FINAL

VALUATION TECHNIQUE PAPER N^{o} 11 – VALUATION OF UNIVERSAL LIFE POLICY LIABILITIES

COMMITTEE ON LIFE INSURANCE FINANCIAL REPORTING

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MEMORANDUM

TO: All Members and Students of the Canadian Institute of Actuaries

FROM: J. Helmut Engels
Vice-president

DATE: December 15, 1999

SUBJECT: Final Standard on Valuation of Universal Life Policy Liabilities

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The exposure draft of Valuation Technique Paper n^{o} 11, "Valuation of Universal Life Policy Liabilities," (VTP 11) was distributed on September 15, 1999. This exposure draft was discussed at the Seminar for the Appointed Actuary in September 1998.

As a result of comments received, the Committee on Life Insurance Financial Reporting made some minor editorial changes. None of these changes affected any material requirements in the standard.

Following the interim rules for due process, the attached document was approved by the Committee on Life Insurance Financial Reporting and the Committee on Adoption of Standards of Practice. At its meeting on November 24, 1999, the CIA Council gave final approval to the VTP 11 standard of practice.

This standard is effective for the 1999 year-end valuation of liabilities.

Members who have questions about this VTP should bring them to the attention of Lesley Thomson, chairperson of the Committee on Life Insurance Financial Reporting, at her *Yearbook* address.

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VALUATION TECHNIQUE PAPER NO. 11 – VALUATION OF UNIVERSAL LIFE POLICY LIABILITIES

I. INTRODUCTION

A. Highlights

- The general method of valuation described in the June 1999 Discussion Draft of the Consolidated Standards of Practice for the Valuation of Policy Liabilities of Life Insurers ("draft life CSOP") is to be used.
- Some products could be valued using approximations (some methods are listed in the appendix).
- Use of a discounted present value calculation (e.g., PPM) with prior scenario testing would be considered an appropriate valuation method.
- Prescribed interest rate scenarios listed in the draft life CSOP plus additional scenarios should be tested.
- Unless the actuary can justify otherwise, the actuary should assume that lapse rates for policies with level cost of insurance (COI) charges will be consistent with the most recent CIA study of Lapse Experience Under Lapse-Supported Policies.
- Guidance is given for setting expected assumptions and applying margins for adverse deviations for premium persistency, partial withdrawals, transfer of funds and premium deposit allocations.
- Due to the complex interrelationship between assumptions, sensitivity testing may be required to determine the proper application of margins for adverse deviations for a number of assumptions.
- Unless the actuary can justify otherwise, when a projected fund reaches zero, the actuary should assume that the policyholder will pay sufficient premiums in order to avoid additional lapses due to insufficient funds.
- Unless the actuary can justify otherwise, for policies containing registered funds, the actuary should assume that no additional lapses will occur upon registered fund maturity if the plan design allows continuation of the policy beyond that point.
- Unless the actuary can justify otherwise based on factors consistent with policyholders' reasonable expectations, the investment spread should not be assumed to increase in the future and it should not be assumed that investment options that are currently available to policyholders will be withdrawn by the insurer in the future.

B. Scope

This is a standard of practice for the valuation of universal life policy liabilities to be used in Canadian financial statements prepared in accordance with generally accepted accounting principles (GAAP).

Universal life is the generic name given to a plan of insurance where premiums are deposited into one or more funds and charges for insurance and expenses are deducted from these funds. The timing of premium payments may be fixed or variable and is not necessarily related to the timing of the deduction of insurance and expense charges.

The degree of risk transfer allowed for in the design of a universal life policy is important for the valuation. At one extreme, a universal life policy could transfer no risk to the policyholder and be similar, for valuation purposes, to a fully guaranteed nonparticipating policy. At the other extreme, it could transfer almost all the risk to the policyholder and be similar, for valuation purposes, to a traditional participating policy. Most universal life policies will fall somewhere between these two extremes.

