

Note: This ASOP is no longer in effect.  
It was superseded in 1991 by ASOP No. 7, Doc. No. 031,  
which was superseded in 2001 by ASOP No. 7, Doc. No. 081,  
which was superseded in 2002 by ASOP No. 7, Doc. No. 089.

**Actuarial Standard  
of Practice  
No. 7**

**CONCERNING CASH FLOW TESTING  
FOR LIFE AND HEALTH INSURANCE COMPANIES**

**Adopted by the  
Actuarial Standards Board  
October 1988**

**Developed by the  
Committee on Life Insurance Financial Reporting  
In Conjunction with the  
Life Committee of the ASB**

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## Conclusion

The Life Committee of the ASB and COLIFR appreciate that a significant number of respondents took the time to make comments, and also appreciate the quality of the responses.

Following the revisions outlined above, the Standard was adopted by the ASB on October 7, 1988, with an effective date of January 1, 1989.

As indicated above, the Standard was prepared by COLIFR in conjunction with the Life Committee of the ASB.

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**ACTUARIAL STANDARD OF PRACTICE NO. 7**  
**CONCERNING CASH FLOW TESTING**  
**FOR LIFE AND HEALTH INSURANCE COMPANIES**

**PREAMBLE**

Section 1. Purpose, Scope, and Effective Date

- 1.1 Purpose - This Actuarial Standard of Practice sets out the considerations that bear on the actuary's professional work in the area of cash flow testing, whenever cash flow testing is done for a life or health insurance company and is a component of an actuarial report. It prescribes appropriate procedures for performing such testing, and instructs actuaries to describe their procedures and document their assumptions in an actuarial report.
- 1.2 Scope - Cash flow testing usually is performed under several sets of economic scenarios which require that consistency be maintained in the relationships between the economic scenarios and the other assumptions. Cash flow testing may be an element of several types of analyses, including pricing studies, evaluation of investment strategy, determination of non-guaranteed elements (e.g., current interest and mortality rates), financial projections or forecasts, reserve adequacy testing, and valuation of blocks of business or appraisal work.

Elements of cash flow testing include the economic scenarios, the investment (or asset) cash flows, the insurance (or liability) cash flows and other items affecting cash flows. Each of these elements is discussed below.

- 1.3 Effective Date - This Standard was adopted by the Actuarial Standards Board October 7, 1988. Its effective date is January 1, 1989.

Section 2. Definitions

- 2.1 Actuarial Report - An actuarial report, as defined in Interpretative Opinion 3, of the Guides and Interpretative Opinions as to Professional Conduct of the American Academy of Actuaries (AAA) is "a document, or other presentation, prepared as a formal means of conveying the actuary's professional conclusions and recommendations, to record and communicate the methods and procedures, and to ensure that the parties addressed are aware of the significance of the actuary's opinion or findings."
- 2.2 Cash Flow Testing - Within the scope of this Standard, cash flow testing is defined as any projection of asset and liability cash flows where the specific timing of asset and liability cash flows is considered.

2.3 Option Pricing Model - A model for calculating the estimated market values of options.

### Section 3. Background and Historical Issues

Actuaries have been performing financial projections for many years. Various cash flow elements have always been an integral part of these projections. Historically, most of these financial projections were performed using a single assumed interest rate path and simplified assumptions regarding investment of future cash flows. These assumptions were deemed appropriate because historical insurance and investment cash flows had been reasonably predictable.

The large increase in the level and volatility of interest rates which occurred in the early 1980s caused unprecedented liquidity problems for many insurance companies and precipitated development of new, interest-sensitive insurance and annuity products. In response to this changing environment, actuaries began to research the effects on the financial condition of life insurance companies caused by various changes in the economic environment. Among the byproducts of this research has been development of the concept of cash flow testing.

### Section 4. Current Practices and Alternatives

Cash flow testing is a relatively new area of actuarial practice; therefore, it is important that actuaries keep abreast of new developments discussed in the literature, meetings, etc. Because of the research being performed and the rapid pace of change in available computer technology, new developments are expected to continue at a fast pace for the near future.

One alternative methodology which has been developed is the use of option pricing models. These models utilize many of the same types of assumptions and economic scenarios used in cash flow testing; therefore, actuaries working with option pricing models can use this Standard of Practice for guidance in their work.

## STANDARD OF PRACTICE

### Section 5. Analysis of Issues and Recommended Practices

- 5.1 Economic Scenarios - A key element of cash flow testing is the set of economic scenarios over which the projections are performed. An economic scenario includes the interest rate path, as well as other economic parameters (e.g., inflation rate).

In some situations, the economic scenarios to be tested may be specified by company management or prescribed by regulation. In other cases, the actuary may develop the set of economic scenarios. In developing scenarios, the actuary should consider changes in the shape of the yield curve as well as changes in the absolute level of interest rates. For example, a set of scenarios might include scenarios where the yield curve is inverted (short-term interest rates exceed long-term interest rates).

The actuarial report should describe the set of economic scenarios used, and the methodology used to develop these scenarios. The range of scenarios selected should be consistent with the purpose of the report. When conclusions are to be drawn from the cash flow testing, any limitations due to the number or types of scenarios utilized should be disclosed in the report.

- 5.2 Classification of Cash Flows - In cash flow testing, all material items of cash flow should be considered. For convenience, the following discussions classify cash flows as related to investment, insurance, and other material items. However, the definitions and examples used are not mandated. Appropriateness of cash flow testing will not be affected by the classification of cash flows so long as all material items are included.

