



Final Standards

Final Standards – Practice-Specific Standards for Insurance (Part 2000)

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2000—Insurance

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2100 Insurance Contract Valuation: All Insurance

2110 Scope

- .01 Part 1000 applies to work within the scope of part 2000.
- .02 Section 2100 applies to all kinds of insurance.
- .03 Section 2200 applies to property and casualty insurance.
- .04 Section 2300 applies to life and health (accident and sickness) insurance.
- .05 Sections 2400 and 2500 apply to all kinds of insurance.
- .06 Section 2600 applies to property and casualty insurance.
- .07 Section 2700 applies to life and health (accident and sickness) insurance.
- .08 Part 2000 does not apply to post-employment benefit plans covered by the Practice-Specific Standards for Post-Employment Benefit Plans, nor does it apply to personal injury compensation plans covered by the Practice-Specific Standards for Public Personal Injury Compensation Plans.
- .09 The legal form of the insurer is not relevant for purposes of the application of part 2000.
- .10 Sections 2100, 2200, and 2300 apply to the valuation of the insurance contract liabilities and reinsurance recoverables in an insurer's financial statements when the intent is that those statements be in accordance with generally accepted accounting principles in Canada, whether or not the insurer is a publicly accountable enterprise¹. They also apply where statutory or regulatory instructions require the actuary to value the insurer's policy liabilities in accordance with accepted actuarial practice.
- .11 In certain cases, methodology described in one of sections 2200 or 2300 may be useful for the insurance to which the other section applies. For example, while a simple technique is usually appropriate for valuation of claim liabilities for life and health insurance, the more sophisticated techniques used for property and casualty insurance may be appropriate for life and health insurance contracts for which claim development is complex. Similarly, for travel insurance and other short-term policies sold by property and casualty insurers, a simple technique may be appropriate.

¹ The *CPA Canada Handbook* contains both Canadian generally accepted accounting principles applicable to publicly accountable enterprises (i.e., International Financial Reporting Standards) and Canadian generally accepted accounting principles applicable to private enterprises and not-for-profit organizations.

2120 Method

- .01 The actuary should value the insurance contract liabilities and the reinsurance recoverables for the statement of financial position and the changes in them for the statement of income.
- .02 The actuary should coordinate the valuation with the insurer's accounting policy as respects the choice between going concern and wind-up accounting, and so that the insurance contract liabilities, reinsurance recoverables, and other items in the statement of financial position
 - Are consistent;
 - Avoid omission and double counting; and
 - Conform to the presentation of the statement of income.
- .03 The relevant insurance contracts for the valuation are those that are in force, including those whose issue is then committed, at the calculation date, or that were in force earlier and that will generate cash flow after the calculation date.
- .04 The insurance contract liabilities, net of reinsurance recoverables, in respect of each of the relevant insurance contracts should be comprised of the cash flow after the calculation date from the premiums, benefits, claims, expenses, and taxes that are incurred during the term of its liabilities.
- .05 The cash flows that comprise the insurance contract liabilities should include the effect of
 - Retrospective premium, commission, and similar adjustments;
 - Experience rating refunds;
 - Reinsurance ceded;
 - Subrogation and salvage;
 - The exercise of policy owner options; and
 - The deemed termination at the end of the term of its liabilities of each policy then in force.
- .06 The valuation should take account of the time value of money.

.07 The actuary should ensure that the application of margins for adverse deviations with respect to the insurance contract liabilities and the related reinsurance recoverables results in an increase to the value of the liability net of reinsurance. The provision resulting from the application of all margins for adverse deviations, in addition to increasing the net liability, should be appropriate in the aggregate. [Effective April 15, 2017]

.08 Policy liabilities other than insurance contract liabilities would be valued in conformity with applicable International Financial Reporting Standards and accepted actuarial practice.

Calculation date

.09 Consistent with its definition in part 1000, the term "calculation date" as used throughout part 2000 refers to the effective date of the valuation of assets and liabilities reported in the financial statements (commonly referred to in practice as the "balance sheet date").

The insurer's accounting policy

.10 In preparing the insurer's financial statements, management would choose between going concern and wind-up accounting. The actuary would conform the valuation to that choice. If the actuary believes the choice to be inappropriate, then, after consultation with the auditor, he or she would so report.

.11 Going concern accounting is appropriate for an insurer that is expected to remain open to new business and in satisfactory financial position indefinitely.

.12 Going concern accounting is also appropriate for an insurer that is expected to become closed to new business, but to continue in a satisfactory financial position, either indefinitely or until

- An increase in capital; or
- A combination with, or transfer of its policies to, another insurer in a satisfactory financial condition,

brings financial relief.

.13 Use of the terms "insurance contract liabilities", "policy liabilities", "reinsurance recoverables", "premium liabilities", and "claim liabilities" is desirable in financial statements, but the choice of the terminology and itemization is a management decision. Regardless of the terminology and itemization chosen, the actuary would ensure that all relevant liabilities are identified and valued.

- .14 Insurance contract liabilities and reinsurance recoverables consist of premium liabilities and claim liabilities. Claim liabilities are those in respect of benefits and claims incurred on or before the calculation date. The valuation of claims liabilities would reflect all cash flow related to such claims, including benefit payments, expenses and taxes, occurring after the calculation date. Premium liabilities are those in respect of premiums and all other benefits and claims, including their related expenses and taxes, incurred after the calculation date.
- .15 When reporting under International Financial Reporting Standards, insurance contract liabilities reported in the insurer's statement of financial position would be presented gross of reinsurance recoverables. The value of the reinsurance recoverables is recorded separately and would be valued appropriately. The valuation of the reinsurance recoverables would take account of not only the reinsurer's share of claims but also reinsurance commissions, allowances, retrospective premium adjustments, and the financial condition of the reinsurer. Where an actuary is valuing, and reporting on, the valuation of policy liabilities other than in compliance with International Financial Reporting Standards, the policy liabilities may be reported net of reinsurance recoverables.
- .16 For the purposes of part 2000, the insurance contract liabilities reported in the insurer's statement of financial position would exclude the liabilities of its segregated funds, but would include, in respect of segregated fund contracts, the liabilities of its general fund related to insurance benefits payable under the terms of such contracts, such as guaranteed minimum benefits in excess of policy owner account values.

.17 The insurer's accounting policy may report amounts related to insurance contracts and the assets that support insurance contract liabilities, as part of the insurance contract liabilities, or as separate items in the statement of financial position, or as a mixture of the two. Examples of such related items include

- Deposit liabilities (for example, policy dividends on deposit);
- Incurred but unpaid items (for example, taxes incurred but not paid and policy dividends due but not paid);
- Future tax liabilities and assets (for example, those in connection with the timing differences between accounting and tax liabilities);
- Receivables from, payables to, and deposits by reinsurers;
- Amounts recoverable from policy owners;
- Provisions for asset depreciation; and
- Deferred policy acquisition expenses.

The actuary would value the insurance contract liabilities so that

- In the aggregate, the insurance contract liabilities and those separate items are consistent and avoid omission and double counting; and
- The separate reporting of those items does not affect the insurer's capital.

.18 As respects consistency, the actuary would, for example, ensure that the cash flows included in the insurance contract liabilities and the reinsurance cash flows in respect of the same policies are estimated based on consistent assumptions, except that reinsurance cash flows would also take account of the financial condition of the reinsurer.

.19 As respects double counting and omission, the actuary would, for example, ensure that

- No asset is allocated more than once to support liabilities; and
- The provision for asset depreciation included in the insurance contract liabilities does not duplicate any provision for asset depreciation deducted from the asset side of the statement of financial position.

Relevant insurance contracts

.20 At the calculation date, the relevant contracts for the valuation include

- Policies that are in force at that date;
- policies which, at that date, the insurer is committed to issue; and
- Policies that were in force prior to that date which could generate cash flow after that date.

There are no amounts included in insurance contract liabilities in the financial statements in respect of other policies expected to be issued after the calculation date, whether or not they are expected to be profitable.

- .21 There usually are both premium liabilities and claim liabilities in respect of policies that are in force at the calculation date. There may be reinsurance recoverables in respect of insurance contracts that are in force at the calculation date.
- .22 There may be claim liabilities in respect of policies that are not in force at the calculation date as a result of outstanding claims incurred while they were in force. There may be premium liabilities in respect of those policies as a result of the right of policy owners to reinstate them, or of their unpaid
- Retrospective premium, commission, and similar adjustments;
 - Experience rating refunds; and
 - Subrogation and salvage.

There may be reinsurance recoverables related to policies that are not in force at the calculation date as a result of outstanding claims incurred while they were in force.

Cash flows comprising the insurance contract liabilities

- .23 The insurance contract liabilities in respect of a relevant policy are comprised of that policy's cash flows after the calculation date that would be incurred during the term of the liability for that policy. Considerations in determining the term of the liability for life and health (accident and sickness) insurance are discussed in section 2300.
- .24 The tax cash flows are limited to those generated by premiums, benefits, claims, and expenses, and by the assets that support the insurance contract liabilities. The expense cash flows are limited to those generated by the relevant policies, including overhead allocations. The tax and expense cash flows exclude, for example, tax on investment income from, and the investment expense of, assets that support capital.
- .25 The actual timing of cash flow for a given policy may occur beyond the term of its liabilities as a result of lag between an insured event (e.g., the incurring of a claim) and its resultant cash flow. The extension may be prolonged, for example, for a claim payable in instalments under long-term disability insurance, and a claim under product liability insurance that has a long settlement period.

Retrospective premium, commission, and similar adjustments

- .26 In determining the value of a contractual right of the insurer to future premiums that depend on past claims experience, the actuary would take account of creditworthiness of the policy owner.

Experience rating refunds

- .27 The liability for experience rating refunds would take account of
- The assumptions used in calculating the insurance contract liabilities in respect of those matters which determine experience rating refunds;
 - The difference between the basis for the insurance contract liabilities and the corresponding basis in the experience rating; and
 - Any cross-rating across coverages in the experience rating.
- .28 The experience rating refund element of the insurance contract liabilities would include provision for adverse deviations only for
- Risk of misestimation of interest rates and risk of interest rate changes; and
 - Uncertainty in the calculation of the experience rating refund.
- .29 The experience rating refund element of the insurance contract liabilities would not be negative except to the extent that in settlement it may be offset against another liability or recovered from policy owners.
- .30 Where an insurer holds an asset for an accrued experience rating deficit, the actuary would test the appropriateness and recoverability of the receivable amount using the valuation assumptions and methodology for experience rating refunds, and make an adjustment to the insurance contract liabilities if necessary.

Reinsurance ceded and retroceded

- .31 The estimated amount of recovery on account of reinsurance ceded would take account of the financial condition of the reinsurer.
- .32 The actuary would assume that the insurer and the reinsurer each exercises its rights under a treaty (e.g., recapture, cancellation or commutation) to its advantage.

Subrogation and salvage

- .33 The actuary would either net subrogation and salvage amounts against claims or value them as a separate item, depending on the insurer's accounting policy.

Exercise of policy owner options

- .34 Examples of policy owner options are
- The conversion of group insurance or individual term insurance;
 - The election of a settlement option in individual life insurance;
 - The purchase of additional insurance or coverage without underwriting; and
 - The selection of the amount of premiums for universal life insurance.

Deemed termination of remaining policies

- .35 The comprised cash flow in respect of a policy that is deemed to terminate at the end of the term of its liabilities would include any amount then payable by the insurer in the event of its termination, modified to take account of the fact that the termination is deemed and not actual. For example, the modification would
- Forego a surrender charge deducted at an actual termination from the policy's account value to calculate its cash value;
 - Forego a deduction at an actual termination from the policy's unearned premium to calculate its premium refund; and
 - Anticipate a persistency bonus becoming payable at a date after the end of the term of the policy's liabilities if the policy remains in force to that date.

Time value of money

- .36 In this context, "supporting assets" means the insurer's assets and asset commitments that support its insurance contract liabilities.
- .37 To take account of the time value of money is to express the forecast of periodic future cash flows as an equivalent single amount at the calculation date, thereby reflecting in the value of the liabilities the amount of future investment income forecast to be earned on the supporting assets. There are two common methods of doing so – a roll-forward approach (e.g., the Canadian asset liability method) and a discounting approach (e.g., the actuarial present value method).
- .38 The discount rates and forecast of supporting assets used in the valuation, would take account of
- The supporting assets owned at the calculation date;
 - The insurer's policy for asset-liability management; and
 - Assumptions about investment return after the calculation date.

- .39 The actuary would value the insurance contract liabilities and reinsurance recoverables so that their aggregate value in combination with the value of other policy-related items in the statement of financial position appropriately takes account of the time value of money.

Margin for adverse deviations

- .40 The margin for adverse deviations reflects the degree of uncertainty of the best estimate assumption. This uncertainty results from the risk of misestimation of and deterioration from the best estimate assumption. The potential for misestimation is greater when the past experience has been more volatile and hence would justify a greater margin. However, the margin for adverse deviations would be based on a forward-looking assessment of the expected experience and would not act as a mechanism to absorb changes in observed experience, such as changes caused by statistical fluctuations.
- .41 Where ceded reinsurance is involved, the sign (positive or negative) of a margin for adverse deviations for a given assumption would take account of the impact of the assumption on assumed recapture, cancellation, commutation, or other treaty provisions and of the corresponding impact on insurance contract liabilities net of reinsurance recoverables.

2130 Reporting

- .01 The actuary's report should describe
- The valuation and presentation of policy liabilities and reinsurance recoverables for the insurer's statement of financial position and statement of income;
 - The actuary's opinion on the appropriateness of those liabilities and recoverables and on the fairness of their presentation; and
 - The actuary's role in the preparation of the insurer's financial statements if that role is not described in those statements or their accompanying management discussion and analysis.

- .02 If the actuary can report without reservation, then the actuary's report should conform to the standard reporting language, consisting of

- A scope paragraph, which describes the actuary's work; and
- An opinion paragraph, which gives the actuary's favourable opinion on the valuation and its presentation;

otherwise the actuary should modify the standard reporting language to report with reservation. [Effective April 15, 2017]

- .03 The actuary's report would conform to relevant Canadian federal and provincial legislation that require the actuary to value the policy liabilities, not only the insurance contract liabilities and related reinsurance recoverables.

Accounting in the statement of financial position

- .04 The amount of the insurance contract liabilities is usually the largest amount in the statement of financial position, so that the disclosure of its main components is desirable.
- .05 The reference to “policy liabilities”, “insurance contract liabilities” and “reinsurance recoverables” in the standard reporting language is adequate if the notes to the financial statements or their accompanying management discussion and analysis verbally define “insurance contract liabilities” and “reinsurance recoverables”, and the statement of financial position presents their total amount as a separate item.