II. VALUATION METHOD

A. Method to be Used

The general method of valuation, as described in the draft life CSOP, is appropriate for the valuation of policy liabilities of universal life policies. Under the general method of valuation, the value of policy liabilities is determined by analysis of projected asset and liability cash flows under the actuary's expected experience scenario and various interest rate scenarios. Under the interest rate scenarios, appropriate margins for adverse deviations are applied in the projection of asset and liability cash flows. Adjustments are made to the starting assets in each scenario in order to produce zero surplus at the end of the projection period, and the scenario liability is then the statement value of the assets[1] that produce this result. The value of policy liabilities is set by reference to these scenario liabilities, with appropriate reflection of the impact of the policyholder pass-through features. Section II.C. of this standard provides a detailed description of the application of the general method of valuation to the valuation of policy liabilities of universal life policies.

The general method of valuation combines projected liability cash flows for all policies being valued in order to determine the appropriate provision for interest rate risk. Since the general method of valuation requires a significant amount of scenario testing and some universal life policy types may require additional sensitivity testing for some assumptions, it may be necessary to perform this testing prior to the valuation date and then use a discounted present value method calculation (e.g., PPM) for the valuation that closely reproduces the result. This procedure would be considered an appropriate valuation method. However, the actuary should adjust for any material changes that have occurred between the time of the scenario testing and the valuation date.

B. Term of the Liability

Some plans include investment fund options which may include segregated funds. Care should be taken in determining the term of the liability for these funds. For example, the policy may be essentially a stand-alone annuity (or segregated fund). In this case, the term of the liability should be the term appropriate for annuity products (or segregated funds), unless extending the term would increase the amount of the liability. However, for most universal life policies, the investment funds are used as investment alternatives within what is primarily a life insurance policy. In this case, the term of the liability for the investment funds would be the same as that of the life insurance policy.

C. Calculation Approach

The general method of valuation combines the projected liability cash flows for the policies being valued and combines all asset cash flows for those policies. The combined asset and liability cash flows are then used to calculate a liability in the aggregate for those policies.

The following is the approach to be used in calculating future cash flows:

First, determine the expected experience scenario liability amount (steps 1 to 4):

1. Make assumptions about the expected experience scenario:
    - All elements of the expected interest rate scenario (reinvestment/disinvestment strategies, reinvestment interest rate assumptions, rates of general inflation)
    - Rates of income and capital appreciation/depreciation on non-fixed income assets[2]
    - Mortality experience

[1] The statement value of identified assets includes (a) the book value of the identified assets, plus (b) accrued interest on those assets, minus (c) any accounting loan loss provision on those assets, minus (d) deferred realized gains that have been created by the sale of assets previously backing the block of business being valued.

[2] The draft life CSOP provides guidance.

- Expected benefit pattern
- Expense assumptions
- Policy lapse experience
- Probability of premium payment
- Partial withdrawal pattern
- Transfer of funds between investment fund options
- Premium deposit allocation between investment fund options

2. Determine the expected policy components consistent with the expected experience scenario[3]:
   - Expected premium loading
   - Expected cost of insurance (COI) charges
   - Expected expense charges
   - Expected investment rates credited to policyholder funds
   - Investment or persistency bonus rates
3. Starting with the current policyholder fund balance, current assets, expected policy components and expected experience assumptions, project future policy elements and future asset and liability cash flows. Due to the interrelationship of assets, spread and credited rates (and/or other policy components), this process may need to be done duration by duration instead of policy by policy.[4]
4. Using these asset and liability cash flows, determine the expected experience scenario liability amount.

Next, perform scenario testing for a number of interest rate scenarios.[5] Repeat steps 5 through 9 for each of these scenarios.

5. Determine the assumptions for the interest rate scenario. Revise the expected experience scenario assumptions to be consistent with these interest rate scenario assumptions in order to obtain the expected assumptions for the scenario. Policyholder behavior may vary with the assumptions in each scenario.
6. Apply margins for adverse deviations to the expected assumptions for the scenario in order to determine the valuation scenario assumptions. Sensitivity testing may be required in order to determine how the margin for adverse deviations should be applied (i.e., to ensure that the margin increases the amount of the liability). The proper application of the margin may be different for different policies and may also be different for different scenarios. For example, margins on partial withdrawal rates might be positive for scenarios where reinvestment rates increase and negative for where reinvestment rates decrease.

