

# 1987 VALUATION ACTUARY HANDBOOK

## Chapter I

### LIFE INSURANCE COMPANY STATUTORY VALUATION

#### Section 1: Introduction

A statutory valuation of a life insurance company's liabilities is performed primarily to demonstrate the company's solvency to its regulators. Every state has laws and regulations which require an annual valuation and prescribe standards for it.<sup>1</sup> The valuation is necessary for the construction of the statutory balance sheet. This balance sheet may be used in many undertakings — analysis of gains and losses by source, distribution of surplus to participating policyholders, estimation of a company's market value, review of capacity to expand new business or other activities, and so forth — but it is first a measure of a company's ability to meet its future obligations.

Though laws and regulations define a large part of the valuation process, there has been growing recognition that a legal structure is too inflexible to be sufficient by itself. Increasingly, the valuation actuary is being asked to use his judgment to evaluate risks and establish supplemental liabilities when reserves required by law or regulation are not enough. He is asked to furnish an actuarial certification in which he opines that the reserves and other actuarial items "make a good and sufficient provision for all unmatured obligations of the

<sup>1</sup> See, for example, Sections 4217, 4218, and 4234 of the New York Insurance Law.

company guaranteed under the terms of its policies," and "include provision for all actuarial reserves and related statement items which ought to be established."<sup>2</sup>

The meaning of "good and sufficient provision" has evolved with the role of the valuation actuary. For years, a present value of future obligations based on static assumptions was the measure of liability. Today the valuation actuary is expected to consider several "futures" with different patterns of interest rates, persistency, inflation, and other experience factors. Also, he is expected to consider not only present values of liabilities, but cash flow patterns as well, involving both assets and liabilities. The scope of the valuation actuary's investigation is expanding.

Fortunately, a body of literature and experience has developed. Regulatory and professional organizations have published materials; and actuaries performing valuations have encountered many practical problems and found solutions. This handbook is intended to be both a catalog of published materials and a summary of valuation experience.

## **Section 2: Background**

Historically, the actuary responsible for valuations has operated within a narrowly defined structure of responsibilities and duties. For a long time, the

<sup>2</sup>Financial Reporting Recommendation 7 of the American Academy of Actuaries: Statement of Actuarial Opinion for Life Insurance Company Statutory Annual Statements.

actuary merely had to make sure that the valuation process was performed accurately and that the reserves established by the company met the minimum legal requirements. These minimum requirements were precisely defined in terms of prescribed methods and specified interest rates and mortality tables.

In June 1975, the NAIC adopted a requirement that the annual statement must contain the statement of a qualified actuary setting forth his opinion relating to policy reserves and other actuarial items. "Qualified actuary" was defined as a member in good standing of the American Academy of Actuaries, or a person who has otherwise demonstrated his actuarial competence to the satisfaction of the insurance regulatory official of the domiciliary state. The statement of actuarial opinion must include a paragraph identifying the actuary, a scope paragraph both identifying the subjects on which an opinion is to be expressed and describing the scope of the actuary's work, and an opinion paragraph expressing his opinion with respect to such subjects. Among other things, the opinion paragraph should indicate that, in the actuary's opinion, the reserves and other actuarial items are:

1. computed in accordance with commonly accepted actuarial standards;
2. meet the requirements of the insurance laws of the state of domicile;
3. make a good and sufficient provision for all unmatured obligations of a company that are guaranteed under the terms of its policies; and

4. include provision for all actuarial reserves and related statement items which ought to be established.

An actuary unable to form an opinion should refuse to issue a statement. If the actuary's opinion is adverse or qualified, the actuary should explicitly state the reason(s) for such opinion.

The actuarial profession, through the American Academy of Actuaries, has issued recommendations and interpretations delineating the responsibility of the actuary in developing the actuarial opinion.

In the late 1970s, a number of events gave rise to a movement within the actuarial profession and the regulatory community to expand and formally define the role and responsibilities of the actuary who forms the opinion. This expanded scope of the actuary's function has loosely become known as the concept of the "valuation actuary."

The increased volatility of financial markets and interest rates and the introduction of interest-sensitive products were principal factors initiating this movement. The valuation laws had operated on the theory that fluctuations in interest rates would occur gradually and within relatively narrow ranges; some changes seemed necessary if that theory no longer applied. The product revolution that was taking place in the life insurance industry and in other parts of the financial services marketplace was characterized by increasingly competitive long-term guarantees. It was felt that it was no longer possible to prescribe specific statutory valuation standards appropriate for all products under all circumstances. Another pertinent development during this period was an

acceleration of state enactments of guaranty fund laws for life insurance companies.

These major changes suggested a public-interest need to assign more responsibility to the actuary to professionally judge the adequacy of reserves. This judgment should be based on an analysis of an insurer's risks as opposed to a mere determination that reserves are at least equal to a rigidly defined minimum statutory standard.

