the economic assumption selected. If appropriate, the actuary may reflect this change as of the measurement date.
- 3.14.4 Advice of Experts—Economic data and analyses are available from a variety of sources, including representatives of the plan sponsor and administrator, investment managers, economists, accountants, and other professionals. When the actuary is responsible for selecting or giving advice on selecting economic assumptions within the scope of this standard, external expert advice may be considered, but the selection or advice must reflect the actuary’s professional judgment.

Section 4. Communications and Disclosures

- 4.1 Disclosures—Pension actuarial communications should contain the following:

- 4.1.1 Economic Assumptions—Describe each economic assumption used in the measurement. When a single rate is assumed, the rate should be stated (e.g., investment return: 8% per year, net of investment expenses). When multiple rates are assumed, sufficient detail should be shown to assess the level and pattern of the rates (e.g., a table showing age-related merit scale rates for every fifth age).

Depending on a particular measurement’s circumstances, the actuary may give information about specific interrelationships among the assumptions (e.g., investment return: 8% per year, net of investment expenses and including inflation at 3%).

- 4.1.2 Changes in Assumptions—Describe any changes in the economic assumptions from those previously used for the same type of measurement. The general effects of the changes should be disclosed in words or by numerical data, as appropriate.
- 4.1.3 Changes in Circumstances—Describe any significant event that has occurred since the measurement date that would change the economic assumption selected and about which the actuary has knowledge. The likely effect of any such change should be described.

- 4.2 Prescribed Assumption(s)—The actuary’s communication should state the source of any prescribed assumption(s).
- 4.3 Deviation from Standard—An actuary must be prepared to justify the use of any procedures that depart materially from those set forth in this standard and must include, in any actuarial communication disclosing the results of the procedures, an appropriate statement with respect to the nature, rationale, and effect of such departures.

Appendix 1

Background and Current Practices

Note: This appendix is provided for informational purposes, but is not part of the standard of practice.

Actuaries have historically used various practices for selecting the economic assumptions they use to measure pension obligations. For example, some actuaries looked to surveys of economic assumptions used by other actuaries, some relied on detailed research by experts, some used highly sophisticated projection techniques, and many actuaries used a combination of these.

Before computer technology was widely available, actuaries commonly used economic assumptions that were not necessarily individually reasonable, but that in aggregate produced results the actuary believed to be reasonable. As technological developments made the use of individually reasonable assumptions feasible, many actuaries began selecting economic assumptions that were individually reasonable. This trend was accelerated by IRC amendments effective for plan years beginning after 1987. These amendments require actuaries to determine the minimum required contribution for a qualified pension plan (other than a multiemployer plan) using individually reasonable assumptions or using assumptions that produce the same total contribution that would have been determined if each assumption had been individually reasonable.

As for current practices, many actuaries change economic assumptions infrequently when measuring obligations of ongoing pension plans. Other actuaries reevaluate the assumptions as of each measurement date and change economic assumptions more frequently.

Many actuaries maintain a long-term conservative view, especially when selecting economic assumptions for funding purposes where adverse economic experience could jeopardize the delivery of plan benefits. Conservative assumptions require higher contributions initially, increasing the security of promised benefits and reducing the likelihood that future contributions will increase to unaffordable levels.

For some purposes, such as funding public employee pension plans, complying with financial accounting rules, or adhering to other requirements, the actuary may advise the plan sponsor about the selection of economic assumptions. But these assumptions—particularly the investment return assumption or the discount rate—may be prescribed by others. In some of these cases, actuaries have adjusted other assumptions to maintain consistency with the mandated assumption.

In preparing calculations for purposes other than ongoing plan valuations, actuaries often use economic assumptions that are different from those used for the ongoing plan valuation.

Appendix 2

Selected References for Economic Data and Analyses

The following list of references is a representative sample of available sources. It is not intended to be an exhaustive list.