[3] For some types of policies, credited rates or other policy components may be dependent on elements of the projections done in step 3. In these cases, steps 2 and 3 will be closely integrated and could involve an iterative approach.

[4] Consider a matrix, where the rows are each policy and the columns are each duration. The traditional way of valuing would be to calculate cash flows for each row, then add them up to obtain total cash flows by duration. The process described above would require a calculation of cash flows column by column instead of row by row. After each column is calculated, the aggregate liability cash flow can be combined with the aggregate asset cash flow to determine the fund credited rate for the next duration.

[5] This would include, but not be limited to, projections using the prescribed interest rate scenarios described in the draft life CSOP.

7. Revise the policy components to be consistent with the interest rate scenario and the valuation assumptions (i.e., including margins for adverse deviation). This process should take into account policyholders' reasonable expectations, including:
   - The insurer's formal or informal policy for making changes to policy components
   - Policy guarantees, contractual limits or market pressures which may limit the insurer's freedom to make changes
   - Practical limitations (e.g., systems and administrative) that may impair the insurer's ability to make timely changes
   - The insurer's recent practice in adjusting policy components
   - Illustrations provided to policyholders
8. Starting with the current policyholder fund balance, current assets, valuation policy components and valuation scenario assumptions, project future policy elements and future asset and liability cash flows.
9. Using these asset and liability cash flows, determine the valuation scenario liability amount.
10. Determine the final liability amount based on the scenario testing of steps 5 through 9.[6]

The differences in liability amount between the final liability amount and the expected experience scenario liability amount represent the provision for adverse deviations.

D. Treatment of Segregated Funds

The GAAP accounting treatment of segregated funds is to hold this liability off the balance sheet. The liability to be held in the insurer's general account is determined by deducting the amount held in segregated funds from the final liability amount (as calculated above).

E. Modelled Cash flows

The actuary may choose to use a model office approach instead of a policy-by-policy calculation for a number of reasons (such as complexity of the product or resources available). The use of a model does not change the underlying valuation process and calculation approach.[7]

Care should be taken to ensure that the model office approach gives results that do not materially differ from the policy-by-policy approach. Therefore, the construction of the model should take into account any policyholder behavior (e.g., lapse rates on minimally funded policies vs. lapse rates on maximum funded policies) that would materially impact the amount of the liability. The actuary should also be careful where product features, such as bonus interest credits that are contingent on the amount of premiums paid or the size of the policyholder funds, may result in a material difference in the amount of the liability when modelled as compared to policy-by-policy.[8]

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[6] The draft life CSOP provides guidance on determining the liability based on the results of scenario testing.

[7] There is considerable literature on the modeling of life insurance. Two sources which provide useful background information for modeling universal life are:

– Primer on Dynamic Solvency

– Record of Society of Actuaries, Volume 12, Number 2, pages 991-997

[8] If a model assumes all policies are average funded, bonus interest credits dependent on fund size may not apply. If the actual in-force is made up of some maximum funded policies and some minimum funded polices, then it is quite likely that the maximum funded polices will make up most of the total policyholder funds and that they will receive the bonus interest credits.

III. APPROXIMATE METHODS

The valuation of universal life policies is often very complex because of the large number of assumptions required and the interrelationship among assumptions. As a result, many actuaries will wish to use approximate methods, such as fund-based methods. These methods offer the advantages of simplicity, ease of explanation and ease of verification.

It is the responsibility of the actuary to justify that the use of any approximation is appropriate and does not materially affect the amount of the policy liabilities. For universal life, it is generally more difficult to justify the use of an approximation when there are material differences between experience and the reflection of that experience in policy components.