This concept of the role of the valuation actuary was adopted in the United Kingdom some years ago. It was adopted in Canada in 1978.

### **Section 3: The Concept of the Valuation Actuary in the United Kingdom and Canada**

In the United Kingdom, the Department of Trade and Industry (DTI), the equivalent of the state insurance departments, requires the appointment of an actuary by the Board of Directors. The appointment must be filed with the DTI. The statutory duties of the appointed actuary are described in the statute and elaborated on by the Institute of Actuaries, the major professional actuarial body in the United Kingdom. The appointed actuary is required to have access to the Board.

The appointed actuary must prepare a certificate stating that liabilities have been valued in accordance with the regulations, that they do not exceed the assets, and that a proper account of the relationship between the nature and term of the assets and liabilities has been taken into consideration. If at any time (including between valuations), the appointed actuary believes: that

premium rates for new business are not adequate; that the current investment policy is inappropriate; or that there is any other jeopardy to solvency, he must make a report to the Board of Directors advising possible courses of action, including a limitation on the volume of business that may be accepted. If the company persists, the appointed actuary must advise the DTI, after so informing the company.

In Canada, a framework which vests responsibility for valuation in a valuation actuary appointed by a life insurance company's Board of Directors was installed in 1978 through major legislative changes. The law does not prescribe a specific valuation standard, but instead requires the valuation actuary to conduct a valuation of the actuarial liabilities of the company, appropriate to the circumstances of the company. The valuation actuary's certificate must be published in the company's annual report, and the auditor is entitled to rely on the opinion. The valuation actuary prepares a detailed report (often 100 pages or more) for the federal Department of Insurance, outlining all details of the valuation.

To arrive at appropriate assumptions, the actuary must review the income-earning potential of the assets and future cash flow expectations. There is no specific requirement to judge the suitability of the investment policy or otherwise to evaluate the relationship of assets to liabilities. Nor is there a requirement to report on difficulties between valuations. The Canadian Institute of Actuaries has detailed financial reporting recommendations supporting its Guide to Professional Conduct.

The Canadian valuation serves the dual purpose of meeting the statutory requirements and presenting a statement based on GAAP accounting. These two purposes are somewhat in conflict.

Two significant developments tend to point the Canadian valuation actuary in the direction of the United Kingdom's appointed actuary. The Canadian Institute of Actuaries appointed a special committee to evaluate the role of the valuation actuary. The committee's report recommends that the opinion should be a solvency opinion; that is, it should be continuous and ongoing, and the valuation actuary should be required to report at least annually to the company's Board of Directors. This would make the valuation actuary's role consistent with that of the appointed actuary in the United Kingdom. The report was adopted by the Council of the Institute and will now be exposed to the membership.

The second event relates to the development of the financial services industry in Canada. In the summer of 1985, the government exposed a paper recommending some sweeping changes in the structure, powers, and administration of insurance and banking institutions. Two banks became insolvent around that time (the first bank insolvencies in over 50 years), and solvency and protection are now uppermost in the minds of legislators. Comments on this government paper were reviewed by a House of Commons committee, which produced a report that will serve as a basis for further discussion and probable action. Two of the committee recommendations are of particular interest to actuaries. The first requires valuation actuaries to report immediately all non-arms-length transactions they become aware of to a Review Committee of the Board of Directors. The second recommendation suggests a responsibility for

valuation actuaries comparable to that of the United Kingdom's appointed actuaries.

#### **Section 4: The Concept of the Valuation Actuary in the United States**

The concept of the valuation actuary first received serious consideration in the United States with the adoption of the 1980 amendments to the NAIC Standard Valuation Law. The increased volatility of financial markets and interest rates in the latter part of the 1970s caused the ACLI to propose changes in the law to make the statutory minimum valuation standards of interest and mortality respond automatically and more rapidly to changing economic and demographic conditions.

The ACLI proposal was an adaptation of the existing valuation structure to rapidly changing conditions, rather than a major reform of valuation practice. Commenting on the proposed 1980 amendments, the Technical Advisory Committee on Dynamic Interest and Related Matters to the NAIC (C-4) Life, Accident, and Health Subcommittee stated:

"The ACLI's proposed dynamic law would not change the basic existing legal structure and tradition. As a result of accepting this practical constraint, the proposal neither coordinates valuation of assets with the valuation of liabilities nor expands the professional responsibility of the actuary signing the actuarial statement of opinion. . . . It is the opinion of the advisory committee that any proposal should neither restrict nor inhibit pursuit of more fundamental solutions of the valuation-nonforfeiture questions and that such eventual solutions may well incorporate requirements for consideration of asset valuation, reliance on professional or regulatory judgment, and recommendations for revised surplus standards."



The clear message from the advisory committee was that the 1980 amendments were only an interim step. The committee felt that the statutory valuation system that had lasted over a hundred years, when interest rates were relatively stable, was inadequate to measure the risks inherent in a volatile interest rate environment.