1. General Comprehensive Sources

- a. Kellison, Stephen G. *The Theory of Interest*. 2d ed. Homewood, IL: Irwin, 1991.
- b. *Statistics for Employee Benefits Actuaries*. Committee on Retirement Systems Practice Education, and the Pension and Health Sections, Society of Actuaries. Updated annually.
- c. *Stocks, Bonds, Bills, and Inflation (SBBBI)*. Chicago, IL: Ibbotson Associates. Annual Yearbook, market results 1926 through previous year.

2. Recent Data, Various Indexes, and Some Historical Data

- a. *Barron's National Business and Financial Weekly*. Dow Jones and Co., Inc. Available on newsstands and by subscription.
- b. U.S. Bureau of the Census. *Statistical Abstract of the United States*. Published annually.
- c. U.S. Department of Labor, Bureau of Labor Statistics. *Consumer Price Index*. Monthly updates of CPI-U and CPI-W by expenditure category and commodity and service group. Available by subscription from the U.S. Government Printing Office, Washington, DC 20402.
- d. U.S. Federal Reserve Monthly Statistical Release G.13. Interest rate information for selected Treasury securities. Federal Reserve Board, Publications Services, Washington, DC 20551. Available by subscription.
- e. U.S. Federal Reserve Weekly Statistical Release H.15. Interest rate information for selected Treasury securities. Available as above.
- f. U.S. House of Representatives, Committee on Ways and Means. *Green Book: Background Material and Data on Programs within the Jurisdiction of the Committee*. Washington, DC: Government Printing Office. Published annually.
- g. U.S. Social Security Administration. *Social Security Bulletin*. Annual Statistical Supplements, Trustee Reports, and quarterly Bulletin. Available by subscription from the U.S. Government Printing Office, Washington, DC 20402.

- h. *The Wall Street Journal*. Daily periodical. Money and Investing (section 3); and stocks (6 indexes), bonds (4 indexes), and interest (4 indexes). Available on newsstands and by subscription.

3. Forecasts

- a. *Blue Chip Financial Forecasts*. Published by Capital Publications, Inc., P.O. Box 1453, Alexandria, VA 22313-2053. March and October issues contain long-range forecasts for interest rates and inflation.
- b. Congressional Budget Office's 5-year economic forecast. The forecast projects three-month Treasury Bill rates, 10-year Treasury Note rates, CPI-U, gross domestic product, and unemployment rates. Prepared annually. Washington, DC: Government Printing Office.

Appendix 3

Comments on the 1996 Third Exposure Draft and Committee Responses

The third exposure draft of a proposed actuarial standard of practice (ASOP), *Selection of Economic Assumptions for Measuring Pension Obligations*, was issued in July 1996, with a comment deadline of October 15, 1996. (The second and third exposure drafts summarize comments received on the first and second exposure drafts, respectively, and the Pension Committee's responses to such comments. Copies of these exposure drafts are available from the ASB office.) The ASB received sixteen comment letters on the third exposure draft. Several letters reflected general satisfaction with the course the committee had taken regarding changes from the second exposure draft. As for those respondents who voiced concerns, the Pension Committee first identified and resolved the key conceptual issues raised, and then addressed comments aimed at clarifying the text. This appendix contains the conclusions reached by the committee upon its review of the comment letters. Summaries of substantive issues raised in the comment letters are in lightface type, and committee responses are in **boldface**.

General Comments

It was suggested that the phrases, *use professional judgment* and *in the actuary's judgment*, in sections 3.1, 3.6.2(b), 3.14.1, and 3.14.2 be removed because the actuary is expected to use his or her professional judgment in *every* aspect of the selection of assumptions, and not just the areas noted in these few sections. **The committee agrees that the actuary is expected to use professional judgment in every aspect of the selection of assumptions. References to professional judgment were retained in section 3.1, Overview, to re-enforce the idea that the selection of assumptions is not a precise mathematical process. However, the text was modified to clarify that the use of professional judgment applies to the entire selection process—not just the determination of the best-estimate range. Most other references were deleted as being redundant.**