- 5.3 Investment Cash Flows - When performing cash flow testing, the actuary needs to consider the various items which affect the projection of investment cash flows. These items would include the modeling of investment cash flows, the characteristics and contractual terms of the assets and company policies concerning assets.

The actuary's report should describe the model used for the investment cash flows, the sources of the asset data, and the analyses made to assure that the modeled investment cash flows are representative of expected investment cash flows.

The characteristics and contractual terms relating to assets may affect the expected investment cash flows. In many cases, these cash flow variations are dependent upon the economic scenarios. Examples of such items include coupon rates which depend upon an external index, call and prepayment provisions, asset quality rating and the associated default probabilities, and conversion from debt to equity rights.

The actuarial report should describe the assumptions made concerning the effects on investment cash flows caused by the asset characteristics and contractual terms, and the relationships between such assumptions and the economic scenarios.

Company policies concerning management of existing assets and investment of future cash flows will affect the projection of investment cash flows under a set of economic scenarios. Examples might include company policies for investing positive cash flows, for funding negative cash flows, for selling assets prior to maturity, and for disposal of assets in default.

The actuarial report should describe the assumptions as to company policies concerning management of existing assets and investment of future cash flows, as well as the assumed relationships between these policies and the economic scenarios.

The allocation of assets to product lines or business segments involved in cash flow testing will affect the projection of investment cash flows. Some insurance companies maintain internal segmentation of assets while others do not.

If cash flow testing by product lines or business segments is done, assets must be allocated and the method of allocation used should be described in general terms in the actuarial report.

5.4 Insurance Cash Flows - When performing cash flow testing, the actuary needs to consider the various items which affect the projection of insurance cash flows.

The actuary's report should describe the model used, the sources of the data, and the analyses made to assure that the modeled insurance cash flows are representative of expected insurance cash flows.

Contractual provisions affect the expected insurance cash flows. In many cases, these cash flows are also dependent upon the economic scenarios. Examples of such items include cash surrender provisions, policy loan rights, premium payment provisions, morbidity benefit provisions, and interest rate guarantees.

The actuarial report should describe the assumptions made concerning the effects on insurance cash flows caused by the contractual provisions, and the relationships between such assumptions and the economic scenarios.

Company policies concerning the management of liabilities can affect the projection of future insurance cash flows under a set of economic scenarios. Examples might include the company policies for determination of non-guaranteed charges for mortality and the company philosophy relative to the determination of policyholder dividends.

The actuarial report should describe the assumptions as to company policies concerning the management of liabilities, as well as the assumed relationships between these policies and the economic scenarios.

- 5.5 Other Items Affecting Cash Flows - In performing cash flow testing, the actuary should consider all other material items affecting cash flows which may not be easily categorized as investment or insurance related. These items might include reinsurance arrangements, federal income taxes, provisions for shareholder dividends, and administrative expenses (including allowances for overhead expense).

The actuarial report should describe the assumptions made concerning other items affecting cash flows. The actuary should be satisfied that all material items have been considered.

- 5.6 Determination of Assumptions - Often there are interrelationships between the expected cash flows and the economic scenarios. As described in the previous sections the actuary needs to consider these interrelationships in developing the assumptions used for cash flow testing.

The actuary should analyze the assumptions with regard to the interrelationships between various cash flows and the economic scenarios, to assure that each set of assumptions is internally consistent.

There are many instances where it would be appropriate for the actuary to test alternative assumptions to gain an understanding of the sensitivity of results. Examples of these instances include assumptions based on sparse data, new marketing strategies or policy types, and informal investment strategies.

The actuary should be satisfied that the issue of sensitivity testing has been adequately addressed.

In addition to describing the assumptions utilized in performing cash flow testing, the actuary should include the basis used for choosing, and source of, each of the assumptions in the actuarial report.

- 5.7 Development of Conclusions - The results of cash flow testing may be analyzed in various ways. Many times these analyses will involve the discounting or accumulating of cash flow results. Generally, the projections are performed for a given time period. It also is important to consider the possible effect of cash flows beyond such a time period in analyzing results.

The actuarial report should describe the methods used to analyze cash flow testing results. Any conclusions presented in the actuarial report should be appropriate for the set of economic scenarios tested and any limitations of the conclusions presented should be described.

## Section 6. Communications and Disclosures

- 6.1 Actuarial Report – Interpretative Opinion 3 of the AAA Guides and Interpretative Opinions as to Professional Conduct establishes that an actuarial report customarily should describe or identify the data, assumptions and methods used with sufficient clarity that another actuary

practicing in the same field could make an objective appraisal of the reasonableness and validity of the report.

- 6.2 Existing Standards - Interpretative Opinion 4 defines the framework of “Generally Accepted Actuarial Principles and Practices” and establishes that an actuary working in a specialized field should take into consideration any published Standard of Practice of the Actuarial Standards Board (ASB).\*

Interpretative Opinion 4 also establishes that an actuary who uses principles or practices which differ materially from any published Standard of the ASB must be prepared to support the particular use of such principles or practices and should include in an actuarial communication appropriate and explicit information with respect to such principles and practices.

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\* Interpretative Opinion 4 was amended in the 1990 Yearbook of the AAA to reflect the establishment of the ASB as the standards-setting authority for the actuarial profession.