A few approximation methods are given in the Appendix. Each method outlines the circumstances in which the use of the method might be appropriate.

IV. POLICYHOLDERS' REASONABLE EXPECTATIONS

The application of the general method of valuation to universal life policies has many elements in common with its application to participating insurance or to adjustable nonparticipating contracts. An important concept in the valuation of such policies is that the liability should make a provision for the policyholders' reasonable expectations with respect to guaranteed benefits, non-guaranteed benefits and premiums.[9]

V. EXPECTED ASSUMPTIONS

Expected assumptions for mortality, investment rates, expenses, asset defaults and policy lapse will be required as they would be for the valuation of any life insurance policy. This section is primarily concerned with the special features of universal life policies that need to be taken into account when setting the expected assumptions. For example, universal life policies require a premium persistency assumption.

A. Interest Rate Scenarios

A number of scenarios will need to be tested in order to determine an appropriate provision for interest rate risk. The expected experience scenario should project that the current reinvestment rates remain unchanged. The interest rates scenarios prescribed in the draft life CSOP should be tested and will result in a minimum liability amount.

Depending on the extent of the testing, the liability determined by the scenario testing may or may not be based on the scenario that produces the highest liability.[10]

B. Mortality Assumption

Some universal life designs create the possibility for antiselection that is not usually found in other policy types.

The actuary should consider the antiselection possible when the policyholder treats the plan as a yearly renewable term (YRT) policy, and pays the minimum amount of premium necessary to keep the contract in force. Evidence of this activity would require an assumption for antiselection.

Usually, mortality studies of standard underwritten policies would exclude mortality from extended term and reduced paid-up non-forfeiture options. The mortality under these options has generally experienced higher than standard rates. Under universal life policies, it may not be possible to separate the coverages that would fall under these non-forfeiture options. The actuary should judge the extent to which this might impact the overall mortality result of universal life policies.

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[9] Additional guidance on policyholders' reasonable expectations can be found in the draft life CSOP and in Valuation Technique Paper N° 10.

[10] The draft life CSOP gives some further guidance on establishing the liability amount based on scenario testing.

If the policy allows increases in coverage without underwriting, the policyholders that elect the increased coverage could exhibit higher mortality than on the policies where no election is made. The actuary should judge the extent to which this antiselection might impact the mortality assumption.

C. Expense Assumption

Universal life unit expense assumptions may be different from unit expense assumptions on traditional policies for a number of reasons. Universal life policies generally have additional complexities and options allowed to the policyholder that require additional administrative effort. The actuary should consider the rate at which policyholder options (premium dump-ins, *ad hoc* requests to transfer funds between investment funds, changes in amount of insurance, in-force illustration requests, etc.) might be exercised when choosing expense assumptions. Other additional expenses (such as exempt testing, annual policyholder reporting, automatic policy modifications, etc.) should also be considered.

D. Policy Lapse Assumption

There are some considerations for lapses of universal life policies that are not necessarily applicable to other policy types. Some of these considerations are as follows:

- Policy design features, such as surrender charges, persistency bonuses and access to cash values without requiring policy surrender
- Policyholder behavior may be affected by the taxation aspects of the policy
- How the policies are being marketed (e.g., maximally funded policies may be marketed as long-term investment contracts, while minimally funded level COI policies may be marketed as term to 100)
- Form of agent compensation (e.g., commissions may be payable on premium deposits or on fund accumulations, which may provide different incentives to the agent)
- Policyholder behavior may vary under different interest rate scenarios

The existence of heavy back-end surrender charges may create reluctance on the part of the policyholder to surrender the policy. If the back-end surrender charges are severe enough, it may create a cash surrender value cliff, with lower than normal lapse rates prior to the end of the surrender charge period, followed by heaped lapse rates when the surrender charge scale ends. A persistency bonus may create a similar effect. For policies that have level COI charges and where the policyholder can access the cash value without surrendering the policy, the existence of cash values may result in partial cash surrenders instead of full policy surrenders.