Section 1. Purpose, Scope, and Effective Date

Section 1.2, Scope—One respondent objected to the promulgation of standards along discipline lines. Another suggested that the standard should apply to defined benefit pension plans that are part of a social insurance program. **The ASB supports promulgation of standards along discipline lines (pension, health, life, and casualty) as an effective means of addressing key concerns that vary across such lines. In developing this standard, the committee did not consider its application to social insurance programs, because such consideration is the responsibility of the Social Insurance Committee of the American Academy of Actuaries. (The Social Insurance Committee has been charged by the ASB to develop an actuarial standard of practice on social insurance.)**

One comment letter pointed out that the disclosure requirement in section 4.2, Prescribed Assumptions, differs from the disclosure of exceptions requirement in ASOP No. 2, *Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88*. It was suggested that ASOP No. 2 should be amended to conform to the economic assumptions standard. **The committee and the ASB are not prepared to amend ASOP No. 2 at this time. However, text was added to section 1.2, Scope, providing that compliance with section 4.2 of this standard is deemed to fully satisfy the disclosure of exceptions requirement in ASOP No. 2, insofar as it pertains to economic assumptions.**

One comment letter suggested that the standard is inconsistent in that it gives total deference to the IRS regarding the selection of any current liability interest rate within the permissible range (regardless of whether such range overlaps with the actuary's best-estimate investment return range), while not deferring to the IRS on the use of assumptions that are not individually reasonable but that produce the same contribution which "would be determined if each such assumption were reasonable." Another letter requested clarification regarding the application of the standard to the selection of the current liability interest rate. In particular, if the best-estimate range for the valuation interest rate overlaps the current liability permissible interest rate, must the current liability interest rate be selected from within the overlapping ranges? If the ranges do not overlap, must the current liability interest rate be the endpoint of the permissible range that is closest to the valuation interest rate range? **The committee does not agree that the standard is inconsistent by deferring to the IRS with respect to prescribed assumptions but not in other areas. The standard gives equal deference to all prescribed economic assumptions regardless of their source, including (but not limited to) the current liability interest rate prescribed by the IRS, the interest rate prescribed by the PBGC for variable-rate premium calculations, and assumptions prescribed by the plan sponsor for employer accounting calculations pursuant to SFAS No. 87. The standard also places consistent requirements on all economic assumptions selected by the actuary, regardless of the purpose of the measurement.**

Furthermore, the committee believes that it would be inappropriate for the standard to limit the current liability rate to a rate within the actuary's best-estimate range in situations where such a range and the current liability range happen to overlap. Such a requirement would imply (incorrectly) that the actuary is free to choose any rate within his or her best-estimate range rather than selecting a specific rate that reflects the appropriate measurement-specific factors. The actuary would also be placed in the untenable position of having to determine the purpose of a measurement that is prescribed by another party in order to properly develop his or her best-estimate range and to select the specific point within the range. Hence, the standard permits the actuary to select any current liability interest rate that is within the range deemed acceptable by the IRS, without regard to any overlap with the best-estimate range for the valuation interest rate or other fact pattern regarding the current liability permissible interest rate range and the other economic assumptions selected by the actuary.

Some respondents incorrectly interpreted examples in the transmittal memorandum or appendix 3 as exempting certain types of plans from the standard and recommended that the standard apply uniformly to all pension plans. **As set forth in section 1.2, Scope, the standard applies**

uniformly to all defined benefit plans, except plans that are part of a social insurance program (unless ASOPs on social insurance specifically provide for application of this standard). The examples in the transmittal memorandum and appendix 3 of the third exposure draft were intended solely to illustrate situations in which the actuary might choose to deviate from the standard. In these examples, the standard would still apply, including section 4.3, Deviation from Standard.

Regarding the second paragraph of section 1.2, one respondent suggested adding the word *only* before *a* in the phrase “or [when] a specified range of assumptions is deemed to be acceptable.” The suggested change was made in the text.