Accounting in the statement of income

- .06 The standard reporting language implies that the statement of income accounts for the total change in the policy liabilities, consisting of the insurance contract liabilities and the liabilities for policies other than insurance contracts, during the financial reporting period, and that it accounts for the total change in reinsurance recoverables. That accounting is direct in the case of a life insurer’s insurance contract liabilities and reinsurance recoverables, whose change is presented as a separate item in the statement of income. That accounting may be indirect in the case of other policy liabilities, if their change is not separately presented, but is included within other items in the statement of income. For example, the item incurred claims would be equal to
- Claims and claim expenses paid during the financial reporting period; plus
 - Claim liabilities (which are part of the policy liabilities) at the end of the financial reporting period; minus
 - Claim liabilities at the beginning of the financial reporting period.

Such indirect accounting would be considered fair presentation, as would the direct accounting presentation.

Disclosure of unusual situations

- .07 The items that the actuary values for the financial statements may be misleading if the financial statements do not present them fairly. The actuary’s report signals to the reader of the financial statements that there is, or is not, fair presentation.
- .08 In an unusual situation, fair presentation may require explanation of an item that the actuary values for the financial statements. Usually, the notes to the financial statements would provide that explanation, including, where appropriate, disclosure of the situation’s effect on income and capital. In the absence of such explanation, the actuary would provide it by a reservation in reporting.

- .09 The question, “Will explanation enhance the user’s understanding of the insurer’s financial position?” may help the actuary to identify such a situation. Unusual situations may include
- Capital appropriated or repatriated on the actuary’s advice;
 - Off-balance-sheet obligations (e.g., contingent policy liabilities in connection with market conduct);
 - Restatement of items for preceding financial reporting periods;
 - Inconsistency among financial reporting periods;
 - The impracticality of restating any items that are reported in current period financial statements and that were reported inconsistently in preceding period financial statements;
 - An unusual relationship between the items in current period financial statements and the expected corresponding items in future period financial statements;
 - A change in the method of valuation that does not have an effect in the current financial reporting period but that is expected to have an effect in future financial reporting periods;
 - A difference between the insurer’s present practices (e.g., policy for setting dividend scales) and those which the actuary assumed in valuing the policy liabilities; and
 - A subsequent event.

Consistency across financial reporting periods

- .10 Financial statements usually present results for one or more preceding financial reporting periods in comparison to those for the current period. Meaningful comparability requires the financial statement items for the various periods to be consistent, which can be achieved by the restatement of preceding period items that were previously reported on a basis which was inconsistent with that for the current period. A less desirable alternative to restatement is disclosure of the inconsistency.
- .11 A change in the method of valuation creates an inconsistency. A change in the assumptions for valuation reflecting a change in the expected outlook does not constitute an inconsistency although, if its effect is material, then fair presentation would require its disclosure.
- .12 A change in assumptions that results from the application of new standards may create an inconsistency.

Communication with the auditor

- .13 Communication with the auditor is desirable at various stages of the actuary's work. These include
- Use of work in accordance with the CIA/CICA Joint Policy Statement;
 - The drafting of common features in the auditor's report and actuary's report;
 - The drafting of a report with reservations;
 - The presentation of the insurance contract liabilities, policy liabilities other than insurance contract liabilities, and the reinsurance recoverables; and
 - The treatment of subsequent events.

Description of the actuary's role

- .14 The actuary would report a description of his or her role in the preparation of the insurer's financial statements only if the financial statements or their accompanying management discussion and analysis do not provide that description.
- .15 Here is an illustrative description.

"The Appointed Actuary is

appointed by the [Board of Directors] of [the Company];

responsible for ensuring that the assumptions and methods for the valuation of policy liabilities [and reinsurance recoverables] are in accordance with accepted actuarial practice in Canada, applicable legislation, and associated regulations and directives;

required to provide an opinion on the appropriateness of the policy liabilities [net of reinsurance recoverables] at the calculation date to meet all policy obligations of [the Company]. The work to form that opinion includes an examination of the sufficiency and reliability of policy data and an analysis of the ability of the assets to support the policy liabilities; and

required each year to analyze the financial condition of the company and prepare a report for the [Board of Directors]. The analysis tests the capital adequacy of the company until [31 December xxxx] under adverse economic and business conditions."

The wording of the illustrative description conforms to relevant Canadian federal and provincial legislation that require the actuary to value the policy liabilities, not only the insurance contract liabilities.

Standard reporting language

- .16 Here is the standard reporting language.

Appointed Actuary's Report

To the policyholders [and shareholders] of [the ABC Insurance Company]:

I have valued the policy liabilities [and reinsurance recoverables] of [the Company] for its [consolidated] [statement of financial position] at [31 December xxxx] and their changes in the [consolidated] [statement of income] for the year then ended in accordance with accepted actuarial practice in Canada including selection of appropriate assumptions and methods.

In my opinion, the amount of policy liabilities [net of reinsurance recoverables], makes appropriate provision for all policy obligations and the [consolidated] financial statements fairly present the results of the valuation.

[Montréal, Québec]
[Report date]

[Mary F. Roe]
Fellow, Canadian Institute of Actuaries

- .17 The language in square brackets is variable and other language may be adjusted to conform to interim financial statements and to the terminology and presentation in the financial statements.
- .18 An auditor's report usually accompanies the financial statements. Uniformity of common features in the two reports will avoid confusion to readers of the financial statements. Those common features include
- Addressees: Usually, the actuary addresses the report to the policyholders of a mutual insurer and to both the policyholders and shareholders of a stock insurer.
 - Years referenced: Usually, the actuary's report refers only to the current year, even though financial statements usually present results for both the current and prior years.
 - Report date: If the two reports have the same date, then they would take account of the same subsequent events.

Reservations in reporting

- .19 The examples that follow are illustrative and not exhaustive.

Self-insured organization that is not obligated to have an appointed actuary

- .20 Here is an example of a report prepared for an underfunded self-insured organization that is not obligated to have an appointed actuary.

I have valued the outstanding claim liabilities of [the Self-Insured Liability Plan] for its statement of financial position at [31 December xxxx] in accordance with accepted actuarial practice in Canada, including selection of appropriate assumptions and methods.

As explained in Note [XX], the [Plan's] self-insured liabilities are not fully funded.

In my opinion, and having regard for Note [XX], the amount of policy liabilities makes appropriate provision for all of the [Plan's] outstanding claims and the financial statements fairly present the results of the valuation.

Note [XX] would quantify and describe the actuary's assumptions with respect to the asset shortfall, describe the plan, if any, for its funding, and explain its implications for the financial security of participants and claimants.

New appointment

- .21 A newly appointed actuary who is unable to use the predecessor actuary's work, but who has no reason to doubt its appropriateness, would modify the standard reporting language as follows:

I have valued the policy liabilities [and reinsurance recoverables] of [the Company] for its [consolidated] statement of financial position at [31 December xxxx] and, except as noted in the following paragraph, their change in the statement of income for the year then ended in accordance with accepted actuarial practice in Canada, including selection of appropriate assumptions and methods.

The policy liabilities [and reinsurance recoverables] at [31 December xxxx-1] were valued by another actuary who expressed a favourable opinion without reservation, as to their appropriateness.

In my opinion, the amount of policy liabilities [net of reinsurance recoverables], makes appropriate provision for all policy obligations and the [consolidated] financial statements fairly present the results of the valuation. For the reason stated in the previous paragraph, I am unable to say whether or not those results are consistent with those for the preceding year.

- .22 If the actuary doubts the appropriateness of the predecessor actuary's work as a result of a review of it, then the actuary would consider a more serious reservation.

Impracticality of restatement

- .23 The actuary would, if necessary, restate the preceding year valuation to be consistent with the current year valuation. If it is not practical to restate the preceding year valuation, then the actuary would modify the opinion paragraph in the standard reporting language as follows:

In my opinion, the amount of policy liabilities [net of reinsurance recoverables] makes appropriate provision for all policy obligations. As explained in Note [XX], the method of valuation for the current year is inconsistent with that for the previous year. Except for that lack of consistency, in my opinion the [consolidated] financial statements fairly present the results of the valuation.

- .24 Note [XX] would usually explain the change in the basis of valuation, explain the impracticality of applying the new basis retroactively, and disclose the effect of the change on the opening equity at the beginning of the preceding year.

Takeover of insurer with insufficient records

- .25 If the insurer took over another insurer with records that did not provide sufficient and reliable data for the valuation, then the actuary would modify the standard reporting language as follows:

I have valued the policy liabilities [and reinsurance recoverables] of [the Company] for its [consolidated] statement of financial position at [31 December xxxx] and their change in the statement of income for the year then ended in accordance with accepted actuarial practice in Canada, including selection of appropriate assumptions and methods, except as described in the following paragraph.

During the year, [the Company] took possession of the assets, liabilities, and policies of [WWW Insurer], whose policy records are, in my opinion, unreliable. [The Company] is implementing but has not completed the necessary improvements. My valuation with respect to the policies taken over from [WWW Insurer] therefore involves an unusual degree of uncertainty. The associated policy liabilities [net of reinsurance recoverables] comprise [N]% of [the Company's] total policy liabilities [net of reinsurance recoverables] at [31 December xxxx].

In my opinion, except for the reservation in the previous paragraph, the amount of policy liabilities [net of reinsurance recoverables] makes appropriate provision for all policy obligations and the [consolidated] financial statements fairly present the results of the valuation.

Liabilities greater than those calculated by the actuary

- .26 If the financial statements of an insurer report policy liabilities, net of reinsurance recoverables, that are greater than those calculated and reported by the actuary, and if the notes to those financial statements do not provide sufficient disclosure of the rationale for doing so, then the actuary would report as follows:

I have valued the policy liabilities [and reinsurance recoverables] of [the Company] for the statement of financial position at [31 December xxxx] and their change in the statement of income for the year then ended in accordance with accepted actuarial practice in Canada, including selection of appropriate assumptions and methods, except as described in the following paragraph.

In my valuation, the amount of the policy liabilities [net of reinsurance recoverables] is \$[X]. The corresponding amount in the [consolidated] financial statements is \$[Y].

In my opinion, the amount of policy liabilities [net of reinsurance recoverables] of \$[X] makes appropriate provision for all policy obligations and, except as described in the preceding paragraph, the [consolidated] financial statements fairly present the result of the valuation.

2200 Insurance Contract Valuation: Property and Casualty Insurance

2210 Scope

- .01 This section 2200 applies in accordance with subsection 2110.

2220 Claim liabilities

.01 The amount of the claim liabilities should be equal to the present value, at the calculation date, of cash flow on account of claims (and of related expenses and future income taxes) incurred on or before that date with provision for adverse deviations. [Effective April 15, 2017]

- .02 The amount of claim liabilities consists of the following components on a present value basis:

- The amount of the case estimates;
- A provision (which may be positive or negative) for development on reported claims, including claim adjustment expenses;
- A provision for incurred but unreported claims, including claim adjustment expenses; and
- A provision for adverse deviations.

For property and casualty practitioners, this is also referred to as the actuarial present value basis.

- .03 The development on reported claims compensates for the inadequacy or redundancy in case estimates.
- .04 The incurred but unreported claims are those not yet reported to the insurer, including those reported but not yet recorded.
- .05 The development on reported claims and the incurred but unreported claims need not be calculated separately. Some valuation methods calculate only their combined amount.
- .06 The selection of valuation methods depends on the circumstances affecting the work. The actuary would usually consider several methods, each of which involves assumptions.

- .07 The actuary would consider the circumstances affecting the work in selecting assumptions. The available past claims experience may lack pertinence for assumptions about the insurer's future claims experience as a result of internal changes, such as changes in
- The insurer's underwriting practice;
 - Its claims handling practice, including case estimate practice;
 - Its reinsurance;
 - Its data processing; and
 - Its accounting;
- and as a result of external changes, such as inflation and changes in
- The legal, regulatory, and legislative environment; or
 - Residual mechanisms, like the Facility Association.
- .08 The past and future claims experience of a pool or association in which the insurer participates tends to be beyond the insurer's control and may differ from the insurer's own claims experience.

2230 Premium liabilities

- .01 The amount of the premium liabilities (after deducting any deferred policy acquisition expense asset) should be equal to the present value, at the calculation date, of cash flow on account of premium development and of the claims, expenses and future income taxes, including provision for adverse deviations, to be incurred after that date on account of the policies in force at that date or an earlier date. [Effective April 15, 2017]
- .02 The amount of premium liabilities consists of the following components on a present value basis:
- The future claims and claim adjustment expenses;
 - A provision for adverse deviations;
 - The expected reinsurance costs (on a net basis only);
 - The maintenance costs;
 - All other liabilities related to premium development; and
 - A premium deficiency, if any.
- .03 The actuary would consider the Standards of Practice for claim liabilities in selecting assumptions about claims.

- .04 Premium development includes additional premiums such as reinstatement premiums and experience adjustments for policies with retrospective pricing.
- .05 Premium deficiency is the amount which, when added to the net unearned premium reserve and unearned (reinsurance) commissions, makes an appropriate provision for future costs arising from the unexpired portion of in-force policies at the calculation date.

2240 Present values

- .01 The expected investment return rate for calculation of the present value of cash flows, net of reinsurance, is that to be earned on the assets, taking into account reinsurance recoverables, that support the insurance contract liabilities. The expected investment return depends on
 - The assets owned at the calculation date;
 - The allocation of those assets and related investment income among lines of business;
 - The method of valuing assets and reporting investment income;
 - The yield on assets acquired after the calculation date;
 - The capital gains and losses on assets sold after the calculation date;
 - Investment expenses; and
 - Losses from asset depreciation.
- .02 The expected investment return rate for calculation of the present value of ceded cash flow may be selected from the following or a combination thereof:
 - The investment return rate selected for net present value net of reinsurance (i.e., as described in paragraph 2240.01);
 - A risk-free rate; and
 - The investment return rate used by the assuming company.
- .03 The actuary need not verify the existence and ownership of the assets at the calculation date, but would consider their quality.

