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"Travel Time" Cont'd.

probably sit for at least one Fellowship exam this fall as well as the remaining Associateship exams.

It is still too soon to say that the number of new ASAs will correct itself in the next few exam sittings, but that scenario would be consistent with the available evidence. In any event, the spring 1987 results indicate that more than three times as many candidates benefited from the new system compared with the number who were adversely affected.

The E&E Committee will continue to monitor this situation and the general effect of the new system on "travel time" through the exams.

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New Books Added to SOA Library

The following is a partial list of additions to the SOA library. Members may borrow library books by contacting the Research Librarian at the Society office.

Andrews, George H. *Actuarial projections for OASDI program of the United States of America*. 1987.

CCH *guide to employee benefits under 1986 tax reform*.

EBRI. *The changing profile of pensions in America*. 1985.

Employee benefit plans: a glossary of terms. 1987.

Fabozzi, Frank J., ed. *Advances in futures and options research, vol. 1, parts A & B*. 1986.

Granger, C.W.J. *Forecasting in business & economics*. 1980.

Levy, Haim, ed. *Research in finance, vols. 1 & 2*. 1980.

Meares, Charles. *Looking back: a memoir of New York Life*. 1985.

Mehr, Robert I. *Fundamentals of insurance*. 2nd ed. 1986.

Mehr, Robert I. and Gustavson, Sandra. *Life insurance: theory and practice*. 4th ed. 1987.

Library Donations

The SOA Library greatly needs back issues of the *Astin Bulletin* published by the IAA. All issues will be appreciated. Please send to: Society of Actuaries, Attn: Librarian, 500 Park Boulevard, Itasca, IL 60143.

Universal Life Reserves — Should Long-Term Sufficiencies Offset Short-Term Deficiencies?

by Douglas C. Doll

In June 1987 the American Academy of Actuaries' Universal Life Task Force (under the Committee on Life Insurance) issued a report on the topic of Universal Life Valuation and Nonforfeiture. One of the valuation issues discussed in the report was whether long-term sufficiencies should offset short-term deficiencies.

I would like to describe that issue in this article. I hope my thoughts will stimulate discussion about when, if ever, such offsets are appropriate for statutory valuations. Except for direct quotations from the report, any opinions given are mine and not the opinion of the Task Force.

The report includes the following paragraphs:

The issue of prefunding cash value increases in reserves has been addressed by the NAIC on more than one occasion in the past several years. So far, an explicit requirement for such prefunding has not been stated either in the Standard Valuation Law or in an Actuarial Guideline. We note that some actuaries believe the Standard Valuation Law should be interpreted to require such prefunding. Two arguments in favor of such prefunding are as follows: (1) "Life insurance and endowment benefits" includes intermediate cash values as part of the benefits; and (2) the Standard Valuation Law prescribes reserves for indeterminate premium plans must be computed by a method "consistent with the principles of this Standard Valuation Law." The method prescribed for policies providing uniform premiums and benefits provides adequate reserves for short-term as well as long-term benefits.

When benefits and/or premiums become non-uniform, additional methodology is required to assure short-term benefit reserve adequacy.

Arguments against such prefunding include: (1) "life insurance and

endowment benefits" does not include intermediate cash values; (2) standard actuarial practice does not include such reserve considerations; and (3) the "good and sufficient" portion of the actuarial opinion is sufficient to require adequate overall reserves.

Consider the simple example of a policy where the policy value and the cash surrender value both equal \$1.00. If the guaranteed interest rate is 4% and the policy matures in 10 years, the guaranteed endowment is \$1.48. The present value of this endowment, at a 6% valuation rate, is \$.83. Let's now change the guaranteed interest rate to 10% for two years, and 4% thereafter. The guaranteed endowment becomes \$1.66 and the present value at 6% becomes \$.92. Note that adding the 10% interest guarantee increased the calculated reserve from \$.83 to \$.92, but that the "final" reserve was unaffected, because it was equal to the \$1.00 cash surrender value in both cases. What happened in the second case was that the interest "sufficiencies" in years 3 through 10 are more than enough to offset the "deficiencies" in years 1 and 2.

The Universal Life Model Regulation has the same effects. A valuation basis more liberal than the ultimate product guarantees produces future "sufficiencies" that can be used to offset short-term "deficiencies." For example, a plan with an interest guarantee of 10% for 3 years and 4% thereafter may have no extra reserves created by the 10% guarantee if the valuation interest rate is 5%. The 1% sufficiencies beyond year 3 will offset the deficiencies in the first 3 years.