Section 1.3, Effective Date—It was suggested that the effective date be delayed until all standards augmenting ASOP No. 4 have been finalized. **The committee believes actuaries can apply this standard without the detailed guidance on other aspects of measuring pension obligations ultimately expected when these future ASOPs are developed. Therefore, this suggestion was not adopted.**

Section 2. Definitions

Section 2.1, Best-Estimate Range—One respondent agreed with the addition of the phrase *compounded over the measurement period* to the definition of *best-estimate range*, while another suggested adding an alternative definition, “the expected value plus or minus one standard deviation.” **The committee’s goal in defining *best-estimate range* was to craft a definition that is meaningful to both actuaries and non-actuaries and which also reflects the fact that the selection of assumptions is not a precise mathematical process. Thus, the committee avoided the use of statistical concepts that would not be meaningful to a non-actuary and that may imply a degree of precision that does not exist. The committee did not change the *best-estimate range* definition in the final standard. However, the committee notes that this definition may exclude the expected value when applied to a severely skewed distribution. For example, a small plan’s investment portfolio might include only three bonds. In this case, the narrowest investment return range that is more likely than not to occur might not reflect the possibility of default on any of these investments. In this unusual situation, the actuary might choose to deviate from the standard by extending the range to appropriately reflect the probability of default, as well as other relevant measurement-specific factors. The standard would still apply here, including section 4.3, Deviation from Standard.**

Section 2.7, Productivity Growth—It was suggested that the definition of *productivity growth* ignores labor market supply and demand conditions. **The committee agrees, but it believes these conditions *are* addressed in section 3.7.3(b), Competitive Factors.**

Section 3. Analysis of Issues and Recommended Practices

Section 3.2, Identifying Types of Economic Assumptions—The use of the term *compensation scale* was questioned on the grounds that laymen might interpret *compensation scale* as the

amount paid rather than the rate of change; the respondent suggested changing the term to *compensation increases* or *compensation changes* in this section and throughout the standard. **The committee retained the term *compensation scale*. The term *compensation increases* is not suitable because compensation is not always expected to increase. The term *compensation changes* seems equally likely to cause confusion (e.g., does the change refer to dollar change versus rate of change, or a fixed rate versus a schedule of rates that vary by age, service, or other factors?) and to be more cumbersome to use when discussing changes in assumptions.**

Section 3.3, General Considerations—The inclusion of *volatility* in item (b) was questioned since volatility does not seem to affect the choice of what types of economic assumptions to use. **Items (a) through (d) apply to the selection of the specific values for a given economic assumption type as well as to the identification of the types of economic assumptions that will be used. Volatility is applicable to the selection of an investment return assumption and, as such, is appropriately included in item (b).**

Section 3.4, General Selection Process—One letter questioned whether a particular method for selecting the investment return assumption complies with the standard, since it does not precisely follow the selection process outlined in section 3.4. The method is a variation of the building-block method, in which a specific value is selected for each component of investment return, and then these values are combined to determine the investment return assumption, without explicitly determining a best-estimate range for the investment return assumption. **The committee believes that the failure to explicitly identify a best-estimate range before selecting a specific point is not automatically a deviation from the standard. The actuary should, nonetheless, be satisfied that the selected point would be within the best-estimate range, if such a range were explicitly identified. Language was added to this section to address this concern.**

The use of the phrase *select and ultimate* in sections 3.5.2, 3.6.4(a), and 3.7.4(a) was questioned by a respondent who believes that there is no selection with respect to economic assumptions, unlike underwriting for individual insurance. **The committee believes the phrase *select and ultimate* has a much broader meaning than the selection associated with individual underwriting; this phrase is commonly used to connote assumptions that change over time.**

Section 3.6, Selecting an Investment Return Assumption and a Discount Rate—Objection was raised regarding the characterization of a discount rate as the expected return on a hypothetical portfolio, because it excludes other discount rate measures that may be appropriate in certain situations—such as a company’s internal rate of return—and does not describe how to develop a hypothetical asset portfolio. **The committee believes the characterization is appropriate. A discount rate is applied to reflect the time value of money. Money only has time value if it can be invested in some income-producing asset. Therefore, the actuary must look to some underlying investment(s) to determine an appropriate discount rate. The appropriate investment(s) will depend on the application. For example, when an actuary determines the discount rate for an unfunded, nonqualified executive retirement plan, a**

hypothetical portfolio invested exclusively in the company may be appropriate, producing a discount rate equal to the company's internal rate of return.