2250 Margin for adverse deviations – general

- .01 The criteria for selection of the margin for adverse deviations for an assumption are based upon the considerations for that assumption. The selected margin for adverse deviations used in the valuation of insurance contract liabilities should tend toward a higher margin for adverse deviations to the extent that the considerations for that assumption, viewed in the aggregate but considering their individual relative importance,
- Have been unstable during the period covered by the experience data on which the selection of the corresponding expected assumption is based and the effect of that instability cannot be quantified; or
 - Otherwise undermine confidence in the selection of the corresponding expected assumption;
- and should tend toward a lower margin for adverse deviations to the extent that the opposite is the case.
- .02 The selected margin for adverse deviations should vary
- Between premium liabilities and claim liabilities;
 - Among lines of business; and
 - Among accident years, policy years, or underwriting years, as the case may be,
- according to how the considerations of paragraphs 2250.08 and 2250.09 so vary. [Effective April 15, 2017]

Assumptions subject to a margin for adverse deviations

- .03 The actuary would include a margin for adverse deviations in the assumptions for
- Claims development;
 - Recovery from reinsurance ceded; and
 - Investment return rates.

Expression of a margin for adverse deviations

- .04 The margin for adverse deviations for claims development would be a percentage of the claim liabilities excluding provision for adverse deviations.
- .05 The margin for adverse deviations for recovery from reinsurance ceded would be a percentage of the amount deducted on account of reinsurance ceded in calculating the premium liabilities or claim liabilities, as the case may be, excluding provision for adverse deviations.

- .06 The margin for adverse deviations for investment return rate would be a deduction from the expected investment return rate per year.
- .07 The actuary would not usually include a margin for adverse deviations in the other assumptions. An example of an unusual circumstance that warrants an exception is a salvage and subrogation assumption when presented as an asset separate from the claim liabilities.

Considerations

- .08 The actuary would select and evaluate considerations for each assumption that are appropriate to the circumstances of the insurer, including
- Insurer practices, for example, the guidelines for setting and reviewing case estimates;
 - Data, for example, the stability of claims frequency and average claim cost;
 - Reinsurance, for example, the history of claim and coverage disputes with reinsurers;
 - Investments, for example, the matching of assets and liabilities and risk of asset depreciation; and
 - The external environment, for example, the effect of regulatory change on claim settlements.
- .09 A consideration for an assumption reduces confidence in that assumption as a result of past or future instability of the consideration or a shortcoming in its quality, quantity, or performance. Significant considerations indicating difficulties in properly estimating the best estimate assumption would include, but would not be limited to
- Instability in the guidelines for setting and reviewing case estimates possibly resulting in inconsistent development among accident years;
 - The credibility of the company's experience being too low to be the primary source of data;
 - Future experience being difficult to estimate;
 - Lack of homogeneity in the cohort of risks;
 - Operational risks adversely affecting the likelihood of obtaining the best estimate assumption;
 - Past experience not being representative of the future experience and the experience possibly deteriorating; or
 - The derivation of the best estimate assumption being unrefined.

2260 Margin for adverse deviations – deterministic analysis

.01 The actuary should select a margin for adverse deviations for an assumption that is at least as much as the amount defined by the low margin for adverse deviations and is not excessive. [Effective April 15, 2017]

.02 The range of margin for adverse deviations would be

	<u>High</u>	<u>Low</u>
<u>claims development</u>	20%	2.5%
<u>recovery from reinsurance ceded</u>	15%	0
<u>investment return rates</u>	200 basis points	25 basis points

.03 Usually, a selection above this high margin for adverse deviations would be considered excessive.

.04 A selection above this high margin for adverse deviations would be appropriate, however, for unusually high uncertainty or when the resulting provision for adverse deviations is unreasonably low because the margin for adverse deviations is expressed as a percentage and the best estimate is unusually low.

.05 A selection below the low margin for adverse deviations may be appropriate in unusual situations. For example, in a situation wherein the best estimate discount rate based on the insurer's asset portfolio is less than 0.25% per annum, a margin for adverse deviations for investment return rates below that specified in paragraph 2260.02 may be reasonable. Similarly, unique situations may support a claims development margin for adverse deviations below that specified in paragraph 2260.02, as in the case of an insurer with aggregate stop loss coverage that is reserved at the stop loss limit.

2270 Margin for adverse deviations – stochastic analysis

.01 The margin for adverse deviations selected based on stochastic techniques should not be less than the low margin for adverse deviations set out in paragraph 2260.02 and should not be excessive. [Effective April 15, 2017]

.02 It is expected that margins for adverse deviations obtained using stochastic techniques would generally be consistent with the range provided in paragraph 2260.02.

- .03 In addition to the circumstances described in paragraph 2260.04, a selection above the high margin for adverse deviations set out in paragraph 2260.02 may be appropriate when stochastic modelling indicates variability in estimates of insurance contract liabilities that may not be identified using deterministic analysis.
- .04 A selection below the low margin for adverse deviations may be appropriate as set out in paragraph 2260.05.

2300 Insurance Contract Valuation: Life and Health (Accident and Sickness) Insurance

2310 Scope

- .01 This section 2300 applies in accordance with subsection 2110.

2320 Method

- .01 The actuary should calculate insurance contract liabilities net of reinsurance recoverables by the Canadian asset liability method.
- .02 The amount of insurance contract liabilities using the Canadian asset liability method for a particular scenario is equal to the amount of supporting assets, including reinsurance recoverables, at the calculation date that are forecast to reduce to zero coincident with the last liability cash flow in that scenario.
- .03 The term of the liabilities should take account of any renewal, or any adjustment equivalent to renewal, after the calculation date if
- The insurer's discretion at that renewal or adjustment is contractually constrained; and
 - Insurance contract liabilities are larger as a result of taking account of that renewal or adjustment.
- .04 In forecasting the cash flow expected to be generated by an insurance contract, the actuary should
- Take account of policy owner reasonable expectations; and
 - Include policy dividends, other than the related transfers to the shareholders' account and other than ownership dividends, in the comprised cash flow from benefits.
- .05 The actuary should calculate insurance contract liabilities for multiple scenarios and adopt a scenario whose insurance contract liabilities make sufficient but not excessive provision for the insurer's obligations in respect of the relevant policies.

- .06 The assumptions for a particular scenario consist of
- Scenario-tested assumptions, which should include no margin for adverse deviations; and
 - Each other needed assumption, whose best estimate should be consistent with the scenario-tested assumptions and which should include margin for adverse deviations.
- .07 The scenario-tested assumptions should include at least the interest rate assumptions.
- .08 The scenarios of interest rate assumptions should comprise
- A base scenario, as defined under paragraph 2330.14;
 - Each of the prescribed scenarios in a deterministic application;
 - Stochastic scenarios, as defined in subsection 2370, in a stochastic application; and
 - Other scenarios appropriate for the circumstances of the insurer. [Effective April 15, 2017]

Liability grouping and asset segmentation

- .09 The actuary would usually apply the Canadian asset liability method to policies in groups that reflect the insurer's asset-liability management practice for allocation of assets to liabilities and investment strategy. That application is a convenience, however, and would not be expected to preclude the calculation of insurance contract liabilities and reinsurance recoverables that, in the aggregate, reflect the risks to which the insurer is exposed.

Other methods

- .10 For a particular scenario, another method may be equivalent to, or approximate, the Canadian asset liability method. If the actuary uses that other method, then the calculation for multiple scenarios and the selection of one that makes sufficient but not excessive provision for the insurer's obligations would be the same as for the Canadian asset liability method.

Supporting assets

- .11 The value of the assets that support insurance contract liabilities at the calculation date would be their value in the insurer's financial statements.
- .12 The forecasted cash flow of the assets would take account of any related, off-balance sheet, financial instruments.

- .13 The value of the assets and forecasted cash flow would take account of the insurer's hedging instruments existing at the calculation date.
- .14 The forecast of cash flow from taxes would take account of permanent and temporary differences between the amortization of capital gains in accordance with generally accepted accounting principles and tax law.

Term of the liabilities

- .15 If an element of a policy operates independently of the other elements, then it would be treated as a separate policy with its own term of liabilities. Examples are
- A flexible premium deferred annuity where the interest guarantee and cash value attached to each premium are independent of those for the other premiums; and
 - A certificate of voluntary non-contributory association or creditor group insurance.
- .16 The term of a policy's liabilities is not necessarily the same as the contractual term of the policy.
- .17 In this context,
- "Renewal" means the renewal of a policy at the end of its term, with the insurer having discretion to adjust premiums or coverage for the new term;
 - "Adjustment" means an insurer's unilateral adjustment to a policy's coverage or premiums equivalent to that in a renewal; and
 - "Constraint" means a constraint on the insurer's exercise of discretion in renewal or adjustment that results from contractual obligations, legally binding commitments, and policy owner reasonable expectations. Examples of constraint are an obligation to renew a policy unless renewal is refused for all other policies in the same class, a guarantee of premiums, a guarantee of credited interest rate, a general account guarantee of segregated fund value, and a limitation on the amount of adjustment. "Constraint" would not include a price-competitive market expected at renewal or adjustment.
- .18 The term of a policy's liabilities takes account of all renewals and adjustments before the calculation date. Depending on the circumstances, that term may also take account of one or more renewals or adjustments after the calculation date.

- .19 If the term of the liabilities is not evident, and if selection of a longer term would reduce insurance contract liabilities, then the actuary would be cautious in making such a selection. On the other hand, if selection of a longer term would increase those liabilities, then the actuary would usually select the longer term. Substance would supersede form in the selection; for example, a universal life policy that is in form an annual premium life insurance policy may be in substance a single premium deferred annuity.
- .20 The term of the liabilities of
- An insurance contract that has been cancelled by the insurer ends at the effective date of cancellation;
 - An insurance contract that has not been cancelled, but that is cancellable by the insurer at or before the date to which its premiums have been paid, ends at that date;
 - An individual annual premium life or accident and sickness insurance contract ends at the last day to which the policy owner may prolong its coverage without the consent of the insurer; and
 - A certificate of group insurance if the group insurance contract is in effect a collection of individual insurance contracts is the same as if it were an individual insurance contract, unless contributions or experience rating of the group negate anti-selection by certificate holders.
- .21 The term of the liabilities of any other insurance contract ends at the earlier of
- The first renewal or adjustment date at or after the calculation date at which there is no constraint; and
 - The renewal or adjustment date after the calculation date that maximizes the insurance contract liabilities.

- .22 The actuary would extend or amend such term as defined in paragraphs 2320.20 and 2320.21 only
- To permit recognition of cash flow to offset acquisition or similar expenses;
 - Whose recovery from cash flow that would otherwise be beyond such term was contemplated by the insurer in pricing the insurance contract; and
 - Where the value of the additional cash flow recognized by such extension of the term cannot exceed the value of the remaining balance of acquisition or similar expenses; or
- For the purpose of the valuation of liabilities related to segregated fund guarantees, as set out in subsection 2360.
- .23 The balance of the allowance for acquisition expense would be written down to zero using an appropriate method. Such method would
- Have a term consistent with the extended term established at inception;
 - Have a write-down pattern reasonably matched with the net cash flow available to offset these expenses at inception; and
 - Be locked in, so that the amount of write-down in each period will not fluctuate from the expected amount established at inception provided such balance is recoverable from the additional cash flow recognized at the calculation date, and where not fully recoverable at the calculation date, is written down to the recoverable amount, with the expected amount of write-down in each future period proportionately reduced.
- .24 A change in the outlook may provoke a change in the term of the insurance contract's liabilities. For example, the constraint of a cost of insurance guarantee that previously lengthened the term of the insurance contract liabilities may no longer do so if the outlook for mortality improves. On the other hand, the constraint of a guaranteed credited interest rate that previously was considered innocuous may become meaningful, and thereby lengthen the term of the insurance contract liabilities, if the outlook changes to one of lower interest rates.

- .25 For example, the term of the liabilities ends at
- The calculation date for the general account portion of a deferred annuity with segregated fund liabilities but without minimum guarantees (other than a guarantee of an annuity purchase rate); for example, with no guarantee of the segregated fund value;
 - The date after the calculation date that maximizes the insurance contract liabilities for guarantees of the fund value for segregated fund annuities whose contracts have no material constraints, and for consistency, for those contracts that contain material constraints;
 - The first renewal of a group policy that insures employee benefits, unless there is a constraint at that renewal; and
 - The next renewal date or adjustment date even if there is a constraint at renewals and adjustments at and after that date, but the constraint is so weak that its operation does not increase insurance contract liabilities.

Policy owner reasonable expectations

- .26 The insurer's policies contractually define its obligations to its policy owners. The contractual definition may leave certain matters to the insurer's discretion, such as
- The determination of policy dividends, experience-rating refunds, and retrospective commission adjustments; and
 - The right to adjust premiums.
- .27 Matters left to the insurer's discretion implicitly include
- Underwriting and claim practices; and
 - The right to waive contractual rights and to create extra-contractual obligations.

- .28 Policy owner reasonable expectations are the expectations that
- May be imputed to policy owners as their reasonable expectations of the insurer's exercise of discretion in those matters; and
 - Arise from the insurer's communication in marketing and administration, from its past practice, from its current policy, and from general standards of market conduct. Past practice includes the non-exercise of discretion; for example, long non-exercise without affirmation of a right to adjust premiums may undermine it. The insurer's communication includes policy dividend and investment performance illustrations at sale of a policy and that of intermediaries reasonably perceived as acting on its behalf.
- .29 In selecting assumptions for the insurer's exercise of discretion in those matters, the actuary would take policy owner reasonable expectations into account. Taking account of policy owner reasonable expectations may affect not only the amount of insurance contract liabilities but also disclosure in the financial statements.
- .30 The determination of policy owner reasonable expectations is straightforward when the insurer's practice has been clear, unvarying, consistent with its communications, consistent with general standards of market conduct, and the insurer does not intend to change it. The actuary would discuss any other practice with the insurer, with a view to clarifying policy owner reasonable expectations.
- .31 If the insurer makes a change that will eventually alter policy owner reasonable expectations, then the actuary would consider both the appropriate disclosure of the change in policy owner communication and the financial statements, and the time elapsed before the altered expectations crystallize.
- .32 A dispute over policy owner reasonable expectations may lead to class action or other litigation by policy owners against the insurer, which may affect insurance contract liabilities or generate contingent liabilities.
- Policy dividends**
- .33 The assumed cash flow from policy dividends would be that from both periodic (usually annual) dividends and terminal and other deferred dividends, but excluding that from the related transfers from the participating to the shareholders' account in a stock insurer.