Some universal life polices have significant premium deposits in addition to the minimum premiums required for the continuation of the insurance. These policies may be attractive to the policyholder due to the ability to defer tax on investment income. The policy lapse rate may be affected by this ability to defer tax and by the reluctance to pay tax on surrender of the policy.

When the product contains features that create significant lapse support (such as level COI charges or negative interest spreads), the valuation lapse assumption should comply with standards of practice for lapse-supported products. The existence of level COI charges creates an implicit permanent surrender charge. Unless the actuary can justify otherwise, the actuary should assume that level COI policy lapse rates will be similar to the lapse rates in the most recent CIA study of Lapse Experience Under Lapse-Supported Policies.[11] The existence of cash surrender values is not, by itself, sufficient justification for the use of higher lapse rates.

[11] The best information currently available for lapses on lapse-supported products is the most recent study published by the CIA. Many level COI policies have the right to withdraw funds and continue the policy as a minimally funded term to 100 policy. For this type of policy, there would usually be no justification for using policy lapse rates similar to cash value policies unless reliable experience is available.

If a projection of policyholder fund balances results in a zero balance, an assumption regarding the continuation of the policy beyond that point is required. For policies where there is little incentive for the policyholder to maintain the policy in force, a heaped lapse rate may occur at that point. This assumption should be consistent with standards of practice for antiselective lapsation.[12] For policies where there is an incentive to keep the policy in force (e.g., many level COI policies), unless the actuary can justify otherwise, the actuary should assume that a heaped lapse rate will not occur and that the policyholder will pay sufficient premiums in order to avoid an additional lapse due to insufficient funds.[13]

Another aspect of the policy lapse rate is the relationship of the credited rate to external interest rates. For example, if an insurer is crediting interest based on portfolio rates, then the policy lapse rates need to be sensitive to the external interest rate environment. In this case, the actuary should consider the possibility of higher policy lapses occurring if new money interest rates were to rise. For some policies, there may be a right to transfer funds into other funds. Instead of the policy lapsing in this situation, transferring funds may satisfy the policyholder's investment objectives.

If any of the funds are registered, then those funds must be matured by the latest retirement age. It may not be necessary to terminate the policy at that point if the plan design allows it to continue on a non-registered basis. For policies where there is an incentive to keep the policy in force (e.g., many level COI policies), unless the actuary can justify otherwise, the actuary should assume that no additional lapses will occur at maturity of the registered funds, if the plan design allows continuation of the policy.

E. Premium Persistency and Partial Withdrawal Assumptions

An important assumption for the valuation of a universal life policy is the future premium deposit assumption. The most sophisticated valuation would determine the situation for each policy individually. It is more likely that policies will be grouped for this assumption. The number of groupings will depend on how the product has been marketed or any other identifying characteristic.

Universal life policies have a variety of premium requirement features. Some of these features are as follows:

- No specific required premium is payable.
- Premiums are required between minimum and maximum premium ranges.
- Minimum premiums are required for a period of time and then no specific minimum premium is required.
- There is a specific required premium that must be paid and guaranteed by the insurer.
- There is a specific required premium that must be paid but adjustable by the insurer.

It could be argued that some product design features will result in higher lapse rates than term to 100 without values. For example, some products have surrender bonuses that may encourage lapses. However, the tax payable on surrender may discourage lapses. The actuary should use care in determining the impact of policy design on policyholder behavior.

[12] If an assumption that all policies lapse when the fund reaches zero does not produce a materially different result, then it would be appropriate to assume that all policies lapse at that point.

[13] Many level COI policies allow the policyholder to access the cash value and keep the insurance in force. This means that the decision to keep a minimally funded level COI policy in force will most likely be similar to a decision about a term to 100 policy with no values. An argument for allowing heaped lapses at the point where funds reach zero is that the insurance may not be needed at that point and the policyholder may no longer want to pay for it. However, lapses prior to this time could be below the level expected for term to 100 policies, since no premium is required to pay the cost of insurance. In the absence of experience, it is difficult to determine the impact of these offsetting considerations. Due to the sensitivity of the lapse rate for many of these policies, significant diversity of practice could result if a heaped lapse assumption were permitted without justification based on experience.