One respondent expressed the following views: (1) the building-block method is inappropriate, because stock market returns have not been correlated with inflation over the past 20 years, (2) the cash flow matching method is inappropriate when the plan invests primarily in equities, and (3) other outside experts have a terrible track record forecasting equity returns. The respondent reasoned, "If an actuary, after ruminating a number of factors in his mind, specific to the investment makeup and performance of that client, says that he has selected an interest assumption of 9¼%, I don't think he need paper his file with pseudo-scientific derivations of that determination." **The committee did not agree with these views.**

Section 3.6.1, Data—An objection was raised regarding the inclusion of item (b), *forecasts of inflation and of total returns for each asset class*, because such forecasts typically do not cover the 15- to 30-year period that is relevant for a pension plan. **The committee retained this item, and notes that (1) some forecasts cover longer periods; (2) not all pension plans have a long investment horizon (consider a small plan with the principal owner nearing retirement); (3) near-term forecasts may still be relevant for pension plans with longer investment horizons, especially when select and ultimate assumptions are used; and (4) this section does not mandate that the actuary use such forecasts.**

Section 3.6.2(a), Building-Block Method—One respondent expressed the view that the building-block method should never be used to determine an investment return assumption or discount rate. **It is up to the actuary performing the measurement to determine what method is appropriate for selecting economic assumptions. The actuary who views the cash flow matching method—or some other method consistent with the principles outlined in this standard—as superior is not required to use the building-block method to select an investment return assumption or discount rate.**

Section 3.6.2(b), Cash Flow Matching Method—One comment letter recommended changing the phrase *a highly diversified portfolio* to *a portfolio highly diversified as to issuer and industry sector* in the second paragraph, item (ii). The letter also recommended deleting the fourth paragraph of this section. **The committee agrees that diversification as to issuer and industry sector are important, but these are not the only relevant areas of diversification. Because the suggested wording ignored other types of diversification, the committee did not make the suggested change in the second paragraph. The committee also retained the fourth paragraph of this section, but modified the text.**

Some respondents questioned the practicality of the cash flow matching method because it would not generally be possible to construct a diversified portfolio of bonds with maturity dates more than 30 years in the future, and because strict application of the method produces different rates for different segments of a plan's liabilities (such as the present value of vested accrued benefits versus the present value of future normal costs). **The description of the cash flow matching method in section 3.6.2(b) recognizes that perfect matching of bond interest and principal payments with projected benefit payments is not possible. That is why the risk adjustment range reflects expected returns on future contributions and reinvestment of interest and**

principal payments not fully needed to pay current benefits. The committee also notes that benefits expected to be paid during the next 30 years will represent the bulk of the liability in many pension plans. The actuary may consider cost effectiveness (see section 3.14.2) in determining the degree of refinement needed in applying the cash flow matching method, including whether different rates should be applied to different segments of the liability. As indicated in section 3.6.4, multiple investment return rates may be used in lieu of a single rate when appropriate.

Section 3.6.3, Measurement-Specific Factors—One respondent asked whether the actuary may consider the benefit security provided by the funded status of the plan and the plan sponsor’s funding objectives when selecting a specific point from within the best-estimate range. It was also recommended that the standard permit, but not require, the actuary to determine to whose interest the actuary owes a responsibility (e.g., the plan participants’ interest in a minimum-funding calculation) and to make a conservative adjustment to protect that interest. **The purpose of the measurement—a primary measurement-specific factor—encompasses benefit security. Measurement-specific factors are intended to permit the actuary to take into account those risks that could materially affect the plan being valued, including the benefit security of plan participants. The lists of measurement-specific factors provided in sections 3.6.3 and 3.7.3 are not intended to be exhaustive. If the actuary identifies additional factors specific to the measurement that are likely to affect the future economic outcome, these additional factors may also be considered in selecting economic assumptions. However, the standard does not permit the actuary to make conservative adjustments for unidentified risks.**

The purpose of the measurement affects how the actuary constructs the best-estimate range and also how the actuary selects a specific point from within that range. For example, as noted below in the discussion of section 3.6.3(h), it may be appropriate for the actuary to take benefit volatility into account when selecting the investment return assumption for funding purposes, because the downside risk of benefit volatility may jeopardize benefit security. On the other hand, reflecting benefit volatility might not be appropriate for other measurement purposes because, over time, untimely liquidation of investments is as likely to occur at inflated values as at depressed values.