- .34 The assumed cash flow from policy dividends would avoid omission and double counting with other elements of the insurance contract liabilities and with liabilities other than insurance contract liabilities. For example, if the actuary has valued the insurance contract liabilities for participating riders and supplementary benefits in participating policies as though they were non-participating—i.e., with provision for adverse deviations in excess of that appropriate for participating insurance—then the assumed cash flow from policy dividends would be reduced for that excess provision for adverse deviations.
- .35 The selected policy dividend scales in a particular scenario would be consistent with the other elements of that scenario, but would take account of how insurer inertia, policy owner reasonable expectations, and market pressure may preclude the dividend scale from being responsive to changes assumed in the scenario. Those scales would also be consistent with the insurer's dividend policy except in a scenario which that policy does not contemplate and which would trigger a change in it.
- .36 If the current dividend scale anticipates a future deterioration in experience, then the actuary would assume continuance of that scale in response to that deterioration. If the current dividend scale does not respond to a recent deterioration in experience but the insurer's policy is to do so, and if the delay in doing so does not provoke a contrary policy owner reasonable expectation, then the actuary would assume such response.
- .37 An assumption of cash dividends to all policy owners is appropriate only if the alternative options to cash have equivalent value. If the alternatives do not have equivalent value, the actuary would
- Either adjust the cash dividends to reflect the non-equivalence or make explicit assumption about policy owner exercise of the various dividend options; and
 - Provide for the anti-selection that will result from increasing exercise of the more valuable options.

Forecast of cash flow

- .38 In calculating insurance contract liabilities, the actuary would allocate assets to the liabilities at the calculation date, forecast their cash flow after that date, and, by trial and error, adjust the allocated assets so that they reduce to zero at the last cash flow.
- .39 Use of the work of another person may be appropriate for forecasting the cash flow of certain assets, such as real estate.

Income tax and alternative tax

- .40 This item deals with cash flow from tax based on income (herein called “income tax”) and other taxes not based on income but which interact with income tax; for example, certain capital taxes in Canada (herein called “alternative tax”).
- .41 The cash flow from such taxes would be limited to that in respect of the relevant insurance contracts and the assets that support their insurance contract liabilities, and thus, with the exception of the recoverability of future tax losses described below, would ignore any interaction between that cash flow and cash flow in the rest of the insurer (e.g., it would ignore tax on investment income from assets that support the insurer’s capital). For a particular scenario, forecasted income before tax is equal to zero in each financial reporting period after the calculation date. That is so because that scenario assumes occurrence of the adverse deviations for which it makes provision. If income according to tax rules were equal to income in accordance with generally accepted accounting principles, and if there were no alternative tax, then the corresponding forecasted tax cash flow would also be equal to zero. In reality, however, such tax cash flow may differ from zero because of
- Differences—both temporary and permanent—between income in accordance with generally accepted accounting principles and income in accordance with tax rules;
 - The operation of carry-forward and carry-back in the tax rules; and
 - Alternative tax and the interaction between it and income tax.
- .42 An example of a temporary difference is a difference between insurance contract liabilities and the corresponding tax liabilities.
- .43 An example of a permanent difference is a preferential tax rate on the investment income on a class of assets.
- .44 The forecast of cash flow from such taxes would therefore take account of positive or negative tax as a result of permanent and temporary differences at, and arising after, the calculation date, and of alternative taxes incurred after the calculation date.
- .45 The actuary would make appropriate provision for cash flow on account of such taxes in the insurance contract liabilities. If the insurer’s statement of financial position records a future tax asset or liability in respect of such taxes, then, in order to avoid double counting, the actuary would adjust the insurance contract liabilities otherwise calculated upward to reflect the existence of a future tax asset and downward to reflect the existence of a future tax liability.

- .46 The realization of negative tax depends on the simultaneous availability of income that is otherwise taxable. In forecasting such income, the actuary would
- Make provision for adverse deviations;
 - Take into account the projected tax position of the company overall; but
 - Not take account of the expected release of provisions for adverse deviations in the insurance contract liabilities because, as noted above, their calculation implicitly assumes that those adverse deviations occur.

Adverse deviations borne by policy owners

- .47 The insurance contract liabilities need not make provision for adverse deviations to the extent that the insurer can offset its effect by adjustments to policy dividends, premium rates, and benefits. The insurer's contractual right of such offset may be constrained by policy owner reasonable expectations, competition, regulation, administrative delays, and the fear of adverse publicity or anti-selection.
- .48 In some jurisdictions, regulatory approval may be required for the application of such contractual pass-through features and, in such cases, the actuary would consider the ability to recover past losses, the clarity of any regulatory rules for approval, time delays caused by the approval process, and whether interest losses during this period can be recouped in determining an appropriate total provision.

Adoption of a scenario

- .49 If the selection of scenarios is deterministic, then the actuary would adopt a scenario whose insurance contract liabilities are within the upper part of the range of the insurance contract liabilities for the selected scenarios. In the case of interest rate scenarios, the insurance contract liabilities would not be less than those in the prescribed scenario with the largest insurance contract liabilities.
- .50 If the selection of scenarios is stochastic, then the actuary would establish insurance contract liabilities that are within the range defined by
- The average of the insurance contract liabilities that are above the 60th percentile of the range of insurance contract liabilities for the selected scenarios; and
 - The corresponding average for the 80th percentile.

Scenario-tested assumptions

- .51 The provision for adverse deviations in respect of scenario-tested assumptions results from calculating the insurance contract liabilities for multiple scenarios and adopting a scenario whose insurance contract liabilities are relatively high.

Other assumptions

- .52 The provision for adverse deviations in respect of each assumption other than the scenario-tested assumptions results from a margin for adverse deviations included in that assumption.
- .53 The assumptions unique to a particular scenario are the scenario-tested assumptions and each other assumption that is correlated with them. For example, policy dividends and the exercise of options by borrowers and issuers, are strongly correlated with interest rates. Lapses may be correlated or not, depending on the circumstances. The assumption on a matter not so correlated would be common to all scenarios.

Margin for adverse deviations

- .54 The margin for adverse deviations would be at least the average of the applicable high and low margin, as specified in subsections 2340 and 2350, whenever at least one “significant consideration” exists, or at least one other consideration is significant in the context of the valuation. Significant considerations vary by type of assumption and are described under subsections 2340 and 2350.

2330 Scenario assumptions: Interest rates

General considerations

- .01 An interest rate scenario comprises, for each forecast period between the calculation date and the last cash flow,
- An investment strategy; and
 - An interest rate for each risk-free asset and the corresponding credit spread for each fixed-income asset subject to depreciation.
- .02 Each interest rate scenario would include an assumption with respect to the rate of inflation that is consistent with that scenario.
- .03 The interest rate scenario would be consistent among the insurer's lines of business.
- .04 The investment strategy defines reinvestment and disinvestment practice for each type, depreciation risk classification, and term of the invested assets that support insurance contract liabilities. Assumption of an investment strategy implies investment decisions of reinvestment and disinvestment consistent with that strategy and, hence, the risk inherent in that strategy.
- .05 The investment strategy for each scenario would be consistent with the insurer's current investment policy and would be consistent with the insurer's expected practice. The insurance contract liabilities would make no provision for any increased risk that may result from a future change in the insurer's investment policy. The insurer's expected practice would be determined without taking into consideration any business that could be issued after the valuation date (new sales).

- .06 The actuary would ensure that the proportion of non-fixed-income assets in the portfolio, at each duration, would be in accordance with the insurer's current investment policy.
- .07 The number of assumed terms of risk-free assets would be large enough to permit assumption of changes in the shape and steepness of the yield curve. That implies a minimum of a short, a medium, and a long term.
- .08 In all scenarios other than the base scenario, credit spreads include margins for adverse deviations as described in paragraph 2340.14. The actuary would also include an additional provision for adverse deviations by modifying the assumptions, if needed, on each fixed-income asset purchased or sold on or after the 5th anniversary from the calculation date, such that
- For assets purchased or sold on or after the 30th anniversary from the calculation date, the difference between the asset's credit spread and its asset depreciation assumption, the net credit spread is not larger than a maximum promulgated from time to time by the Actuarial Standards Board; and
 - For assets purchased or sold between the 5th and 30th anniversary from the calculation date, the net credit spread is not larger than that determined using a uniform transition between the corresponding difference if the asset were purchased on the 5th anniversary from the calculation date and the promulgated maximum if the asset were purchased on the 30th anniversary from the calculation date.
- .09 A scenario for a foreign country's interest rates would be formulated independently of that for Canadian interest rates unless a positive historical correlation is expected to continue.
- .10 The importance of the assumptions for a particular forecast period depends on the magnitude of the net forecasted cash flow for that period.
- .11 The Actuarial Standards Board will promulgate from time to time the following ultimate risk-free reinvestment rates for use in the base scenario and the prescribed scenarios
- Short-term ultimate risk-free reinvestment rate-high;
 - Long-term ultimate risk-free reinvestment rate-high;
 - Short-term ultimate risk-free reinvestment rate-median;
 - Long-term ultimate risk-free reinvestment rate-median;
 - Short-term ultimate risk-free reinvestment rate-low; and
 - Long-term ultimate risk-free reinvestment rate-low.

- .12 Ultimate risk-free reinvestment rates at other terms would be determined in accordance with the historical relationship between rates at those terms and the short- and long-term rates. Ultimate risk-free reinvestment rate-low refers to low rates at all terms (including short-term ultimate risk-free reinvestment rate-low and long-term ultimate risk-free reinvestment rate-low), and similarly for ultimate risk-free reinvestment rate-median and ultimate risk-free reinvestment rate-high.
- .13 The parameters in the base and prescribed scenarios, including maximum net credit spreads, apply to investments denominated in Canadian dollars. For the base and each prescribed scenario, the actuary would determine the corresponding parameters for investments denominated in a foreign currency from the historical relationship between investments denominated in that currency and investments denominated in the Canadian dollar if the expected continuance of that relationship so permits. Otherwise the actuary would devise independent scenarios for investments denominated in that currency.

Base scenario

- .14 In the base scenario,
- Risk-free interest rates effective after the calculation date would be equal to the forward interest rates implied by the equilibrium risk-free market curve at that date, for the first 20 years after the calculation date;
 - At and after the 60th anniversary from the calculation date, risk-free interest rates would be equal to the ultimate risk-free reinvestment rate-median;
 - At the 40th anniversary from the calculation date, the risk-free interest rates would be equal to 30% of the rates at the 20th anniversary plus 70% of the rates at the 60th anniversary;
 - Between the 20th and 40th and between the 40th and 60th anniversaries, the risk-free interest rates would be determined using a uniform transition; and
 - Credit spreads at all durations would be the best estimate described in paragraph 2340.12.
- .15 The provision for adverse deviations for interest rate risk for both deterministic and stochastic applications would be measured as the difference between the reported insurance contract liabilities and the insurance contract liabilities resulting from the application of the base scenario.

Prescribed scenarios

- .16 Because future investment returns and inflation rates are so conjectural, it is desirable that the calculation of insurance contract liabilities for all insurers takes account of certain common assumptions. There are, therefore, eight prescribed scenarios as presented below.
- .17 The prescribed scenarios apply to fixed-income assets purchased or sold after the calculation date.
- .18 For a prescribed scenario, if the net cash flow forecast for a period is positive, then the actuary would assume its application to repay the outstanding balance, if any, of borrowing in accordance with paragraph 2330.19.
- .19 For a prescribed scenario, if the net cash flow for a period is negative, then the actuary would assume an offsetting disinvestment or borrowing, or a mix of the two. For insurer-controlled investment decisions, any borrowing would be in accordance with the investment policy, would be short-term, and would be expected to be repayable soon by subsequent positive forecasted net cash flow.

Prescribed scenario 1

- .20 The risk-free interest rates for investments purchased or sold
- At the calculation date are those available in the market;
 - At the 40th anniversary from the calculation date and beyond, the risk-free interest rates are equal to ultimate risk-free reinvestment rate-low;
 - At the 1st anniversary from the calculation date, the risk-free interest rates are equal to 90% of the risk-free interest rates at the calculation date;
 - At the 20th anniversary of the calculation date, the risk-free interest rates are equal to 10% of the risk-free interest rates at the calculation date plus 90% of ultimate risk-free reinvestment rate-low; and
 - Between each of the calculation date and the 1st, 20th, and 40th anniversaries, the risk-free interest rates are determined using a uniform transition.

Prescribed scenario 2

- .21 This scenario is the same as prescribed scenario 1, with the ultimate risk-free reinvestment rate-low replaced by the ultimate risk-free reinvestment rate-high, and the 90% multiplier applicable on the 1st anniversary replaced by 110%.

Prescribed scenario 3

- .22 The oscillation period for use in prescribed scenarios 3 to 6 is 20 years.

- .23 The long-term risk-free interest rate moves cyclically between long-term ultimate risk-free reinvestment rate-low and long-term ultimate risk-free reinvestment rate-high as follows:
- Over the first quarter oscillation period, the long-term risk-free interest rate moves uniformly from the long-term interest rate at the calculation date to 75% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-low);
 - Over the next quarter oscillation period, the long-term risk-free interest rate moves uniformly from 75% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-low) to long-term ultimate risk-free reinvestment rate-low;
 - Over the next half oscillation period, the long-term risk-free interest rate moves uniformly from the long-term ultimate risk-free reinvestment rate-low to the long-term ultimate risk-free reinvestment rate high; and
 - This cycle is repeated for the remaining oscillation periods.
- .24 The short-term risk-free interest rate moves as follows:
- Over the first quarter oscillation period, the short-term risk-free interest rate moves uniformly from the short-term interest rate at the calculation date to 50% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-low);
 - Over the next quarter oscillation period, the short-term risk-free interest rate moves uniformly from 50% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-low) to 60% of the corresponding long-term interest rate; and
 - Thereafter remains at 60% of the corresponding long-term interest rate.
- .25 Other interest rates are determined using yield rates that are appropriate for the terms of those assets, in accordance with the historic relationship between the rates of those assets and the short- and long-term interest rates.

Prescribed scenario 4

- .26 This scenario is similar to prescribed scenario 3, but with the peaks of prescribed scenario 3 coinciding with the troughs of prescribed scenario 4. Over the first quarter oscillation period, the long-term risk-free interest rate moves uniformly from the long-term risk-free interest rate at the calculation date to 125% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-high). Over the next quarter oscillation period, the long-term risk-free interest rate moves uniformly from 125% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-high) to long-term ultimate risk-free reinvestment rate-high. Over the next half oscillation period, the long-term risk-free interest rate moves uniformly from the long-term ultimate risk-free reinvestment rate-high to the long-term ultimate risk-free reinvestment rate-low, and this cycle is repeated for the remaining oscillation periods.
- .27 The short-term risk-free interest rate moves as follows:
- Over the first quarter oscillation period, the short-term risk-free interest rate moves uniformly from the short-term interest rate at the calculation date to 150% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-high);
 - Over the next quarter oscillation period, the short-term risk-free interest rate moves uniformly from 150% of (80% of the risk-free interest rates at the calculation date plus 20% of ultimate risk-free reinvestment rate-high) to 60% of the corresponding long-term interest rate; and
 - Thereafter remains at 60% of the corresponding long-term interest rate.