At about the same time, the Society of Actuaries Committee on Valuation and Related Matters presented a discussion draft entitled, "Valuation, Surplus and Related Problems," which suggested a conceptual framework for the balance sheet of an insurance enterprise and the valuation of policy liabilities. It identified three adverse contingencies, designated as the C-1, C-2 and C-3 risks, for which provision must be made in the balance sheet. The C-1 risk relates to asset losses arising from defaults, destruction of assets, or other declines in asset value other than changes in market value due solely to changes in the prevailing interest rates. The C-2 risk relates to losses arising from pricing inadequacy. The C-3 risk relates to losses resulting from swings in interest rates. This committee is continuing to produce basic and practical research on these risks as well as their combined effect.

The committee's discussion draft gave a good exposition of the C-3 risk. It indicated the problems the actuary faces in determining the degree to which the company is immunized against future interest rate variations through the matching of future asset and liability cash flows. It also pointed to the deficiencies of the current valuation system, which assumes only one path for future events, and suggested the need for actuarial analysis of future cash flows under a variety of interest rate assumptions.

The next significant step in the development of the concept was the December 1983 establishment of the Joint Committee on the Role of the Valuation Actuary in the United States by the boards of the American Academy of Actuaries and the Society of Actuaries. The joint committee was asked to make recommendations concerning the appropriate role for the valuation actuary in the United States and define what is necessary to effect and support this role.

In its final report published in February 1985, the committee's first major recommendation was that each state enact a statute requiring the directors of a life insurance company licensed in that state to appoint by resolution a valuation actuary and to inform the appropriate state regulator of that appointment or any subsequent appointment of a valuation actuary. Valuation actuaries who are members of the American Academy of Actuaries would be subject to its qualification standards to assure that they remain knowledgeable concerning current valuation principles and standards of practice. The committee's second major recommendation was for the establishment of principles and development of practices underlying the valuation of life insurance companies for solvency and solidity purposes. Initially, these principles and practices would be superimposed upon the existing specific legal solvency requirements. In time, the solvency standards promulgated by statute or regulation might evolve to cover only principles, and possibly a minimum standard methodology. The assumptions selected and the associated methods used in making a valuation would be left to the professional judgment of the valuation actuary and would be fully described in the valuation actuary's report to management, which would be available to regulators on a confidential basis.

The proposed valuation system would envision an actuarial opinion to the effect that reserves make good and sufficient provision for all future obligations on a basis sufficient to cover future reasonable deviations from expected assumptions. The opinion would further state that reserves plus additional internally designated surplus make good and sufficient provision for all future obligations on a basis sufficient to cover future plausible deviations from expected assumptions. "Plausible" deviations are assumed to have a much lower probability of occurring than "reasonable" deviations. The amount of internally designated surplus and its determination would be available for review by regulators, but would not be shown separately on the balance sheet. (Note: The ACLI Task Force on the Valuation Actuary does not support the valuation system proposed here. See Appendix 4, section 4.1.)

The committee also recognized and recommended further work to:

1. develop proposed changes in laws and regulations;
2. continue research on valuation principles;
3. educate students and practicing actuaries in the principles and standards of the new valuation system; and
4. develop and codify principles and standards of actuarial practice.

Since presenting its report, the joint committee has been exercising a monitoring and oversight function to ensure that progress on implementing the concept of the valuation actuary proceeds at a satisfactory pace. Meanwhile, work has been continuing within the actuarial professional toward achieving objectives 2, 3 and 4 previously mentioned.

It is clear from all these efforts that no consensus has been reached concerning the theoretical or practical considerations underlying the concept of

the valuation actuary. For example, drafts of papers relating to valuation principles and to standards of practice in connection with the actuarial opinion in the annual statement have generated considerable discussion and differences of opinion. Also, the discussion at a symposium held by the Society of Actuaries in November 1985 indicated that the methodology necessary for implementing the concept of the valuation actuary is far from complete. The symposium participants pointed to a wide variety of existing actuarial techniques and many unsolved problems in connection with the types of analyses that would be required under the concept.

At the regulatory level, some aspects of the concept of the valuation actuary have already been introduced into the valuation system on a limited basis by the NAIC and a few states, especially New York. In 1982 New York enacted legislation requiring the opinion of a qualified actuary as a condition for using higher valuation interest rates (thus creating lower reserves) for certain annuity and guaranteed interest contracts. Insurance Department Circular Letter No. 33 defines "qualified actuary" and contains guidelines that set forth requirements for an actuarial opinion. The guidelines contain very detailed specifications for making tests of future asset and liability cash flows.

In 1985 New York amended its valuation law to encourage use of the concept of the valuation actuary. The statute specifically requires insurers to hold — with respect to annuities, annuity benefits, and guaranteed interest contracts — such additional reserves as the valuation actuary deems necessary to make good and sufficient provision for the liabilities. The current status (1987) of regulations prescribing requirements for the actuarial opinion required by New York are described in Appendix 3.