No premium persistency assumption is necessary when there is a specific required premium payable. In other situations, a premium persistency assumption is needed, subject to the limitations specified in the policy design.

When premiums are flexible, the future premiums that are assumed may produce significant differences in liabilities for different assumptions. The assumption chosen should be consistent with the information available from the policy administration system. The actual premium received could be compared to the amount of premium that would have been generated by the future premium assumption applied to the prior period in-force policies. This analysis may be valuable in determining the appropriateness of the future premium assumption.

Low premium persistency rates could be expected if the following are present:

- Marketing material places emphasis on premium flexibility
- Sales illustrations feature quick-pay premiums (which could lead to low premium persistency rates in later years)
- Presence of large lump sum premiums in the past
- Interest rate crediting is based on portfolio rates and new money rates spike upwards

High premium persistency rates could be expected if the following are present:

- Most business is pre-authorized chequing
- Marketing material places emphasis on credited interest rates, tax advantages and savings aspects of the plan
- Interest rate crediting is based on portfolio rates and new money rates decrease

Policyholder behavior may be affected by the interest rate scenario. For example, the actuary would assume that, during the period when minimum interest rate guarantees are being credited, the policyholder will tend to increase premium persistency.

The partial withdrawal assumption may be as important as the premium persistency assumption since both affect the size of the fund balance for the policy. Considerations for choosing partial withdrawal assumptions are similar to the considerations for choosing premium persistency assumptions.

F. Transfer of Funds and Premium Deposit Allocation Assumptions

Some universal life policies have multiple investment fund options and may allow transfers among investment funds. For some policies, material differences in investment spread may exist among the funds, especially when minimum credited rates exist on certain funds.

When material differences in spread occur, assumptions for transfers among funds and for the allocation of future premium deposits among funds are likely to have a material impact on the valuation.

In general, the actuary should assume that policyholders will tend to act to the insurer's detriment, to the extent that they expect to benefit. This antiselection is an important consideration in setting assumptions about allocations among funds. Tax consequences of policyholders' actions should also be considered when the policyholder taxation of funds is different (e.g., some policies have both segregated funds and general account funds in the same contract).

It should not be assumed that investment fund options that are currently available will be withdrawn by the insurer in the future if that would be inconsistent with policyholders' reasonable expectations.

VI. POLICY COMPONENTS RELATED TO EXPECTED ASSUMPTIONS

Policy components consist of COI charges, expense charges, premium loadings, investment rates credited to the policy and any other charge or credit to the policy.

For some universal life policies, some of the policy components are guaranteed. For these components, the guaranteed rates should be used in the valuation if it is consistent with policyholders' reasonable expectations.

For policy components that are not guaranteed, it is necessary to determine a proper set of policy components that are consistent with each scenario and the assumptions used in the scenario.

In order to determine appropriate assumptions for policy components, the actuary should understand the insurer's philosophy, policies and practices with respect these items.

A. Expected Policyholder Credited Rate

When credited rate guarantees are not present, it may be possible to relate the expected policyholder credited rate to the assumed asset investment rate. When credited rate guarantees are present (such as linkage to an external index) and asset investments are chosen to match these guarantees, then it is also possible to relate the expected policyholder credited rate to the assumed asset rate.

It may be necessary to establish expected policyholder credited rates unrelated to the asset investment rate. For example if,

- management tends to set rates based on the declared rates of other insurers,
- the policyholder credited rate is linked to an external index and asset investments do not match these guarantees.

In this case, a larger number of interest rate scenarios should be tested.

The difference between the assumed investment rate and the policyholder credited rate determines the amount of the "spread" available in the future, which may be a key element of the valuation. It may be inappropriate to assume that the current level of this spread will continue to be available for the following reasons:

- Future competitive pressures may reduce the spread available
- Contractual guarantees, especially minimum credited rates, may reduce the spread available under some interest rate scenarios.
- Assets and liabilities may become mismatched, causing a potential decrease in spread.