Prescribed scenario 5

- .28 This scenario is the same as prescribed scenario 3, except that the short-term risk-free interest rate at an anniversary of the calculation date is a percentage of the corresponding long-term risk-free interest rate. That percentage moves cyclically in 20% annual steps from 40% to 120% and back. The first cycle is irregular:
- Over the first quarter oscillation period, the short-term risk-free interest rate moves uniformly from the short-term interest rate at the calculation date to 40% of the corresponding long-term interest rate.
 - Thereafter the short-term risk-free interest rate moves cyclically in 20% annual steps from 40% to 120% and back.

Prescribed scenario 6

- .29 As respects long-term risk-free interest rate, this scenario is the same as prescribed scenario 4.
- .30 As respects short-term risk-free interest rate, this scenario is the same as prescribed scenario 5, except that, over the first quarter oscillation period, the short-term risk-free interest rate moves uniformly from the short-term interest rate at the calculation date to 120% of the corresponding long-term interest rate. Thereafter the short-term risk-free interest rate moves cyclically in 20% annual steps from 120% to 40% and back.

Prescribed scenario 7

- .31 The risk-free interest rates for investments purchased or sold
- At the calculation date are those available in the market;
 - At the 60th anniversary from the calculation date and beyond, are equal to 80% of the ultimate risk-free reinvestment rate-median;
 - At the 1st anniversary from the calculation date, are equal to 80% of the risk-free interest rates at the calculation date;
 - At the 20th anniversary from the calculation date, are equal to 80% of (30% of the risk-free interest rates at the calculation date plus 70% of ultimate risk-free reinvestment rate-median);
 - At the 40th anniversary from the calculation date, are equal to 80% of (10% of the risk-free interest rates at the calculation date plus 90% of ultimate risk-free reinvestment rate-median); and
 - Between each of the calculation date and the 1st, 20th, 40th, and 60th anniversaries, are determined using a uniform transition.

Prescribed scenario 8

- .32 This scenario is the same as prescribed scenario 7, with the 80% replaced by 120%.

Other scenarios

- .33 In addition to the prescribed scenarios, which would be common to the calculation of insurance contract liabilities for all insurers, the actuary would also select other scenarios that would be appropriate to the circumstances affecting the work. The reasonableness of degrees of change of interest rates would be largely dependent on the period of time being considered. Other plausible scenarios would include parallel shifts up and down as well as flattening and steepening of the yield curve.

- .34 The number of other interest rate scenarios would be relatively large to the extent that
- The pattern of forecasted net cash flow in the base scenario is such that the classification of scenarios between favourable and unfavourable is unclear;
 - Forecasted net cash flow is sensitive to the selection of interest rate scenarios;
 - The range of present values of forecasted net cash flow is wide, suggesting exposure to mismatch risk;
 - Investment policy does not control mismatch risk;
 - Asset-liability management policy allows a wide range of practice; or
 - Flexibility to manage assets or liabilities is limited.

2340 Other assumptions: Economic

Margin for adverse deviations

- .01 To set the level of the margin for adverse deviations as specified in paragraph 2320.54, significant considerations indicating difficulties in properly estimating the best estimate assumption would include
- There is little relevant experience;
 - Future experience is difficult to estimate;
 - Operational risks adversely affect the likelihood of obtaining the best estimate assumption;
 - Asset underwriting criteria are weak or poorly controlled;
 - There are liquidity concerns;
 - There is uncertainty regarding the credit enhancement techniques used;
 - The trust structure and legal responsibilities of the different parties for a securitized asset are not clearly understood in a practical and/or legal sense;
 - The asset held is from a non-pass-through structure with a repackaging of the credit risk that is difficult to understand;
 - The asset held is from a lower-quality tranche from a structure that is not a pass-through structure that repackages credit risks;
 - There is uncertainty about the counterparty credit; or
 - There is no netting of the aggregate exposure with a counterparty.
- .02 Significant considerations indicative of a potential deterioration of the best estimate assumption would include situations where operational risks are present such that the likelihood of continuing to obtain the best estimate assumption is adversely impacted.

Fixed income assets: investment return

- .03 The forecast of cash flows from a fixed income asset would be the promised cash flows over the term of the asset, modified for asset depreciation and borrower and issuer options.

Fixed income assets: asset depreciation

- .04 The actuary's best estimate of asset depreciation would depend on
- Asset type, credit rating, liquidity, term, and duration since issue;
 - Subordination to other debt of borrower or issuer;
 - The insurer's credit underwriting standards, diversification within a particular type of investment, to the extent that it is indicative of the future, and the insurer's own experience;
 - The insurance industry's experience;
 - Guarantees that offset depreciation, such as that in an insured mortgage; and
 - Potential for anti-selection by borrowers and issuers.
- .05 Asset depreciation comprises that of both assets that are impaired at the calculation date and assets that become impaired after the calculation date, and includes loss of interest, loss of principal, and expense of managing depreciation.
- .06 Asset depreciation is likely to be relatively high after the forced renewal of a mortgage loan; i.e., one where the mortgagor can neither pay, nor find an alternative mortgagee for the balance outstanding at the end of its term but is able to continue its amortization. The explicit forecasting of subsequent cash flow is usually so conjectural that to commute the cost of that asset depreciation to the end of the term of the mortgage would be an acceptable approximation unless it undermines the interest rate assumption in the scenario.
- .07 The actuary would not necessarily assume that the best estimate of asset depreciation is less than the asset's credit spread.
- .08 The low and high margins for adverse deviations for a scenario would be respectively 25% and 100% of the best estimate for that scenario, except that
- A higher range would be appropriate where those percentages of an unusually low best estimate are not meaningful; and
 - Zero would usually be appropriate for an Organisation for Economic Cooperation and Development (OECD) government's debt denominated in its own currency.

Fixed income assets: exercise of borrower and issuer options

- .09 Examples of borrower and issuer options are the option to prepay a mortgage loan, to extend the term of a loan, and to call a bond.

- .10 The assumed exercise of an option may depend on the interest rates in the scenario. Anti-selection by commercial borrowers and issuers would usually occur systematically.
- .11 Forecasted cash flows would include any penalty generated by exercise of an option.

Fixed income assets: credit spreads

- .12 The best estimate of credit spreads
- Would be the credit spreads observable in the market at the calculation date;
 - At and after the 5th anniversary from the calculation date, would be based on long-term historical average credit spreads corresponding to assets by type, credit rating, and term; and
 - Between the calculation date and the 5th anniversary, would be determined using a uniform transition.
- .13 When choosing the best estimate of credit spreads based on long-term historical averages, the actuary would consider
- Using as long a period of history as practicable; and
 - Adjusting the assumptions to reduce any inconsistencies that may arise from using different historical periods or sources of information for different asset types, credit ratings, or terms.
- .14 The margin for adverse deviations in credit spreads would be
- Zero at the calculation date;
 - An addition or subtraction, as appropriate in aggregate, of 10% of the best estimate assumptions at and after the 5th anniversary from the calculation date; and
 - Between the calculation date and the 5th anniversary, the margin for adverse deviations as percentage of the best estimate would be determined using a uniform transition.

Non-fixed income assets: investment return

- .15 Where reliable historical data are available, the actuary would choose the best estimate of investment return on a non-fixed income asset (such as common shares, real estate and other non-fixed income portfolios) such that it would not be more favourable than a benchmark based on historical performance of assets of its class and characteristics.

- .16 Where the best estimate for a class of non-fixed income assets is based on reliable historical data, the margin for adverse deviations in the assumption of non-fixed income capital gains would be 20% of the best estimate plus an assumption that those assets change in value at the time when the change is most adverse. That time would be determined by testing, but usually would be the time when their book value is largest. The assumed change as a percentage of market value
- Of a diversified portfolio of North American common shares would be 30%; and
 - Of any other portfolio would be in the range of 20% to 50% depending on the volatility relative to a diversified portfolio of North American common shares.
- .17 Where the best estimate for a class of non-fixed income assets is based on reliable historical data, the low and high margins for adverse deviations in the assumptions of income on the class (for example, common share dividends and real estate rental income) would be respectively 5% and 20%. Furthermore, if the ratio of income (other than that fixed by agreement) to asset value increases following the assumed change in asset value described in paragraph 2340.16, the margin for adverse deviations in the assumption for income would be adjusted so the ratio five years after the assumed change in asset value is not higher than the ratio immediately before the assumed change in asset value.
- .18 Where reliable historical information is not available for a non-fixed income class of assets, the actuary would select a best estimate investment return assumption and margins for adverse deviations such that the assumed return in excess of risk-free interest rates, net of margins, would not exceed the assumed return in excess of risk-free interest rates, net of margins, for a similar asset class for which reliable historical information is available in the same jurisdiction, or in Canada if there is no relevant reliable historical information in the same jurisdiction.
- .19 Whether the assumed change is a gain or loss would depend on its effect on benefits to policy owners. A capital loss may reduce insurance contract liabilities as a result of that effect.

- .20 If non-fixed income assets are used to support liability cash flows that are not substantially linked to returns on non-fixed income assets, the actuary would include an additional provision for adverse deviations by modifying the assumed investment strategy in the scenario adopted, if needed, so that the amount of non-fixed income assets supporting such liability cash flows at the calculation date and at each duration in the projection does not exceed the amount required to support 20% of cash outflows for the first 20 years and 75% thereafter, where cash outflows are the greater of the annual liability cash flows and zero in each forecast period. The actuary would not consider this additional provision when selecting the scenario used to establish the insurance contract liabilities. This modification of the assumed investment strategy would be applied at each duration independently.

Taxation

- .21 The best estimate would be for continuation of the tax regime at the calculation date, except that the best estimate would anticipate a definitive or virtually definitive decision to change that regime. The margin for adverse deviations would be zero.

Foreign exchange

- .22 The needed assumptions would include foreign exchange rates when insurance contract liabilities and their supporting assets are denominated in different currencies.
- .23 The base scenario used to develop the assumption for foreign exchange rates would be based on currency forwards. If currency forwards are not available, the forward exchange rates would be derived based on risk-free interest rate differentials where available. If neither is available, the actuary would use his or her best judgment to develop an appropriate approach.
- .24 A provision for adverse deviations would be developed from a scenario using adverse movements in the exchange rate. Such movements would reflect the historical volatility in the exchange rate over the applicable period. The provision for adverse deviations would be the excess of the insurance contract liabilities based on this adverse scenario over the insurance contract liabilities calculated using the base scenario.
- .25 A minimum provision for adverse deviations would apply. This would be the excess of the insurance contract liabilities resulting from the application of an adverse 5% margin to the projected exchange rates underlying the base scenario over the insurance contract liabilities calculated using the base scenario.

2350 Other assumptions: non-economic

Margin for adverse deviations

- .01 The actuary would select a margin for adverse deviations between a low margin and a high margin
- Specified for each best estimate assumption discussed below; and
 - Of 5% and 20% (or –5% and –20%), respectively, of each other best estimate assumption.
- .02 If a margin for adverse deviations cannot be defined as a percentage of the best estimate assumption, then the related provision for adverse deviations would be taken as the increase in insurance contract liabilities that results from substitution of a conservative assumption for the best estimate assumption.
- .03 Significant considerations indicating difficulties in properly estimating the best estimate assumption would include
- The credibility of the company's experience is too low to be the primary source of data;
 - Future experience is difficult to estimate;
 - The cohort of risks lacks homogeneity;
 - Operational risks adversely impact the likelihood of obtaining best estimate assumption; or
 - The derivation of the best estimate assumption is unrefined.
- .04 Significant considerations indicative of a potential deterioration of the best estimate assumption would include
- A significant concentration of risks and/or lack of diversification;
 - Operational risks that adversely affect the likelihood of continuing experience which is consistent with the best estimate assumption; or
 - Past experience that may not be representative of future experience and the experience may deteriorate.

Other significant considerations may exist, but are tied to specific assumptions. Where applicable, they are described below.

- .05 A selection above the high margin would be appropriate, however, for unusually high uncertainty or if the resulting provision for adverse deviations is unreasonably low because the margin is expressed as a percentage and the best estimate is unusually low.

Insured life mortality

- .06 The actuary's best estimate of insured life mortality would depend on
- The life insured's age, sex, smoking habit, health, and lifestyle;
 - Duration since issue of the policy;
 - Plan of insurance and its benefits provided;
 - The insurer's underwriting practice (that of its reinsurer for facultative reinsurance), including, if applicable to the policy, the absence of underwriting or less stringent underwriting for a group of simultaneously sold policies;
 - The size of the policy; and
 - The insurer's distribution system and other marketing practice;
- and would include the effect of any anti-selection.
- .07 The actuary would consider the inclusion of mortality improvement (a secular trend toward lower mortality rates) in the best estimate assumption and associated margin. The margin for adverse deviations related to the mortality improvement assumption is not restricted to the range of 5% to 20% noted in paragraph 2350.01.
- .08 If the inclusion of mortality improvement reduces the insurance contract liabilities, then the resulting reduction would be no greater than that developed using prescribed mortality improvement rates as promulgated from time to time by the Actuarial Standards Board. If, at an appropriate level of aggregation, the inclusion of mortality improvement increases the insurance contract liabilities, then the actuary's assumption would include such improvement. The resulting increase in insurance contract liabilities would be at least as great as that developed using prescribed mortality improvement rates as promulgated from time to time by the Actuarial Standards Board.
- .09 The low and high margins for adverse deviations for the mortality rates per 1,000 would be respectively an addition or subtraction, as appropriate, of 3.75 and 15, each divided by the curtate expectation of life at the life insured's projected attained age. These margins for adverse deviations are applied after mortality improvement.

Annuitant mortality

- .10 The actuary's best estimate assumption of annuitant mortality would depend on
- The annuitant's age, sex, smoking habit, health, and lifestyle;
 - Size of premium;
 - Plan of annuity and its benefits provided; and
 - Whether registered or not, whether structured settlement, and whether group or individual contract;
- and would include the effect of any anti-selection resulting from the annuitant's option to select the timing, form, or amount of annuity payment, or to commute annuity payments.
- .11 The insurance underwriting in a "back-to-back" insurance/annuity package may unfavourably affect the best estimate.
- .12 The mortality improvement assumption would include a best estimate assumption and an associated margin. The margin for adverse deviations related to the mortality improvement assumption is not restricted to the range of 5% to 20% noted in paragraph 2350.01. The actuary's assumption would include mortality improvement, the effect of which is to increase insurance contract liabilities, such that the resulting increase would be at least as great as that developed using prescribed mortality improvement rates as promulgated from time to time by the Actuarial Standards Board.
- .13 The low and high margins for adverse deviations for the mortality rates would be respectively a subtraction of 2% and 8% of the best estimate.
- .14 An additional significant consideration for the determination of the level of margin for adverse deviations would be the possibility of commuting survival dependent benefits after periodic payments have started.