Furthermore, the committee notes that benefit security may be only one of several competing interests that the actuary must balance in selecting economic assumptions. The reader is referred to section 5.8 of ASOP No. 4, which addresses the actuary’s responsibility with regard to pension plan funding.

The absence of any reference to asset/liability management was questioned. **The committee believes asset/liability management is addressed in sections 3.6.3(b), Investment Policy; 3.6.3(c), Reinvestment Risk; 3.6.3(g), Cash Flow Timing; and 3.6.4(b), Obligations Covered by Designated Current Assets.**

Section 3.6.3(d), Investment Volatility—One respondent suggested deleting the word *severely*, and including text which states that the best-estimate range of investment return values would normally be wider when the plan invests heavily in volatile asset classes. **The word *severely* was**

deleted from the text. However, although the committee agrees that heavy investment in volatile asset classes could widen the best-estimate investment return range, the risks associated with such asset classes must also be taken into account in determining the best-estimate range and selecting a specific point within the range. Since investment volatility is only one of many measurement-specific factors that affect the width of the range, the committee did not feel it was necessary to add text making this point.

Section 3.6.3(h), Benefit Volatility—The consideration of benefit volatility in selecting the investment return assumption was questioned, since untimely liquidation of investments is as likely to occur at an inflated price as at a depressed price. Therefore, over time, benefit volatility should not affect investment return. **The committee agrees that over time, benefit volatility should not significantly affect the investment return of ongoing plans. However, the downside risk of benefit volatility may jeopardize benefit security in some plans and, therefore, may be an appropriate measurement-specific factor for an actuary to consider when selecting an investment return assumption for funding purposes.**

Sections 3.6.3(i) and 3.7.3(e), Expected Plan Termination—The consideration of expected plan termination in selecting economic assumptions was questioned because IRS regulations do not permit the actuary to anticipate future plan amendments. Another respondent questioned the inclusion of expected plan termination while not including an expected amendment freezing benefit accrual. Further, it was suggested that the text be modified to require that the actuary *consider* the potential impact of such events, rather than require the actuary to *reflect* them. **Sections 3.6.3(i) and 3.7.3(e) focus on the impact of expected plan termination on the time horizon over which the investment return assumption and the compensation scale will operate. The committee believes that, when selecting the economic assumptions, the actuary may reflect a shortened time horizon due to expected plan termination and still fulfill IRS requirements. With respect to the absence of any mention of benefit freezes, the committee points out that the list of measurement-specific factors is not intended to be all-inclusive; an expected benefit freeze may be reflected if relevant to the measurement. As to the last suggestion regarding these sections, the committee agreed that expected plan termination, like the other measurement-specific factors listed here, should be considered by the actuary, but is not required to be reflected; the text was changed accordingly.**

Section 3.6.5, Form of Benefit—Some respondents questioned whether this section permits the use of a typical actuarially equivalent calculation method, in which the lump-sum payment form is valued assuming an annuity payment form together with a post-retirement interest rate equal to the plan's lump-sum interest rate. **When the actuary expects essentially 100% utilization of the lump-sum form of payment, this actuarially equivalent calculation method would generally be permitted under section 3.14.2, Cost Effectiveness, for liability measurements or other actuarial present value calculations. However, this method would not be appropriate for cash flow projections or other estimates of future plan obligations.**

Section 3.7, Selecting a Compensation Scale—One respondent indicated the standard should more strongly encourage the use of compensation scales that vary by age and/or service as a more accurate reflection of actual compensation patterns. Another questioned the use of compensation scales that vary by age (in this section and in section 3.7.4), since age discrimination is

illegal in the U.S. for anyone over age 40. **The committee did not change the text in response to these comments. Age- and/or service-related scales may more accurately reflect actual compensation practices for some groups, but they may not apply to other groups, including certain collectively bargained groups. In any event, the compensation scale is not used to determine participants' actual benefits.**