The Universal Life Task Force took note of its scope as described in its December 1986 preliminary report: "A key criterion for evaluating proposed revisions will be that they produce

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Universal Life Cont'd.

results consistent with results for otherwise similar fixed benefit fixed premium plans. Consistent results would imply that methodology is consistent with the Standard Valuation and Nonforfeiture Laws."

Although the Task Force noted that "the traditional reserve methodology in certain cases may cause short-term reserve inadequacy," it did not find requirements for additional reserves in these cases for fixed premium plans. Therefore, the Task Force recommendation was: "We believe that the appropriate place to address the general issue of cash value prefunding is not in the Universal Life Model Regulation, but in a regulation, guideline, or law applying to all types of life policies. Whether and how this can be accomplished is beyond the scope of our report."

Recently, regulators have become concerned about reserve adequacy of universal life, especially single premium universal life. What causes short-term deficiencies for universal life? Anything that increases the cash value quickly. The most common causes are short-term guarantees of current mortality and interest credits, the grading off of surrender charges, and the payment of persistency bonuses, e.g., returning mortality charges at the end of a given policy year.

Short-term deficiencies are not unique to universal life. They can occur on traditional whole life policies, for example, if cash values are graded from minimum to net level over a short period of time. They can also occur on graded premium whole life products that mimic term insurance in the early durations. For these policies the gross premiums in the early durations may be less than statutory mortality, but net premiums may be less than gross premiums when calculated on a present value to maturity basis. (Actuarial Guideline IV prohibits using long-term sufficiencies to offset short-term deficiencies for term insurance, but its scope says that it is applicable only to term life insurance without cash values.)

The regulators have attempted to deal with the issue of short-term deficiencies on a problem-by-problem basis. When the 1980 amendments to the SVL were adopted, the "modified premium whole life" version of deposit term was considered a valuation

problem—a special paragraph was added to Section IV of the SVL to require deposit term reserves to grade to the cash value at the end of the term period.

The committee developing the new valuation law, although focusing primarily on valuation actuary/cash-flow testing requirements, will have to deal with the issue of short-term deficiencies. However, it may be several years before a new valuation law is adopted. Meanwhile, we can expect to see several regulatory proposals to address specific concerns. A general solution would be one that directly requires reserves to be large enough so that there are not short-term deficiencies. Proposals to date have attempted either to address specific sources of short-term deficiencies or to eliminate sources of long-term sufficiencies. For example, the NAIC's Actuarial Task Force had proposed an extra reserve requirement for product guarantees more liberal than the minimum valuation basis. This proposal currently is on hold. The California Insurance Department is proposing to eliminate one source of long-term sufficiencies on universal life by requiring the valuation interest rate to be no larger than the interest rate guaranteed in the policy. The Indiana Department of Insurance has included the same requirement in a bulletin dated July 27, 1987.

It would be interesting to have some response to this article on the following:

1. Are reserves for short-term deficiencies currently required by the SVL? By standard actuarial practice?
2. How should such extra reserves be calculated? Should all products be covered?
3. May the valuation interest rate exceed a product's guaranteed interest rate? Note that this currently is accepted practice for annuities.

Responses to these questions may be sent to me at my *Yearbook* address. I will write a follow-up article for *The Actuary* if responses are sufficient.

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Recent Changes in Course 150 – (Actuarial Mathematics)

by Curtis E. Huntington

Candidates for an Associateship Examination were presented with written-answer questions (previously called essay questions) for the first time in more than 15 years last May. Labeled as an "experiment," the questions appeared on the Course 150 examination in Actuarial Mathematics (previously called the Part 4 examination in Life Contingencies).

Since the subject of contingency mathematics in the areas of life and health insurance, annuities, and pensions forms the foundation for most actuarial work, both students and members have expressed an interest in the background of this development.

Essay questions used to appear regularly on the Life Contingencies examination. Extensive analysis of the results on both the multiple-choice and the essay portions were performed by E&E Committee members. It was determined that final pass results based solely on the multiple-choice paper were not significantly changed when the essay results were added. Because of the sizable time commitment required from volunteers to create these twice-a-year examinations, the decision was made in 1971 to eliminate all essay questions from the Associateship examinations.

Since then, several things have changed. In 1984, the textbook for this subject was changed to the new *Actuarial Mathematics* text that uses a stochastic approach integrating life contingencies into a full risk theory framework. (Note: The new textbook has just been produced in a casebound edition and is available from the Society for \$65.) Second, calculators have been allowed. Third, a Flexible Education System (FES) has been implemented for the Associateship designation (formerly Parts 1 through 5). And, finally there has been a perceived significant deterioration in communication skills evident on Part 6, the first essay examination.

Along with these developments, several topics in Actuarial Mathematics do not lend themselves to being

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