Morbidity

- .15 The actuary's best estimate of insured life morbidity would depend on
- The life insured's age, sex, smoking habit, occupation, industry, health, and lifestyle;
 - Duration since issue of the policy;
 - In the case of income replacement insurance, definition of disability, unemployment levels, and, in the case of an outstanding claim, cause of disability;
 - Plan of insurance and its benefits provided, including elimination period, guarantees, deductibles, coinsurance, return-of-premium benefits, and benefit limits, indexation, and offsets;
 - The insurer's underwriting practice (that of its reinsurer for facultative reinsurance), including, if applicable to the policy, the absence of underwriting or less stringent underwriting for a group of simultaneously sold policies;
 - The insurer's administration and claim adjudication practice;
 - The size of the policy;
 - Seasonal variations;
 - In the case of group insurance, participation level; and
 - Environmental factors, such as a change in the offset to government benefits;
- and would include the effect of any anti-selection.
- .16 If the actuary selects a higher than usual best estimate of disability incidence because of an outlook for a high level of unemployment, he or she would not necessarily select a concomitant higher than usual best estimate of disability termination.
- .17 The low and high margins for adverse deviations would be, respectively, an addition of 5% and 20% of the best estimate of morbidity incidence rates, and a subtraction of 5% to 20% of the best estimate morbidity termination rates. The actuary's selection would reflect any expected correlation between incidence and termination rates.

.18 Additional significant considerations to be taken into account when determining the level of margin for adverse deviations would include

- Contract wording is not tight enough to protect against medical advances;
- Definitions of claim events are not precise and/or not protecting against potential anti-selection; or
- Interpretation of claim event definitions by the court uncertain.

Withdrawal and partial withdrawal

.19 The actuary's best estimate of withdrawal rates would depend on

- Policy plan and options;
- The life insured's attained age;
- Duration since issue of the policy;
- Method of payment and frequency of premiums;
- Premium paying status;
- Policy size;
- The policy's competitiveness, surrender charges, persistency bonuses, taxation upon withdrawal, and other incentives and disincentives to withdrawal;
- Policy owner and sales representative sophistication;
- The insurer's distribution system and its commission, conversion, replacement, and other marketing practices; and
- The interest rate scenario;

and would include the effect of any anti-selection.

.20 The insurer's withdrawal experience would be pertinent and usually credible. It would not be available for new products and for higher durations on recent products, which is a problem for the actuary if the insurance contract liabilities are sensitive to withdrawal rates.

.21 The automatic payment of insurance premiums by the annuity benefit in a "back-to-back" insurance/annuity package would be a disincentive to withdrawal.

.22 Reinsurance assumed withdrawal rates would depend on practice in the direct insurer.

- .23 A “cliff” is a sudden significant increase in the benefit available at withdrawal. That increase may result from increase in cash value, decrease in surrender charge, or availability of a maturity benefit or persistency bonus. Unless there is pertinent persistency experience data to the contrary, the actuary’s best estimate withdrawal rates would grade to zero as the cliff approaches and remain at zero for an interval before the cliff is reached. The same would apply to a return of premium benefit in life insurance and to one in accident and sickness insurance, with modification in the latter case if the benefit is contingent upon zero claims or reduced by the amount of claims.
- .24 The actuary’s best estimate withdrawal rate would be zero for a paid-up policy without non-forfeiture benefit.
- .25 The low and high margins for adverse deviations would be, respectively, an addition or subtraction, as appropriate, of 5% and 20% of the best estimate withdrawal rates. In order to ensure that the margin for adverse deviations increases insurance contract liabilities, the choice between addition and subtraction may need to vary by interest scenario, age, policy duration, and other parameters. In the case of partial withdrawal, two assumptions would be needed, the amount withdrawn and the partial withdrawal rate.
- .26 Additional significant considerations to be taken into account when determining the level of margin for adverse deviations in situations where a decrease in lapse rates increases the insurance contract liabilities would include
- Remuneration policy encouraging persistency; or
 - Cancellation of a contract being clearly detrimental to the policy owner.
- .27 Additional significant considerations to be taken into account when determining the level of margin for adverse deviations in situations where an increase in lapse rates increases the insurance contract liabilities would include
- Remuneration policy encourages terminations;
 - Cancellation of a contract would be clearly beneficial to the policy owner;
 - Company’s contracts have provisions where rating decreases may trigger additional withdrawals; or
 - There is no market value adjustment on withdrawals for deposits and deferred annuities.

Anti-selective lapse

- .28 Strictly speaking, “lapse” means termination of a policy with forfeiture, but in the context of anti-selection has come to include any termination or the election of the extended term insurance non-forfeiture option. “Anti-selective lapse” is a tendency of policies on healthy insured lives to lapse or unhealthy insured lives not to lapse, with a concomitant deterioration in the insurer’s mortality or morbidity experience. To determine whether the tendency has operated in a particular case would require either a re-underwriting of those who have lapsed and those who have not, or a study of the mortality among those who lapsed, neither of which is likely to be practical. Policy owners will, however, make decisions in their own perceived interest, so that anti-selective lapse is plausible whenever that perceived interest is for policies on unhealthy lives not to lapse or for policies on healthy lives to lapse.
- .29 It is difficult to estimate with confidence the intensity of anti-selective lapse. It is plausible for the intensity to be proportional to the intensity of policy owner perceived interest. However, anti-selective lapse is merely a tendency provoked by the policy owner’s perceived interest. The policy owner may not know the true state of health of the life insured. The policy owner may imprudently favour, or be obliged by financial pressure to adopt, a short-term interest with long-term detriment; thus, a policy on an unhealthy life may lapse when the premium increases, the policy owner perceiving the policy to be no longer affordable. Through ignorance or inertia, a policy on a healthy life may be continued by a policy owner, even though it could be replaced by a superior one. Moreover, anti-selective lapse is not the unvarying effect of a decision in the policy owner’s perceived interest. For instance, a policy owner may lapse a policy on an unhealthy life, if the policy is no longer needed, or the policy on a healthy life may remain in force if the policy owner perceives a continuing need. Without pertinent and reliable experience, however, the actuary would not assume that the non-lapsation of policies on healthy lives favourably affects the mortality best estimate for the persisting insurance contracts.
- .30 The premise to the actuary’s assumptions would be that policy owners’ decisions
- Will tend to serve their perceived interest; and
 - Will not serve the insurer’s interest unless the two run together.

.31 Examples where the perceived interest of the policy owners of policies with healthy life insureds may be to lapse include

- Premium increase at renewal of term insurance;
- Unfavourable underwriting decision at renewal of re-entry term insurance;
- Benefit decrease or premium increase of adjustable insurance;
- Premium needed to avoid termination of universal life insurance with exhausted funding;
- Reduction in policy dividend scale;
- Offer or availability of a superior replacement policy, such as by the creation of preferred underwriting class;
- Significant but temporary increase (spike) in non-forfeiture value; and
- Downgrade in the insurer's credit rating.

Expense

.32 The actuary would select a best estimate assumption that provides for the expense of the relevant policies and their supporting assets, including overhead. The insurer's other expense is irrelevant to the valuation of insurance contract liabilities. Other expense would include

- Expense related to policies that, for the relevant policies, was incurred before the calculation date, such as marketing and other acquisition expense; and
- Expense not related to the relevant policies and their supporting assets, such as investment expense for the assets that support capital.

.33 The assumption would provide for future expense inflation consistent with that in the interest rate scenario.

.34 A stable insurer's expense experience is pertinent if its expense allocation is appropriate for valuation of insurance contract liabilities (or if the actuary can correct the inappropriateness, e.g., by reallocating corporate expense to operating lines of business).

.35 A particular insurer may have an expectation of reduced expense rates, but the actuary would anticipate only a reduction that is forecasted with confidence.

- .36 Investment expense comprises
- Administration expense, both internal and external;
 - Expense related to investment income, such as deferred fees and commissions and direct taxes; and
 - Interest on money borrowed to finance investment.
- .37 The insurer incurs neither cash rental expense nor cash rental income on real estate that it owns and occupies. The actuary would deem such expense and, if the real estate supports the insurance contract liabilities, such income at a reasonable rate in the selection of an assumption of expense and investment return.
- .38 Certain taxes are akin to expenses. The actuary would make similar provision for them in the insurance contract liabilities to the extent that they relate to the relevant insurance contracts and their supporting assets. They include both premium taxes, which are straightforward, and taxes whose basis is neither income nor net income but which may be complicated by a relationship with income tax; for example, those currently incurred may be offset against later income tax.
- .39 The low and high margins for adverse deviations would be respectively 2.5% and 10% of best estimate expense including inflation thereof. No margin for adverse deviations is needed for a tax, such as premium tax, whose history has been stable.
- .40 Additional significant considerations to be taken into account when determining the level of margin for adverse deviations would include
- Distribution of general expenses by line of business, by product, or by issue and administrative expenses is not based on a recent internal expense study;
 - Allocation is not an appropriate basis for the best estimate expense assumption;
 - Expense study does not adequately reflect the appropriate expense drivers; or
 - Future reductions in unit expenses (before inflation) are assumed.

Policy owner options

- .41 Examples of policy owner options are options to
- Purchase additional insurance;
 - Convert term to permanent insurance;
 - Select the extended term insurance non-forfeiture option;
 - Make partial withdrawal from a universal life insurance policy;
 - Select the amount of premium for a flexible premium policy; and
 - Purchase an annuity at a guaranteed rate.
- .42 The actuary would select a best estimate assumption of policy owner exercise of both contractual options and extra-contractual options of which they have reasonable expectations.
- .43 The actuary's best estimate would depend on
- Life insured's attained age;
 - Duration since issue of the policy;
 - Plan of insurance and its benefits provided;
 - Historical premium payment patterns;
 - Method of premium payment;
 - Sophistication of the policy owner and the intermediary;
 - Perceived self-interest of the policy owner and the intermediary;
 - Policy's competitiveness; and
 - Insurer's distribution system and other marketing practice;
- and would make provision for anti-selection.
- .44 The actuary would make provision for adverse deviations by testing the effect on insurance contract liabilities of plausible alternative assumptions of policy owner exercise of options and adopting one with relatively high insurance contract liabilities.

Related assumptions

- .45 The actuary would consider how the assumptions may be interrelated in determining the best estimate assumptions and appropriate margins. In determining these interrelationships the actuary would take account of potential anti-selection. For example, the actuary would consider what the relationships among term conversions, withdrawals, and mortality might be as a contract nears the end of a term renewal period.

Other examples of how potential anti-selection might affect the selection of assumptions are provided above and in section 1700.

2360 Valuation of segregated fund insurance contract liabilities

- .01 This subsection addresses considerations applicable to the valuation of insurance contract liabilities related to guarantees provided under the terms of segregated fund contracts. While the requirements of subsections 2310 to 2350 apply generally to all life and health insurance contracts including segregated fund contracts, the nature of the insurance guarantees and other provisions of segregated fund contracts are such that this additional subsection is warranted to supplement, and to clarify the application of, the preceding requirements to such contracts.

Method

- .02 The actuary should calculate insurance contract liabilities for the guaranteed benefits of segregated fund contracts by the Canadian asset liability method using stochastic modelling.
- .03 If the bifurcated approach is used, the allocation of future fee revenue between recoverability testing of the allowance for acquisition expense and providing for the cost of guarantees should not change from period to period. [Effective April 15, 2017]
- .04 A factor-based approach, approved by a regulator, would be considered an appropriate approximation and the actuary would not need to undertake testing to determine the appropriateness of this approximation.

- .05 Either of two approaches would be appropriate to value segregated fund policies where guaranteed benefits are involved and an allowance for acquisition expense is being amortized.
- For the bifurcated approach, forecast fee revenue is allocated between recoverability testing of the allowance for acquisition expense and providing for the cost of the guarantees. Where the actuary can reasonably determine an additional charge priced into the contract to cover the cost of guarantees, the portion of revenue allocated to the guarantees would reflect such additional charge, with the remainder of revenue applied to test the recoverability of the unamortized allowance for acquisition expense. The insurance contract liability for the guarantees is calculated separately using the net cash flows allocated to the guarantees while the recoverability of the allowance for acquisition expense is tested excluding those revenues allocated to the guarantees.
 - For the whole contract approach, all general account net cash flows associated with segregated funds are considered in calculating the total liability, i.e., the liability for guaranteed benefits less the balance of unamortized acquisition expense. This total liability will change over the reporting period as a result of market movements and other factors and, therefore, may need to be adjusted to remove any write-up to the balance of the allowance for acquisition expense.
- .06 Under the bifurcation approach, the requirement to use the Canadian asset liability method applies to the calculation of the liability related to guaranteed benefits and to recoverability testing of the unamortized balance of the allowance for acquisition expenses; whereas under the whole contract approach, the Canadian asset liability method would be used to calculate the total liability. In either case, the balance of the allowance for acquisition expense would be written down to zero using an appropriate method. Such method would
- Have a term consistent with the extended term established at inception;
 - Have a write-down pattern reasonably matched with the net cash flow available to offset these expenses at inception; and
 - Be locked in, so that the amount of write-down in each period will not fluctuate from the expected amount established at inception provided such balance is recoverable from the additional cash flow recognized at the calculation date, and where not fully recoverable at the calculation date, is written down to the recoverable amount, with the expected amount of write-down in each future period proportionately reduced.

Term of the liability

- .07 While the provisions of subsection 2320 concerning the term of the liability apply generally to segregated fund contracts, an exception to paragraph 2320.21 would apply to segregated fund contracts that contain material constraints. In this situation, the term of the liability would end at the date after the calculation date which maximizes the insurance contract liabilities, consistent with the treatment for contracts with no material constraints.
- .08 The actuary would extend the term of the liability as determined under subsection 2320
- To permit reflection of hedging arrangements related to segregated fund guarantees by considering both the value of the liability and its associated hedge, where the resulting statement of financial position presentation is consistent with market movements over the reporting period; and
 - Where such extension would be subject to constraints on the amount of net cash flow capitalized, consistent with an unhedged position.

Assumptions – non-economic

- .09 In addition to considerations discussed in subsection 2350, the following considerations apply to the valuation of liabilities for segregated fund guarantees and recoverability testing of the allowance for acquisition expense.
- .10 The actuary's best estimate of withdrawal rates would depend on
- Extent to which the guaranteed values are greater or less than the market value of the funds;
 - Time to maturity;
 - Systematic withdrawal consistent with the contractual terms of the policies;
 - Market conditions; and
 - Distribution of investment income from the funds if such amounts are not automatically reinvested.
- .11 The actuary would select a best estimate assumption for management expense ratios (including all taxes charged to the fund such as GST) that varies by fund according to the terms of the contract and recent practice of the insurer. The actuary would not assume a change in management expense ratios in the future unless there is a clear and justifiable reason for doing so, taking into account past practices, competitive pressures, and reasonable policy owner reactions.