The compensation scale components of inflation, productivity growth, and merit scale were questioned on the basis that there are other factors that affect the level of general increases in real wages. **The committee has broadly defined the three components listed to include a variety of factors that affect real compensation, but this is not intended to limit the actuary's discretion to separately reflect other components in selecting a compensation scale.**

Section 3.7.3, Measurement-Specific Factors—It was suggested that the term *compensation* should be used throughout this section, not *pay*. **The suggested change was made throughout the section.**

Section 3.10, Consistency among Economic Assumptions Selected by the Actuary—Some respondents misinterpreted this section as requiring the assumptions selected by the actuary to be consistent with prescribed assumptions. **To prevent such misinterpretations in the future, the text in the first paragraph was modified to clarify that, in the example, the actuary is selecting the assumptions—they are not prescribed. Further, a new paragraph was added at the end of this section stating that assumptions selected by the actuary need not be consistent with prescribed assumptions.**

Regarding the end of the first paragraph, one respondent suggested that the phrase, *the actuary should be prepared to demonstrate*, be changed to *the actuary should be satisfied*, and that the phrase, *such assumptions are consistent*, be changed to *such assumptions are reasonable*. **The first suggested change was made in the text, but not the second. Two or more economic assumptions that are each reasonable may, nonetheless, be inconsistent. This section requires that each economic assumption selected by the actuary be consistent with every other economic assumption selected by the actuary. Changing the word *consistent* to *reasonable* at the end of this section would alter this requirement.**

Section 3.11, Prescribed Assumption(s)—One respondent suggested deleting the last sentence of this section, because, in this person's view, deviations from the standard should not be permitted. Another disagreed with the requirements of this section because calculations performed using "mixed" assumptions would be meaningless. **The committee did not adopt either of these suggestions. The committee believes that situations exist in which deviations from actuarial standards of practice *are* justified. Further, future developments in actuarial practice may produce new methods for selecting economic assumptions that are not covered by this standard. In such situations (including situations where the actuary believes results determined with mixed assumptions are meaningless), the actuary may deviate, provided the requirements of section 4.3 are satisfied.**

One respondent suggested changing the phrase *prescribed assumption(s)* to *prescribed assumptions or prescribed ranges* to clarify that *prescribed assumptions* include assumptions selected

from within prescribed ranges. **The committee believes that it is clear from the definition of *prescribed assumption* that this section also covers assumptions selected from within prescribed ranges, and that the suggested changes would detract from readability. Therefore, the suggested change was not adopted.**

Section 3.12, Changing Assumptions—Guidance was requested as to situations where it might be warranted to change an assumption annually. **One example of such a situation is where the actuary advises the plan sponsor on the selection of a discount rate for employer accounting purposes. SFAS No. 87 requires the use of a discount rate that reflects the rates at which the pension benefits could be effectively settled on the measurement date, so employers typically change the discount rate annually.**

Sections 3.14.1 Materiality—One respondent objected to the last sentence in this section because it implies that select and ultimate assumptions are more accurate than fixed rate assumptions. **The committee agreed with the respondent and deleted this sentence.**

Further, confusion was expressed over the meaning of *refined methodology* in the first sentence of this section and section 3.14.2. ***Refined methodology* is intended to include both the method used to select the assumption and the complexity of the assumption.**

Guidance was also requested on the meaning of *materially different* in sections 3.14.1 and 3.14.2. In particular, is the result materially different when a tiny percentage change in actuarial accrued liability causes a large percentage change in the current year's minimum required contribution because of the operation of the full funding limit? **A general standard on materiality is currently on the ASB's agenda. Pending future guidance, the actuary must decide what is material given the purpose and nature of the measurement. With respect to the specific question regarding small liability changes resulting in large percentage changes in the minimum required contribution, the committee believes that these results are not necessarily materially different, although such a determination necessarily depends on the facts and circumstances surrounding the measurement.**

It was suggested that when a plan is so overfunded that refining assumptions will have no effect on the funding results, there should be some allowance for not requiring as much refinement in the development of the funding assumptions. **The committee agrees and believes that sections 3.14.1, Materiality, and 3.14.2, Cost Effectiveness, address this question.**