Normally, it should not be assumed that the spread will increase in the future. Current rates being credited should be assumed to create policyholders' reasonable expectations that the current level of competitiveness in the credited rates will continue.

In some cases (e.g., if a credited rate decrease has been temporarily delayed), it may be appropriate to assume that the spread will increase, in order to reflect the insurer's plan to rectify the situation. However, the actuary should be satisfied that the insurer, by its delay, has not effectively changed policyholders' reasonable expectations. This is meant to be consistent with a planned change in dividend scales for participating policies. However, usually the reaction time for universal life credited rate changes is considerably shorter than the reaction time for participating insurance dividend scale changes. Therefore, the actuary should exercise caution in assuming that the spread will increase in the future.

B. Expected Cost of Insurance Charges

For some policies, the COI charges are guaranteed, and the expected COI charges would be equal to the guaranteed rates. For other policy types, it may be possible to relate the expected COI charges to the expected mortality experience. One complication is that the expected COI charges may contain some loading to recover acquisition expenses (e.g., the reverse select and ultimate COI charges scale). The actuary should attempt to quantify how any change in mortality experience will be passed on to the policyholder in the form of revised COI charges.

For policies with adjustable COI charges, if illustrations projected at various interest rates do not adjust the level COI charges, the actuary should assume that policyholders' reasonable expectations are that COI charges are not adjustable for interest rate changes. However, if management has taken action to change these expectations, the actuary could assume that the level COI charges are adjustable for interest to the extent that the expectations have been changed.

C. Expected Expense Charges and Expected Premium Loadings

For some policies, the expense charges and premium loadings are guaranteed, and the expected charges and loadings would be equal to the guaranteed rates. For other policy types, the actuary should quantify how any change in administrative expenses would be passed on to the policyholder.

For policies with adjustable expense charges or adjustable premium loadings, if illustrations do not adjust these charges or loadings, the actuary should assume that policyholders' reasonable expectations are that they are not systematically adjustable. For example, if illustrations project level expense charges, the actuary should assume that expense charges are not increased for inflation. However, if management has taken action to change these expectations, the actuary could assume that the charges or loadings are adjustable to the extent that the expectations have been changed.

VII. MARGINS FOR ADVERSE DEVIATIONS

In addition to the regular considerations for mortality, expense, asset default for fixed income assets, cash flow default for non-fixed income assets, and policy lapse margins for adverse deviations, some additional considerations with respect to margins for adverse deviations apply to the valuation of universal life policies.

A. Interest Rate Risk

Risk due to changes in interest rates is largely addressed through the scenario-testing process. However, a margin for adverse deviations may also be required to cover the interest rate risk associated with the uncertainty of timing of cash flows for factors other than interest rates. Multivariate cash flow testing would address this risk, but this technique is outside the scope of the current and proposed standards of practice.

Many universal life policies have a significant amount of uncertainty in liability cash flows due to uncertainty with respect to policy lapses, partial withdrawal of cash values, premium persistency, transfer of funds, premium allocation and any other assumptions that may be required. Therefore, matching of assets and liabilities is less certain than it would be for policies with more predictable liability cash flows. To the extent that this uncertainty exists for the policies being valued, larger margins for adverse deviations should apply.

B. Policy Lapse Assumption

Special considerations for universal life policies that lead to a high margin situation include:

- Premium persistency rates show great volatility
- The existence of persistency bonuses
- Credited rate structures such as "bucketing" (higher credited rates for higher fund amounts)

C. Premium Persistency and Partial Withdrawal Assumptions

Due to the interaction of the many variables in universal life policies, sensitivity testing will often be required to determine the correct application of margins for adverse deviations for these assumptions. For example, lower premium persistency may increase the liability for some policies while a higher premium persistency may increase the liability for other policies. Moreover, the correct application of the margin may be different for different valuation scenarios.