In December 1983 the NAIC adopted a Universal Life Insurance Model Regulation, which has since been adopted in 11 states. A section of that regulation contains special requirements for interest-indexed universal life insurance policies, one of which is an opinion of a valuation actuary concerning tests of insurance and investment cash flows arising from these policies and related assets. Adoption of this requirement prompted the American Academy of Actuaries to adopt a recommendation and an interpretation relating to actuarial opinions for interest-indexed universal life insurance policies.

In June 1985 the NAIC adopted a Modified Guaranteed Annuity Model Regulation, which permits insurers to sell guaranteed annuities where assets backing the contract are held in a separate account and cash values are subject to a market-value adjustment formula. The regulation calls for the opinion of the valuation actuary that assets in the separate account are adequate to provide all future benefits that are guaranteed.

At its December 1985 meeting, the NAIC considered a recommendation from its Life and Health Actuarial Task Force that the NAIC adopt an actuarial guideline, developed by a special advisory committee, that would define expectations relating to the actuarial opinion. The proposed guideline would appear in the NAIC Financial Condition Examiners Handbook, which is used as a guide for insurance department examinations of insurers. It would describe the kind of actuarial report to management that should be prepared by the valuation actuary to support the actuarial opinion in the NAIC annual statement. The actuarial report would mention the extent to which future insurance and investment cash flows, under a range of future interest rate scenarios, were considered in forming the opinion for interest-sensitive products.

At the same meeting, the ACLI asked for deferral of action to enable a more studied consideration of the proposal. The ACLI statement also indicated concern of some member companies about the relatively high cost of compliance with the proposal, particularly for smaller companies, in view of the lack of established guides and procedures to comply with a number of its requirements. The NAIC decided to delay the implementation of a major part of the proposal and to refer it to two of its task forces to consider its inclusion in the Examiners Handbook for 1986 and in the annual statement for 1987. In the spring of 1986, the proposal was further modified by the NAIC so that it could be entirely contained in the Examiners Handbook without being a part of the annual statement.

#### **Section 5: What is the Concept of a "Valuation Actuary"?**

The concept of the valuation actuary is in an early evolutionary stage in the United States. Even within the actuarial profession, there is no universal consensus on the precise meaning of the concept. However, there are a few basic ideas which most people would agree are a part of the concept of a valuation actuary, namely:

1. The rendering of an opinion as to the adequacy of reserves is so important that the directors of a life insurance company should be more explicitly involved in the selection of the actuary who is given that responsibility. One recommendation is that the directors be required by statute to appoint the valuation actuary, or to designate

an individual to make such appointments, and to notify the state regulatory authority of such appointments or changes in previous appointments.

2. With the increased volatility of financial markets and interest rates, it is no longer satisfactory for actuaries to make judgments about the adequacy of reserves without taking into account, where appropriate, the nature and term of the assets supporting the reserves.
3. Qualification standards for valuation actuaries would be established by the profession and the regulators.
4. Standards of practice would be established by the profession. These professional standards would set out specific considerations that bear on the professional work product of the valuation actuary. Accordingly, the actuary would be expected to utilize all of the appropriate tools available to test and make sound judgments as to the adequacy of reserves, considering the nature and term of the supporting assets.
5. The required public statement of opinion would include a statement that current standards of practice were observed when making tests and forming judgments.

The main objective of the concept of a valuation actuary is to alert management and regulators to potential insurance company insolvencies. As conceived, the concept would provide greater assurance to regulators, to the

public, and to company managements that current standards of practice were followed by qualified actuaries in valuing the liabilities of all life insurance companies in the United States. However, although the expertise of the actuarial profession is expanding, the valuation actuary's capabilities will probably never expand to the point where he or she can give an opinion on solvency with respect to all aspects of a life insurance company. Rather, the valuation actuary's opinion should be regarded as a necessary, but not sufficient, condition to assure company solvency.

One benefit of the valuation actuary concept is that it will lead to greater focus on the actual levels of risk assumed by individual companies. The valuation actuary will be required to use greater skills to determine valuation reserves that properly reflect those risks. This will encourage companies to control risks assumed by using sound investment and management practices.

The reserve levels developed by a valuation actuary could be materially different from reserve levels developed in accordance with statutory minimum reserve standards, which are often intended to be set at very conservative levels. The end result could be a statutory valuation system that encourages risk control within the industry. This would reward those companies who control risk by allowing lower minimum statutory reserves that are more consistent with reserves as developed by a valuation actuary.



## Section 6: Emerging Statutory Valuation Perspectives

Statutory valuation concepts for life insurance companies are moving away from the strictly defined rules of 1985 and earlier and toward a new perspective. Insurers, regulators, and actuaries are beginning to realize that the entire statutory valuation process is intended to meet only one purpose: to provide an ongoing measure of a company's ability to meet the reasonable expectations of its policyholders. Unfortunately, no set of specific rules for calculating reserves can provide such a measure in a dynamic marketplace. Informed and experienced judgment from an actuary highly familiar with the operations of a company is absolutely essential. In current literature, this individual is called the Valuation Actuary.