Policy owner options

- .12 The actuary would assume the contract terminates on maturity unless allowing a proportion of the policy owners to roll their contracts over would increase the insurance contract liabilities. The proportion of policy owners that elect to roll their policies over would take into account the experience of the insurer. The actuary would test future maturity dates that the policy owner may elect and would use caution in setting this maturity date assumption.
- .13 The actuary would test the effect of fund transfers and shifting asset mix and would exercise caution in assuming that the status quo would be maintained indefinitely.
- .14 The actuary would test the effect of future optional deposits to the extent they can reasonably be anticipated and use caution in assuming that the status quo would be maintained indefinitely.
- .15 The actuary's best estimate of rates at which ratchet and reset options are exercised by policy owners would depend on the
- Extent to which the guaranteed values are greater than the market value of the funds;
 - Relationship of the fund value and guaranteed benefit amounts;
 - Term to maturity; and
 - Growth of funds.
- .16 If resets are discretionary, the actuary would assume that some proportion of policy owners would elect to exercise the reset option when it is in their financial best interest to do so. The actuary need not assume that all policy owners would act with absolute efficiency in an economically rational manner. However, the assumptions would allow the frequency of elective resets to vary according to the current and/or historical economic environment.
- .17 The actuary would consider the extent to which an increase in partial withdrawals on segregated funds might lead to deferrals in benefit commencement dates.

2370 Stochastic scenarios

- .01 Where the actuary uses stochastic modelling techniques to reflect assumptions for interest rates and/or investment returns, the development of scenarios should consider
- Selection of market indices and proxies;
 - Development of economic scenario generators and model parameters; and
 - Calibration of risk-free interest rates and investment returns (i.e., equity returns, bond fund returns and money market returns).
- .02 Where investment returns are stochastically modelled, the calibration of stochastic models used in the valuation should meet the criteria for investment returns as promulgated from time to time by the Actuarial Standards Board.
- .03 Where the interest rate scenarios selected are stochastically modelled, the actuary's calibration of stochastic models should meet the criteria for risk-free interest rates as promulgated from time to time by the Actuarial Standards Board. [Effective April 15, 2017].
- .04 Where valuation is performed using stochastic scenarios, the actuary would assign a value to the insurance contract liabilities which is within the range defined by
- The average of those values that are above the 60th percentile of the range of liability values produced by the entire set of modelled scenarios; and
 - The corresponding average for the 80th percentile.
- .05 Each average value referred to above is referred to as a conditional tail expectation and the specific average values described above can for simplicity be denoted by CTE[60] and CTE[80] respectively.
- .06 With respect to interest rate scenarios, the actuary would adopt a scenario where the insurance contract liabilities are higher than the midpoint of the range CTE[60] to CTE[80] whenever current long-term risk-free interest rates are near the limits or outside the range of long-term ultimate risk-free reinvestment rate-low to long-term ultimate risk-free reinvestment rate-high or whenever any of the considerations in paragraph 2330.34 exist.

Random number generators

- .07 The random numbers generated by computer algorithms are called pseudorandom because they are not truly random. Knowing the algorithm and the seed to the sequence is sufficient to predict the next random number that will be generated. A sound pseudorandom number generator provides a sequence that is statistically indistinguishable from a truly random sequence from the given distribution. The actuary would test the random number generator to demonstrate that it provides a sequence that is statistically indistinguishable from a truly random sequence for the given distribution.
- .08 It would be preferable for the results from stochastic modelling to be reproducible, so that a repeatable pseudorandom number generator would be available to an auditor.

Number of scenarios

- .09 The actuary would test that the number of scenarios used to calculate the insurance contract liabilities provides an acceptable level of precision that meets the standard of materiality. To increase the precision of the insurance contract liability calculation, it may be necessary to increase the number of scenarios significantly.
- .10 The actuary may consider scenario reduction techniques, such as stratified sampling, to reduce the number of scenarios on a sound statistical basis.

Modelling period

- .11 The actuary would use a modelling period that is not longer than one month unless testing shows that the liability value is not sensitive to the frequency of election of benefits or features.

Economic scenario generators

- .12 The actuary would develop stochastic models for each market index or proxy that is constructed.
- .13 The actuary would select economic scenario generators for stochastic models that are robust and statistically sound.

Model parameter estimation

- .14 The actuary would estimate model parameters based on historical market data as opposed to recent market performance. The historical data would cover a period at least twice as long as the projection period. However, when historical data are not available or appropriate for use, adjustments may be required.
- .15 The actuary would update model parameters regularly to reflect recent changes in market conditions.

- .16 When market data for foreign indices are used to estimate model parameters, the foreign exchange rate would be taken into account. The actuary may consider separate parameters for the market index and for the foreign exchange rate, for example, by including an explicit currency exchange model together with using local currency data to estimate the model parameters.
- .17 Parameters would take into account appropriate correlations among investment returns for all market indices and proxies that are constructed.

Selecting investment return assumptions for specific funds

- .18 To develop investment returns for a specific fund, an appropriate proxy for the fund would be constructed. The specific fund's investment policy, its asset allocation implied by the fund performance objective, its performance history, and its trading activities would be considered and reflected in the proxy asset composition. The proxy may take the form of a combination of recognized market indices or economic sector sub-indices or, less commonly, a well-defined set of trading rules in a specified asset universe. It would be appropriate for there to be a close relationship between the investment return proxy and the specific funds.

Investment returns would be generated on a gross basis, before the application of any fees or consideration of specific product features. The objective would be to model the investment returns independently of any product features. However, care would be taken to assess whether total or price returns are required for the specific funds being modelled.

Discount rates

- .19 Where a discounting approach is used in conjunction with stochastic modelling as an approximation to the Canadian asset liability method, the actuary would select discount rates (or accumulation rates) to determine the asset balance necessary to support the liabilities under a given scenario using the assets allocated at the calculation date to support the liabilities and reflecting in a reasonable manner portfolio yields that would be projected given the insurer's investment policy and hedging practices.

Base scenario

- .20 With respect to investment return scenarios, the base scenario for calculating the provision for adverse deviations would be defined as a notional or implicit scenario, which would result in a liability equal to the average of the insurance contract liabilities for all modelled investment return scenarios. This implicit scenario does not need to be explicitly identified or described.

2400 The Appointed Actuary

2410 Definitions

- .01 In sections 2400 and 2500, “senior management” means
- In the case of a Canadian insurer, the chief executive officer, the chief financial officer, and the chief risk officer; and
 - In the case of a foreign insurer, both the chief agent for Canada and the person designated by the insurer as having responsibility for its Canadian operation.
- .02 In this section 2400, “directors” means an insurer’s board of directors and, in the case of a foreign insurer, includes the person whom they designate as responsible for the insurer’s Canadian branch.

2420 Scope

- .01 Part 1000 applies to work within the scope of this section 2400.
- .02 This section 2400 applies to an appointed actuary who, pursuant to
- The federal Insurance Companies Act, is the actuary of a company or society;
 - The federal Insurance Companies Act, is the actuary of the Canadian branch of a foreign company; or
 - A provincial Act, has the access to information, protection against civil liability, and duties in an insurer, that are substantially the same as those of the appointed actuary in the federal Act.
- .03 This section 2400 also applies to an actuary who has the access to information and protection against civil liability equivalent to that which the federal Insurance Companies Act grants to an appointed actuary, even if this actuary is not an appointed actuary.

2430 Accepting and continuing an engagement

- .01 Section 1400 applies rigorously to the engagement. [Effective April 15, 2017]

Qualifications, experience, and knowledge

- .02 The necessary qualifications, experience, and knowledge for the engagement go beyond technical understanding and include the awareness that comes with maturity, communication with other actuaries, discussions at Institute meetings, and familiarity with conditions both internal and external to the insurer, and include communications skills.

- .03 An actuary accepting an engagement for the first time may wish to arrange professional, formal, and timely access to another actuary with experience as an appointed actuary.
- .04 It is important that the insurer's directors understand and accept the actuary's role and its requirements for time, resources, and access to information. The actuary may wish written confirmation of the understanding and acceptance unless the role is part of the insurer's corporate culture.

Information needed

- .05 The information necessary for the work consists of the records, accounts, documents, and oral briefings which provide an understanding of the insurer's operations, its obligations, and the resources available to meet those obligations. That information includes, but is not limited to
- Files of in-force policies and outstanding claims, including their reinsurance;
 - Policy provisions and other communications with policy owners;
 - Past experience data;
 - Past financial data;
 - Communications with auditors and regulators;
 - Pricing practice;
 - Underwriting practice;
 - Accounting practice;
 - Claims settlement practice (including case estimate practice) and cost;
 - Asset-liability management practice;
 - Capital management practice;
 - Enterprise risk management policy; and
 - Own risk and solvency assessment (ORSA) report.

- .06 The process to identify and assure timely receipt of that information includes
- An understanding of the insurer's decision-making;
 - Continual communication with members of management who can supply information; and
 - Continual communication with the auditor in accordance with the CIA/CICA *Joint Policy Statement*.

2440 Report on matters requiring rectification

- .01 The appointed actuary should identify and monitor matters that may threaten the insurer's financial condition. The appointed actuary should investigate and then report, as required by law, any such matter that requires rectification to the senior management and, in the case of a Canadian insurer, send a copy of the report to the directors. Depending on the jurisdiction of the insurer, the law may also require that the report be provided to the insurer's regulator.
- .02 The report may include recommendations for rectification and should specify a deadline for rectification that the actuary may later extend if appropriate. If there is no suitable rectification by that deadline or its extension, then the appointed actuary should report the matter to the insurer's regulator. [Effective April 15, 2017]
- .03 The sensitivity of financial condition to adverse conditions and events varies among insurers. Financial condition and hence, the magnitude of the conditions and events that may threaten it, also varies among insurers.
- .04 The frequency and intensity of the monitoring depend on the threatening conditions and events and on the circumstances of the insurer. A quarterly review would usually be a minimum.
- .05 There would be no such report to senior management of an adverse condition that does not threaten the insurer's financial condition. Informal notification and consultation would usually precede, and may obviate, that report to senior management.
- .06 That report would describe the threatening condition or event and the assumptions and methods in the actuary's investigation of it. It is desirable that the report includes recommendations for its rectification.
- .07 The deadline would allow time, that is reasonable in the circumstances, to arrange rectification.
- .08 The report to the regulator would describe the actuary's investigation, the report to senior management, and senior management's response to that report. The actuary would advise the directors of the report to the regulator.

2450 Report to the directors

- .01 The appointed actuary for a Canadian insurer should report at least yearly to the directors, or to their audit committee if the directors so delegate,
- On the insurer's financial position and financial condition; and
 - If required by law;
 - If the insurer has one or more participating accounts;
 - On the method of allocation of income and expenses to each such participating account;
 - On the management of the participating account(s), the dividend policy and dividend scales for the participating policy owners; and
 - If the insurer has adjustable policies in force, on the criteria established or amended by the directors for changes made by the company to the premium or charge for insurance, amount of insurance or surrender value in respect of its adjustable policies.
- .02 The appointed actuary for a foreign insurer should report at least yearly to its chief agent for Canada on its financial position and financial condition. [Effective April 15, 2017]

Allocation of income

- .03 The report on allocation of income and expenses among accounts would consider the fairness and equity of such allocation to participating policy owners.

Management of the participating account(s)

- .04 The report on the management of the participating account(s) would consider the fairness to participating policy owners of the policy established by the directors respecting the management of the participating account(s).

Dividend policy and dividend scale

- .05 The report on the dividend policy would consider the fairness of the policy to the participating policy owners. The report on the dividend scale would consider the conformity of the dividend scale to the dividend policy and its fairness to the participating policy owners.

Adjustments of adjustable policies

- .06 The report on adjustable policies would consider the fairness of the criteria for changes to adjustable policies established or amended by the directors, the fairness to adjustable policy owners of the adjustments made, and their conformity to those criteria.

Fairness opinions

.07 Where the applicable law requires that the appointed actuary opine on the fairness of the policies, criteria, or methods established by the insurer with respect to any of

- Management of the participating accounts;
- Dividend policy;
- Dividends declared;
- Policy established respecting the criteria for making adjustments to adjustable policies and the adjustments made under this policy;
- Allocation of investment income to the participating accounts; and
- Allocation of expenses to the participating accounts;

the wording of an unqualified opinion would be as follows:

Management of participating accounts opinion

I have reviewed the policy established by the Board of Directors with respect to the management of the participating accounts of [the Company], [including amendments made during the most recent 12 months]. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the policy is fair to the participating policyholders.

Mary F. Roe

Fellow, Canadian Institute of Actuaries

[Place of issue of opinion]

[Date of opinion]

Dividend policy opinion

I have reviewed the policy established by the Board of Directors for determining the dividends [and bonuses or other benefits] of [the Company], [including amendments made during the most recent 12 months]. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the policy is fair to the participating policyholders.

Mary F. Roe
Fellow, Canadian Institute of Actuaries
[Place of issue of opinion]
[Date of opinion]

Dividend declaration opinion

I have reviewed the proposed dividends [and bonuses or other benefits], determined by the Board of Directors of [the company] with respect to policy years [ending between XX and YY], and have considered whether they have been determined in accordance with the policy established by the Board. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the proposed dividends [and bonuses or other benefits] are in accordance with the policy established by the Board and are fair to the participating policyholders.

Mary F. Roe
Fellow, Canadian Institute of Actuaries
[Place of issue of opinion]
[Date of opinion]

Adjustable policy changes opinion

I have reviewed the criteria established by the Board of Directors of [the company] with respect to any changes to be made to the premium or charge for insurance, amount of insurance or surrender value in respect of its adjustable policies [including amendments made during the most recent 12 months] and the changes made pursuant to those criteria. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the criteria are fair to the adjustable policyholders, and the changes made to the adjustable policies during the most recent 12 months are in accordance with those criteria and are fair to the adjustable policyholders.

Mary F. Roe
Fellow, Canadian Institute of Actuaries
[Place of issue of opinion]
[Date of opinion]

Allocation of investment income to participating account(s) opinion

I have reviewed the method established by the Board of Directors for determining the portion of the investment income or losses of [the company] for the financial year ending [XX], including capital gains and losses, that is allocable to the participating account [each participating account] maintained by the company. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the method is fair and equitable to the participating policyholders.