No margins for adverse deviations are necessary when there is a specific required premium payable or when there is no partial withdrawal feature. In other situations, margins for adverse deviations are needed, subject to the limitations specified in the policy design.

Given the nature of these assumptions, the margin for adverse deviations would be applied by substituting an alternative choice for these assumptions which produces a higher liability than the liability resulting from the use of the expected assumption. The actuary should use judgment in determining reasonable alternative assumptions.

D. Transfer of Funds and Premium Deposit Allocation Assumptions

For policies where transfer of funds and premium deposit allocation assumptions are necessary, margins for adverse deviations are required for these assumptions. Given the nature of these assumptions, the margin for adverse deviations would be applied by substituting an alternative choice for these assumptions which produces a higher liability than the liability resulting from the use of the expected assumption. The actuary should use judgment in determining reasonable alternative assumptions.

APPENDIX – APPROXIMATE METHODS

(a) Holding the Statement Value of Assets Supporting the Fund Balance as a Liability

This method implicitly assumes that all experience variations are passed through to the policyholder via the policy components. It may be an acceptable approximation if all of the following circumstances, when applicable, are met:

(i) The acquisition expenses are largely recovered by front-end charges

(ii) The determination of policy components is closely linked to current experience and it is anticipated that this will be the case in the future

(iii) Back-end surrender charges are small or non-existent

(iv) There are no material guarantees attached to the policy

(v) There are no material persistency bonuses

(vi) Each policy component has a profit loading that is reasonably close to the appropriate margin for adverse deviations

(vii) The policy is relatively insensitive to lapses (i.e., there is no significant gain or loss on surrender).

(b) Liability Equal to the Statement Value of Assets Supporting the Fund Balance Less an Amount for Deferred Acquisition Expenses

This method also implicitly assumes that all experience variations are passed through to the policyholder via the policy components. If the acquisition expenses are recovered by a combination of back-end charges and loadings in the policy components which are specifically earmarked for recovery of acquisition expenses, then an implicit liability equal to the statement value of assets supporting the fund balance less an amount for recovery of deferred acquisition expenses may be an appropriate approximation. The amount of recoverable deferred acquisition expenses could be calculated by accumulating the acquisition expenses that the actuary deems to be recoverable less the policy component charges or loadings that are earmarked to recover the acquisition expenses.

This method may be a reasonable approximation if all of the following circumstances, when applicable, are met:

(i) The portion of policy components not earmarked to recover acquisition expenses are closely linked to current experience and it is anticipated that this will be the case in the future

(ii) The back-end surrender charges are closely linked to the acquisition expenses which have not by then been recovered by policy component charges or loadings

(iii) There are no material guarantees attached to the policy

(iv) There are no material persistency bonuses

(v) The portion of each policy component not earmarked to recover acquisition expenses has a profit loading which is reasonably close to the appropriate margin for adverse deviations

(vi) the policy is relatively insensitive to lapses (i.e., there is no significant gain or loss on surrender).

(c) Liability Equal to the Statement Value of Assets Supporting the Fund Balance Less the Present Value of Excess Charges

This method calculates the liability as the statement value of assets supporting the fund less the present value of any differences between the valuation assumptions and the policy components (consistent with the valuation assumptions) using the following formula:

Liability = Statement value of assets supporting the Fund

- Present Value [cost of insurance charges – valuation death benefits]
- Present Value [expense charges – valuation expenses]
- Present Value [valuation investment income – credited investment income]
- Present Value [surrender charges]
+ Present Value [persistency and investment bonuses]

The advantage of this method is that only cash flows that are materially different from the policy components need to be projected for liability purposes.

This method may be an acceptable approximation if all of the following circumstances are met:

(i) An allowance is made for all material amounts in the present value items (in the above formula)

(ii) There are no material guarantees attached to assumptions not included in the present value items

(iii) The actuary has performed sufficient scenario testing to determine which valuation scenario assumptions (especially investment rates and lapse rates) should be used in the formula calculations.