This chapter will discuss perspectives for the work of the Valuation Actuary which have emerged during the first half of the 1980's. Such perspectives have grown from professional discussions, regulatory activities, industry activities, and product developments in the marketplace. The chapter will cover:

- Valuation implications of new marketing approaches and products which became more popular in the first half of the 1980's,
- Valuation implications of a focus on customers instead of policies in marketing efforts, and a shift from prospectively-calculated reserves to retrospectively-calculated account values,

- Valuation implications of interest sensitivity and product flexibility,
- The natural movement from statutory minimum requirements for reserves to a more encompassing adequacy standard supported by statutory guidelines and an expanded importance for the actuarial opinion, and
- Qualification standards for Valuation Actuaries.

After completing this chapter, it is hoped that the reader will have a better understanding of the emerging valuation issues and potential role of Valuation Actuaries in resolving those issues.

### **Valuation Implications of New Products and Marketing Approaches**

One of the reasons for controversy regarding the Valuation Actuary opinion proposed by the Joint Committee is the difficulty in expressing such an opinion on many of the products introduced during the first half of the 1980's. Some actuaries have suggested that Valuation Actuaries may perhaps be required to take responsibility for irresponsible decisions made by pricing actuaries and marketing officers. While few would contend that the Valuation Actuary's job with respect to these new products is impossible, most would acknowledge that many of the new products present a real valuation challenge. In this section, several representative product challenges are discussed.

Possibly the one product most responsible for recent discussions about an expanded Valuation Actuary role is the single-premium deferred annuity (SPDA). This product's substantial investment orientation and significant market acceptance have created concern among actuaries responsible for statutory valuations. While other annuity products have involved a greater investment orientation, they were generally issued on a group basis and therefore not subject to the standard nonforfeiture law for individual annuities. This law, in effect, requires a book-value cash-out option. While book-value cash-out options are nothing new for the life insurance industry, they have never been provided on products with such substantial investment orientation. Further, many of the SPDA's have been sold by stock brokers and investment firms rather than traditional life insurance agents. Stock brokers are much more accustomed to short-term commitments for their customers and in many cases make their living by trading their customers' investments from one form to another. Since insurance products are generally designed for long-term commitments, life companies that distribute through stock brokers often must modify their product design. SPDA's will certainly be one of the first products to receive significant scrutiny from Valuation Actuaries.

In performing his work on SPDA's, the Valuation Actuary must wrestle with the sensitivity of future benefit cash flows to future interest rates. While published experience statistics are not generally available, one can clearly expect surrender rates on a block of SPDA's to go higher when the interest rate credited to that block is significantly lower than the interest rate available to newly-sold contracts. The extent of those additional surrenders might depend on:

- The actual difference between credited rates and new money rates,
- The distribution system which sold the contract (stock brokers, life agents, or others), and
- Product provisions which discourage surrender (surrender charges, etc.).

Assumptions regarding these additional surrenders will generally be based on limited experience data, and will be highly subjective even when such data are available. Also, statutory reserves for "reasonable" or "plausible" fluctuations in this experience will be sensitive to these assumptions.

Group annuity contracts will also present substantial challenges to Valuation Actuaries. In this discussion, only guaranteed investment contracts issued to employer pension programs will be considered. These contracts are frequently issued exclusively for investment purposes, and few, if any, mortality guarantees are provided. Market-value adjustment provisions are frequently included. These provisions adjust any surrender values for actual or assumed changes in the market values of supporting assets. Such adjustments provide substantial protection against the book-value cash-outs discussed under SPDA's. However, because group annuities are generally purchased by more sophisticated buyers, product provisions are likely to be more complicated and often are unique for each individual group. Finally, group annuities are much more likely to have long-term guarantees.

Valuation Actuaries responsible for group annuities will face substantial challenges in understanding each of the contracts outstanding. Further, asset segmentation will be more critical, because product provisions are likely to be set in light of investment conditions at the time the contract was issued. Any market-value adjustment provisions built into the contracts will be specifically designed for an actual or assumed asset portfolio. Finally, long-term guarantees must be tested against interest scenarios where investment income rates are declining but credited interest rates are not.

Universal life will also pose some interesting challenges for Valuation Actuaries. While most UL products will not be as investment-oriented as group annuities and SPDA's, significant exceptions will exist. Substantial difference in tax treatment between life insurance and annuities will prompt some companies to issue universal life products designed to compete with annuities. Some UL products provide only the minimum death benefits required to qualify as life insurance for tax purposes. Such policies also include all of the state-of-the-art provisions found in SPDA contracts. Thus, the Valuation Actuary for a block of Universal Life must first consider whether his products were sold primarily for insurance or investment purposes.