Section 4. Communications and Disclosures

Section 4.1.1, Economic Assumptions—A respondent recommended changing the example of a table showing age-related merit scale rates for every fifth age, believing this to be an unwise basis for setting salary increase assumptions (see the related comment on section 3.7). **The committee did not agree with this comment and retained the example.** In addition, another respondent indicated that the phrase *want to* is misleading and should be deleted. **The suggested change was made in the text.**

Additional disclosures were also suggested, including the best-estimate range for each economic assumption and the method used to select each assumption. **The committee does not agree that such additional disclosures should be required. The committee believes such disclosures would not materially enhance the understanding of large numbers of users and might mislead some users by implying that the selection process has a degree of precision that does not exist. Furthermore, as indicated in the discussion of section 3.4, General Selection Process, some acceptable methods may not produce an explicit best-estimate range for each assumption.**

Section 4.1.3, Changes in Circumstances—One respondent indicated that this section would require burdensome and confusing disclosure in many cases, such as when the cash flow matching method has been used to select the investment return assumption, but market bond yields have changed significantly between the measurement date and the date Schedule B is filed (often more than a year after the measurement date). **The disclosure requirement of section 4.1.3 would not apply in the situation cited. The cash flow matching method determines the best-estimate investment return range based on a highly diversified bond portfolio “available as of the measurement date.” Changes in bond yields after the measurement date do not affect the yields that were available as of the measurement date, and, hence, would not change the investment return assumption selected using this method. Because section 4.1.3 would not apply in the situation cited as the basis for the suggested change, the committee did not make any changes to this section.**

Section 4.2, Prescribed Assumption(s)—One respondent indicated that simply disclosing the source of the prescribed assumption(s) is inadequate when the prescribed assumption is not what the actuary would have chosen. Another objected to the requirement that the source of the assumption be disclosed, suggesting that the disclosure be limited to a statement of the assumptions the actuary did not select. Others supported the changes made in this section since the second exposure draft. **The committee did not make any changes to this section, believing that the source of the prescribed assumption should be disclosed and that this requirement is not unduly burdensome. Furthermore, the committee believes disclosing the source of the assumption is adequate when considered in conjunction with the existing disclosure requirement in section 6.3(g) of ASOP No. 4—that the actuary must disclose a significantly increased or decreased long-term cost trend expected to result from the continued use of present assumptions and methods.**

Section 4.3, Deviation from Standard—One respondent indicated that the standard should not authorize deviations. Others asked for additional explanation regarding the application of this section, particularly the requirement that the actuary be prepared to justify the deviation, and whether the justification must be disclosed. **The ASB has standardized the text of this section, which has appeared in all ASOPs since the standardization. This section is intended to accommodate future advances in actuarial practice as well as unusual circumstances that may not have been anticipated in formulating the ASOP. It requires that the actuary be prepared to justify the deviation and disclose the nature, rationale, and effect of the deviation from the standard.**

Justification is not synonymous with disclosure, nor is disclosure alone sufficient to satisfy the actuary's responsibilities under the standard. *Justifying the deviation* means demonstrating that the deviation is objectively appropriate for the measurement in question. The justification is not required to be set forth in the actuarial communication, but should be supplied to the user (whether direct or indirect) upon request. Justification may take the form of a dialogue between the actuary and the user. It is not intended that the standard provide guidance on whether the justification provided by the actuary is adequate. In some cases, the determination as to the adequacy of the justification may be made by the courts, the Actuarial Board for Counseling and Discipline (ABCD), the disciplinary committees of the actuarial organizations governed by ASB actuarial standards of practice, or other governing authorities.

The purpose of the required disclosure is to put the informed reader on notice that a deviation has occurred and to invite relevant questions. It is not necessary to numerically quantify the effect of the deviation. Furthermore, communications prepared for different purposes may contain different deviation statements if the deviation's effects vary according to the purpose of the measurement.

The committee thanks everyone who took the time and made the effort to submit comments. In developing the final ASOP, the committee appreciated all of the input.