Flexible premium provisions will complicate the Valuation Actuary's work with Universal Life. If future premiums are considered in the Valuation Actuary's cash flow projections, then liabilities might appear to be quite long indeed. On the other hand, future premiums payments could well be sensitive to future interest rates, so they could easily "dry up" if credited rates are not competitive with new policies. Those actuaries developing asset/liability studies

for Universal Life have found that profit studies which consider all cash flows under a variety of interest scenarios are necessary in order to understand the risks involved in alternative investment and interest-crediting strategies.

This discussion has only scratched the surface of challenges faced by Valuation Actuaries in addressing some of the new products. Vast bodies of literature are sure to develop as Valuation Actuaries address the problems posed by the products of individual companies. Also, as new products are developed, new valuation challenges will be presented. It is absolutely clear that substantial judgment will be required of Valuation Actuaries in addressing the potential risks of each individual product.

#### **Focus on Customers Rather Than Policies**

Life insurance companies have become increasingly customer oriented rather than policy oriented during the first half of the 1980's. The industry has developed "life cycle" products intended to serve the financial needs of customers through changing needs and changing economic circumstances. While a customer orientation is quite logical for the life insurance industry, it has several implications for Valuation Actuaries. Items which might be considered in the Valuation Actuary's cash flow projections include:

1. A retrospective focus on accumulated values rather than a prospective focus on policy reserves.
2. Recognition of guaranteed future purchase options.

3. Recognition of periodic reunderwriting and changing health status.
4. Implications of inadequate accumulated values on future mortality and morbidity experience.

These are but a few of the challenges posed by life-cycle policies. This section will provide a general discussion of the Valuation Actuary's possible considerations in dealing with such policies.

Historically, life insurance has been sold to fill a prospective need for funds at death. Reserves were developed as a result of funding an increasing probability of death with a level and/or limited-period premium payment. Thus, reserves and related cash surrender values were developed as an integral part of the total life insurance product scheme. Increasingly, however, life cycle policies (particularly universal life) view reserves as a retrospective accumulation of excess premium payments. Actuarially, these two views generate the same result. However, practically, a vast difference in perception exists on the part of the policyholder. Policyholders begin to view accumulated values or reserves as a current asset similar to cash in the bank. They see plainly the return realized by that investment and are apt to seek alternative investments when that return is not acceptable. In short, a retrospective focus is likely to divert a policyholder's attention away from long-term objectives (such as death benefits) and toward short-term objectives (such as year-to-year rate of return).

A retrospective policyholder focus has significant implications for valuation actuaries. First, historical lapse and surrender experience on policies sold with a prospective focus has little relevance to expected future experience on policies with a retrospective focus. Surrender rates are certain to correlate positively with the difference between credited interest rates on old policies and such rates available on new policies. Finally, and most obviously, reserves on such policies should consider the underlying assets. Traditional approaches using conservative valuation interest rates are not acceptable for policies with book-value cash out provisions and less significant long-term guarantees. In short, life-cycle policies share many of the same problems discussed earlier with SPDA's.

Guaranteed future purchase options in many life-cycle products create an opportunity for anti-selection which must be recognized by valuation actuaries. Many life-cycle policies provide guaranteed opportunities to increase death benefits with increases in a cost-of-living index. Some policies could also guarantee physical insurability if financial underwriting requirements are satisfied (death benefits equal to some multiple of income). Problems for life-cycle products are not limited to life insurance. The same challenges would be faced with Universal Disability Income, a product being considered by several companies, only to a much larger extent.

In preparing their cash flow projections, Valuation Actuaries may need to address the guaranteed future purchase options in life-cycle products more explicitly than has been the case with more traditional policies. Clearly, some of those policyholders who exercise future purchase options will be selecting



against the company. However, the potential amount of that selection will be dependent upon conditions beyond the company's control. Specifically, future rates of inflation would determine the amount of antiselection available. Such increased risks might be offset to some extent by increased investment income, but there is no guarantee that higher interest rates will cover higher inflation. Also, reserves for such risks must be held outside the policyholder accumulation account, or the higher investment income would be passed along as higher credited interest rates. In short, future purchase options included in life-cycle policies create another interest-sensitive risk which may require consideration in statutory reserve calculations.

One of the attractive features of life-cycle products is the ability to accommodate future changes in insurance amount with one policy. Such changes could well involve new underwriting information which is obtained several years after original issue. If a policyholder's risk classification should change from one underwriting to another, which risk classification should be used by the Valuation Actuary? The initial answer might be that each layer of coverage should be reserved based on its original underwriting classification. Normal deterioration of health status is considered in most select and ultimate mortality tables. However, selective lapsation on life-cycle products could well be greater than that experienced on the more traditional policies used to develop standard mortality tables. Also, Valuation Actuaries could well be required to base their projections on the best currently-available information. Thus, a number of arguments could be made for adjusting statutory reserves with each new underwriting on life-cycle policies.

The final challenge to be discussed in this section deals with life-cycle policies with declining accumulated values. In the past, traditional policies could experience declining net cash values as policy loans began to accumulate. Mortality experience on such policies has always been worse than on policies with no loans outstanding. Similar experience is likely to develop on life-cycle policies with declining accumulated values. Should interest rates decline or cost-of-insurance rates increase, substantial increases in premiums (compared with those illustrated at issue) could be required to keep these policies in force. Whenever an increase in premium is required, a policyholder is likely to re-evaluate his insurance needs and/or shop for alternative products. Those policyholders who pay the higher required premiums are quite likely to be substandard risks where a claim is imminent. Thus, Valuation Actuaries may need to consider an additional element of mortality antiselection in declining interest environments.

A focus on customers rather than policies is probably a positive element for the life insurance industry. Certainly the recently-developed life-cycle products are superior product forms from a number of consumer-oriented perspectives. However, these forms will create a number of challenges for Valuation Actuaries when specific requirements for statutory minimum reserves may no longer be relied upon as a safe harbor.

### **Interest Sensitivity**

A number of valuation problems posed by interest sensitivity have been discussed as related to individual products (SPDA's and Universal Life specifically). All of these problems can be considered as a form of adverse

selection. Adverse selection is possible any time a policyholder can make an election which can be financially adverse to the life insurance company. Policy forms are typically drafted to prevent opportunities for adverse selection. However, conditions often change, creating opportunities for adverse selection which were not contemplated when the policy was originally designed. Such was the case with policy loan provisions on traditional policies, which were not designed to withstand the high interest rates of the early 1980's. Also, legal, regulatory, and market realities often force companies to issue policies with potential opportunities for adverse selection. The standard nonforfeiture laws for individual life and annuities, for example, inforce book-value cash-outs to be available in individual products, even during periods of rising interest rates. Valuation actuaries will face a number of issues created by interest sensitivity and related opportunities for adverse selection.

If mortality and morbidity risks are ignored for a moment, universal life insurance and annuity contract may be viewed as a combination of various financial option contracts. Insurers have the option to adjust the price of the contract by changing the credited interest rate. Policyholders have the option to "put" the contract, or sell it back to the insurer at a given price (i.e., book value or accumulated value). For flexible-premium contracts, policyholders also have the option to purchase more of a contract through future premium payments, often at a pre-set price or yield. Valuation Actuaries are faced with the challenge of predicting activity with respect to these various options under alternative future economic scenarios. Friction within the system will cause some options to be elected or not elected at illogical times considering the best interest of the parties involved. Policyholders may not surrender their contracts

immediately when higher credited interest rates are available elsewhere. By the same token, life companies may not decrease their credited interest rates immediately when market conditions indicate that they should. Thus, cash flow projections for the interest-sensitive characteristics of life policies and annuity contracts must consider the likely activities of a perfect market for the various options involved, as well as the friction inherent in real-world markets.

Valuation Actuaries will undoubtedly develop a number of models to consider interest sensitivity in projections of future credited interest rates and surrender rates. One model used for credited interest rate projection offers the following options:

1. Credited interest rate equal to portfolio earned rate less a spread.
2. Credited interest rate equal to assumed market rate (among competing insurers) for newly issued contracts.
3. Credited interest rate equal to portfolio earned rate less a spread, but not more than X% below or Y% above the assumed market rate for newly issued contracts.

While these options certainly pose some questions of their own, they are useful in demonstrating the potential future impact of alternative interest-crediting strategies. Valuation Actuaries may require a commitment from management to follow some specified interest-crediting strategy before a particular level of reserves can be justified.

A number of formulas have been suggested for interest-sensitive surrender rates. One approach would assume a base level of surrender rates which might be appropriate for a level interest scenario, and then add more surrenders when credited rates lag significantly behind new money rates. Additional surrender rates might be defined with the following formula:

$$\frac{K}{100} \frac{100 (N - C - T) E}{100}$$

where:

- N = Assumed new-money credited rate
- C = Current credited rate
- T = Threshold to consider friction in the system (note that if N-C-T is negative, not additional surrenders are assumed)
- K = A multiplicative constant
- E = An exponential constant

This formula was developed intuitively, and no experience data have been collected to confirm or deny its validity. However, if surrender experience were available, least-squares regression or other methods could be used to fit this or other formulas to actual experience.

While a number of assumptions used by Valuation Actuaries will be interest-sensitive, credited interest rates and surrender rates will be the most obvious examples. Models to deal with such sensitivity will evolve with time, and each model should be tested for reasonableness in applying it to certain situations.

## Product Flexibility

Product flexibility has been discussed as it relates to life-cycle products and customer orientation. However, the mere existence of product flexibility poses a basic valuation question: To what extent should statutory reserve valuations assume that policyholders will take future actions favorable to the life insurance company? Presumably, for example, payment of future premium on universal life is an action favorable to the life insurance company. However, products with substantial interest guarantees on future premium payments may face significant risk in accepting future premium payments. It is clear that Valuation Actuaries must make some assumptions regarding future policyholder actions on flexible premium policies. The key question is to what extent such actions are assumed to select adversely against the company.

While no hard rules can be developed regarding the extent of adverse selection in flexible policies, several items might be considered in all cases:

1. Market Sophistication — All else being equal, sophisticated markets are more likely to select adversely against the company than nonsophisticated markets.
2. Experience with Distribution System — If a company has vast experience with a particular distribution system, then the degree of adverse selection is more predictable. For example, a company that shifts its established distribution system from traditional ordinary life to universal life is likely to experience adverse selection, but within reasonably predictable limits. Companies with new or

experimental distribution systems should probably use more conservative assumptions in this regard.

3. Product Visibility — Certain product provisions are likely to be more visible than others, creating greater opportunity for adverse selection regarding flexibility. For example, a product offering significant interest guarantees on future premium rates is likely to experience more adverse selection than a company offering attractive cost-of-insurance rates on future increases in face amounts.

Consumer behavior relative to flexible product provisions will be hard to predict, and is likely to be a volatile assumption for Valuation Actuaries. Such assumption will, however, be required in the cash flow projections, and related experience should be monitored carefully.

#### **Movement from Statutory Minimums to Statutory Guidelines**

Each of the challenges to Valuation Actuaries which is emerging from these discussions serves to emphasize the importance of professional judgment in the valuation process. Professional judgment has always been important. However, in past years when economic conditions were more stable and market movements less rapid, a portion of the judgment could be legislated in the form of statutory minimum reserves. Statutory reserves were considered to be a conservative test of life-company solvency if conservative methods and assumptions were used. However, the task of developing such conservative methods and guidelines for the vast array of new products is impossible given the political and regulatory environment of the United States. Thus, the movement away from statutory minimums and towards statutory guidelines has begun.

The first attempt at standards of practice for Valuation Actuaries has been developed by the American Academy of Actuaries' Committee on Life Insurance Financial Reporting Principles. Discussion Drafts on these standards of practice were released in July, 1985. A revised version of Financial Reporting Recommendation 7 was included, which provides the extension of standards of practice to add a cash flow opinion to the current actuarial opinion. The cash flow opinion states that anticipated investment cash flows from assets (allocated in an amount equal to reserves), plus anticipated considerations to be received, are appropriate according to present standards of practice to satisfy policy obligations and related expenses of the company under its currently in-force policies. This additional opinion is intended to prompt a move away from statutory minimum reserves and towards guidelines for the Valuation Actuary.

Recommendation 7 further states that examination of future cash flows should include, but not necessarily be limited to:

- Interest rate scenarios selected,
- Objectivity of investment strategies,
- Loans and repayments,
- Lapse, mortality, and expense,
- Tax rates,
- Dividends, and
- Reasonable margins for adverse deviation.

The recommendation goes on to list the various procedures necessary to support the cash flow opinion. In effect, this cash flow opinion, if adopted,



would superimpose a subjective set of Valuation Actuary standards on the current statutory minimum reserves. Clearly, it is intended to be a step toward a completely subjective set of guidelines for Valuation Actuaries, with substantially greater reliance on professional judgment as expressed in the actuarial opinion.

### Qualification Standards

Actuaries who step up to the expanded responsibilities of Valuation Actuary will require a broad range of skills and experience. The American Academy of Actuaries' Committee on Qualifications has issued a discussion draft on qualifications to sign statements as a Valuation Actuary. Such qualifications deal with education, experience, and new developments. Regarding education, the standards state that a Valuation Actuary must have a comprehensive and current knowledge of the subject specifically involved in satisfactorily applying generally accepted actuarial standards of practice to the valuation process. The standards enumerate certain areas of the syllabus of the Society of Actuaries which will be pertinent to the valuation process. However, substantial emphasis is placed on updating and maintaining knowledge by continued study and practice. In short, the education process for Valuation Actuaries will be continuous and comprehensive.

Regarding experience, Valuation Actuaries are expected to have at least three years of reasonably current experience involving significant responsibility for valuation. Finally, Valuation Actuaries will be responsible for acquiring knowledge on new developments. In summary, the American Academy of Actuaries appears intent upon imposing high standards of qualification on those serving as Valuation Actuary.

## Conclusion

This chapter has discussed a number of emerging valuation perspectives. The reports or draft reports of a number of professional committees have been considered. Valuation problems posed by several recently introduced products have been discussed. Valuation implications of interest sensitivity, customer focus, and product flexibility have been considered. Finally, the movement away from statutory minimum reserves and towards greater reliance on the opinion of a Valuation Actuary has been reviewed. These emerging perspectives will become increasingly clear as legislation to expand the Valuation Actuary's role is developed. A perspective on the evolution of that role and the objectives for its expansion should be helpful to both those who serve as Valuation Actuaries and those who rely on their work.