Mary F. Roe
Fellow, Canadian Institute of Actuaries
[Place of issue of opinion]
[Date of opinion]

Allocation of expenses to participating account(s) opinion

I have reviewed the method established by the Board of Directors for determining the portion of the expenses, including taxes, of [the company] for the financial year ending [XX] that is allocable to the participating account [each participating account] maintained by the company. I conducted my review in accordance with accepted actuarial practice in Canada and pursuant to the guidance of the Superintendent of Financial Institutions.

In my opinion, the method is fair and equitable to the participating policyholders.

Mary F. Roe

Fellow, Canadian Institute of Actuaries

[Place of issue of opinion]

[Date of opinion]

- .08 If the appointed actuary is unable to issue an unqualified opinion, the wording of the opinion would be adjusted to reflect the necessary qualification.

2460 Communication with the auditor

- .01 Communication with the insurer's auditor would be desirable when the actuary makes a report to the insurer's senior management on a matter requiring rectification or makes an unfavourable report on the insurer's financial condition.

2470 Certification of capital filings as required by the regulator

- .01 This subsection 2470 applies to the appointed actuary of a life insurer when giving an opinion on the appropriateness of capital requirement calculations pursuant to law or on the appropriateness of internal models used to determine required capital for segregated fund guarantees pursuant to requirements of the regulator.

- .02 Such certifications should contain an opinion signed by the appointed actuary. [Effective April 15, 2017]

Appropriateness of capital requirement calculations

- .03 The appointed actuary should prepare a report to support the opinion on the appropriateness of capital requirement calculations that outlines the areas where the calculation required discretion or significant technical calculations, and the methods and judgments that were applied. The report should be completed before the provision of a signed opinion pursuant to subsection 2470. [Effective April 15, 2017]

- .04 The opinion would be provided annually in support of the fiscal year-end regulatory capital filing on form(s) as directed by the regulator.
- .05 In providing such an opinion, the actuary would not be opining on whether the underlying factors or specified methods to be followed are appropriate but rather on the appropriateness of any interpretation and discretionary technical calculations and methods with respect to such guidelines.
- .06 Here is the standard opinion language [insert appropriate wording where indicated by square brackets].

“I have reviewed the calculation of the Minimum Continuing Capital and Surplus Requirement ratios of [company name] as at [date]. In my opinion, the calculations of the components of the required and available capital have been determined in accordance with the regulatory guidelines, and the components of the calculations requiring discretion were determined using method and judgement appropriate to the circumstances of the company.”

[Note: For Test of Adequacy of Assets in Canada form filings “Minimum Continuing Capital and Surplus Requirement ratios” and “required and available capital” are replaced by “test of adequacy ratio” and “required and available margin”.]

[Note: For filings for provincially regulated companies, the ratio definition, and definitions of required and available resources, would be amended to reflect the appropriate definitions in the provincial requirements.]

Appropriateness of internal models used to determine required capital for segregated fund guarantees

- .07 The appointed actuary should prepare a report to support the opinion on the appropriateness of internal models used to determine required capital for segregated fund guarantees that outlines how the models comply with the related requirements of the regulator. The report should be completed before the provision of a signed opinion pursuant to subsection 2470. [Effective April 15, 2017]

- .08 The opinion would be provided annually in support of the fiscal year-end regulatory capital filing on form(s) as directed by the regulator. The opinion would also be provided to the regulator upon a new application to the regulator for permission to use such a model for required capital purposes and upon request of the regulator when making a modification to an existing model approved by the regulator.
- .09 In providing such an opinion, the actuary would not be opining on whether the underlying factors or specified methods to be followed are appropriate, but rather on the compliance with the requirements of the regulator.
- .10 Here is the standard opinion language [insert appropriate wording where indicated by square brackets].

“I have reviewed the internal model of [company name] for determining required capital for segregated fund guarantee risks as at [date] in the context of the requirements of [the regulator]. In my opinion, the [proposed] model is compliant in all material respects with the requirements of [the regulator] for an approved model used to determine required capital for segregated fund guarantee risks.”

2500 Dynamic Capital Adequacy Testing

2510 Scope

- .01 Part 1000 applies to work within the scope of this section 2500.
- .02 This section 2500 applies to the appointed actuary of an insurer when preparing a report on the insurer's financial condition pursuant to law.

2520 Analysis

- .01 The appointed actuary should make an investigation at least once during each financial year of the insurer's recent and current financial position and financial condition, as revealed by dynamic capital adequacy testing for selected scenarios.
- .02 The appointed actuary should make a report of each investigation in writing to the insurer's board of directors (or to their audit committee if they so delegate) or its chief agent for Canada. The report should identify possible actions for dealing with any threats to satisfactory financial condition that the investigation reveals.
- .03 The appointed actuary should ensure that the investigation is current. The investigation should take into consideration recent events and recent financial operating results of the insurer.
[Effective April 15, 2017]
- .04 The timing and frequency of the appointed actuary's investigations would be sufficient to support timely corrective actions by management and the board of directors or chief agent for Canada.

Recent and current financial position

- .05 The investigation would review operations of recent years (normally at least three years) and the financial position at the end of each of those years.

Dynamic capital adequacy testing

- .06 Dynamic capital adequacy testing examines the effect of selected plausible adverse scenarios on the insurer's forecasted capital adequacy. It would be one of the actuary's primary tools for investigation of an insurer's financial condition.
- .07 The purpose of dynamic capital adequacy testing is to identify plausible threats to satisfactory financial condition, actions that would lessen the likelihood of those threats, and actions that would mitigate a threat if it materialized.

- .08 Dynamic capital adequacy testing is defensive, i.e., it addresses threats to financial condition rather than the exploitation of opportunity.

Satisfactory financial condition

- .09 The insurer's financial condition would be satisfactory if throughout the forecast period,
- Under the base scenario, the insurer meets the supervisory target capital requirement; and
 - Under the base scenario and all plausible adverse scenarios, the statement value of the insurer's assets is greater than the statement value of its liabilities.

Data, methods, and assumptions

- .10 The actuary would start the forecast period using the data as of the most recent available fiscal year-end statement of financial position date.
- .11 The assumptions and methods would reflect up-to-date studies and analysis available to the actuary.
- .12 The policy liabilities would be revalued at the end of the first financial year of the forecast period if a change in assumptions or method that is expected to be made by the insurer would result in a material change to the financial position of the insurer.
- .13 The actuary would consider recent events and recent operating results of the insurer up to the date of the report. The opening position would be consistent with the most recent year-end financial reporting.
- .14 If an adverse event occurs between the date of the report and the date of its presentation to the insurer's board of directors (or its chief agent for Canada), then the actuary would, at a minimum in the presentation to the insurer's board of directors (or its chief agent for Canada), address the event and its potential implications on the results of the investigation. If appropriate, the actuary would redo the investigation.

Forecast period

- .15 The forecast period would begin at the date of the most recent available fiscal year-end statement of financial position. The forecast period for a scenario would be sufficiently long to capture the effect of its adversity and the ability of management to react. The forecast period for a typical life insurer would not be less than five fiscal years. The forecast period for a typical property and casualty insurer would not be less than three fiscal years.

Scenarios

- .16 The scenarios would consist of a base scenario and several plausible adverse scenarios. Each scenario takes into account not only in-force policies but also the policies assumed to be sold or acquired during the forecast period, and both insurance and non-insurance operations (e.g., asset management, banking, or trust company subsidiaries).

Base scenario

- .17 The base scenario would be a realistic set of assumptions used to forecast the insurer's financial position over the forecast period. Normally, the base scenario would be consistent with the insurer's business plan. The actuary would accept the business plan's assumptions for use in the base scenario unless these assumptions are so inconsistent or unrealistic that the resulting report would be misleading. The actuary would report any material inconsistency between the base scenario and the business plan.

Plausible adverse scenarios

- .18 An adverse scenario is a scenario with an adverse outcome developed by stress-testing the assumptions used in forecasting the business plan, including the determination of insurance contract liabilities, with regard to risk factors that may trigger potential threats to the insurer's financial condition. An adverse scenario would be characterized as a plausible adverse scenario if it is credible and has a non-trivial probability of occurring. The actuary may use percentile rankings of outcomes to determine whether a scenario is both plausible and adverse. Plausible adverse scenarios vary among insurers and may vary over time for a particular insurer.
- .19 The actuary would consider material, plausible risks or events to the insurer. Reverse stress-testing can help assess whether certain risk factors need to be tested, on the grounds that certain risk factors could never deteriorate to the point where they would be a threat to the insurer's financial condition. The actuary can thereby determine whether a material, plausible risk or event exists for the insurer over the forecast period.

Risk categories

- .20 For life insurers, the actuary would consider threats to capital adequacy under plausible adverse scenarios that include, but are not limited to, the risk categories
- Mortality;
 - Morbidity;
 - Persistency and lapse;
 - Interest rate;
 - Inflation;
 - Deterioration of asset values;
 - New business;
 - Expenses;
 - Reinsurance;
 - Government and political issues;
 - Counterparty;
 - Off-balance-sheet items; and
 - Related companies.
- .21 For property and casualty insurers, the actuary would consider threats to capital adequacy under plausible adverse scenarios that include, but are not limited to, the risk categories
- Claim frequency and severity;
 - Policy liabilities;
 - Inflation;
 - Premium;
 - Reinsurance;
 - Investment;
 - Government and political issues;
 - Off-balance-sheet items; and
 - Related companies.

Integrated scenarios

- .22 The actuary would construct integrated scenarios by combining two or more risk factors whose combination gives rise to a plausible adverse scenario.
- .23 In developing integrated scenarios, the actuary would consider how risk factors interact. For example, the impact of combining adverse scenarios for two or more risk factors, where each is associated with a relatively high probability, may give rise to an integrated adverse scenario to which the insurer's financial condition is sensitive. In such cases, an integrated scenario would be constructed by combining stress tests related to two or more risk factors. An integrated scenario would be designed so as to itself constitute a plausible adverse scenario.
- .24 An integrated scenario would be included in the minimum of three plausible adverse scenarios required by paragraph 2520.32 if the integrated scenario was found to be one of the three most adverse scenarios.

Ripple effects

- .25 In assuring consistency within each scenario, the actuary would consider ripple effects. Although most of the other assumptions used in the base scenario may remain appropriate under the plausible adverse scenario, some may require adjustment to reflect the interdependence of assumptions in the plausible adverse scenario.
- .26 Ripple effects would include both policy owner action and the insurer's expected response to adversity. Selection of the assumptions for the insurer's response would, where appropriate, take into account
- Effectiveness of the insurer's management information systems and adjustment mechanisms;
 - Insurer's historical record of promptness and willingness, when faced with adversity, to make difficult decisions; and
 - External environment assumed in the scenario.
- .27 The actuary would report the expected response, so that users may consider its practicality and adequacy. The actuary may also report the results assuming that the insurer does not respond to the adversity.
- .28 Ripple effects also include regulatory action, especially under any plausible adverse scenario where the insurer fails to meet the supervisory target capital requirement. The actuary would consider action that could be taken by the Canadian regulator(s) as well as action taken by regulators in foreign jurisdictions. Such regulatory action and associated management response would consider the local assessment of solvency regardless of the insurer's worldwide solvency position as measured by Canadian regulatory standards.

Corrective management actions

- .29 For each of the plausible adverse scenarios that would result in a threat to satisfactory financial condition, the actuary would identify possible corrective management actions that would lessen the likelihood of that threat, or that would mitigate that threat, if it materialized. These actions could include but are not limited to
- Repricing the insurance products;
 - Suspending dividend payments, capital reductions, and transfers to the parent or home office, where applicable;
 - Raising additional capital or adopting an approved plan to raise additional capital if and when needed within a reasonable timeframe, or, in the case of a branch, requesting transfer of adequate funds from the parent company;
 - Strengthening risk management practices;
 - Mitigating the risk causing the capital shortfall; and
 - An increased level of monitoring and reporting with respect to the insurer's capital position.
- .30 Consideration would also be given to the effectiveness of planned management actions in a volatile or stressed environment.

Scope of the investigation and report

- .31 The report would contain the key assumptions of the base scenario and the plausible adverse scenarios posing the greatest risk to the satisfactory financial condition of the insurer.
- .32 The report would disclose each of the risk categories considered in undertaking the dynamic capital adequacy testing analysis, including those identified in these Standards of Practice. It is expected that the actuary would scenario test and report at least once during each financial year on the base scenario, and a minimum of three plausible adverse scenarios posing the greatest risk for the insurer. Fewer than three plausible adverse scenarios may be reported only in the rare event that it is not possible to develop such scenarios.
- .33 The report would also contain the plausible adverse scenarios examined that cause the insurer to fall below the supervisory target capital requirement. The report would make it clear that under these scenarios the regulators may impose restrictions on the operations of the insurer, including its ability to write new business.

- .34 If the investigation identifies any plausible threat to satisfactory financial condition, then the actuary would identify possible corrective management action that would lessen the likelihood of that threat, or that would mitigate that threat, if it materialized. For each such adverse scenario reported upon, the actuary would report the results both with and without the effect of corrective management action. The actuary would ensure that the disclosure of the corrective management action was sufficiently clear so that users may consider its practicality and adequacy.
- .35 The report would present the financial position of the insurer at each fiscal year-end throughout the forecast period.

Revaluation of the policy liabilities

- .36 Ideally, for the base and each plausible adverse scenario, the insurance contract liabilities and, if applicable, other policy liabilities or reinsurance recoverables, would be revalued throughout the forecast period. But their revaluation only at the end of the forecast period may be a suitable compromise, unless the actuary believes, given the financial position at the end of the forecast period, that the financial condition would not be satisfactory at some point during the forecast period if revaluation were performed at that point.

Frequency and/or timing

- .37 The frequency and/or timing of the report would depend on the urgency of the matters being reported and on the desirability of integrating dynamic capital adequacy testing into the insurer's financial planning cycle.
- .38 The frequency and/or timing of the actuary's investigation would be adjusted where an adverse change in the insurer's circumstances since the last investigation may be so significant that to delay reporting to the time of the next scheduled investigation would be imprudent. For example, failure to meet the supervisory target capital requirement, or adoption of a radically different business plan, may necessitate the preparation of an immediate report.

2530 Reporting

- .01 In the case of a Canadian insurer, the appointed actuary should report to the board of directors or to their audit committee if they so delegate. In the case of a Canadian branch of a foreign insurer, the appointed actuary should report to the chief agent for Canada and may also report to the responsible senior executive in the parent head office. [Effective April 15, 2017]
- .02 In order to give the insurer's senior management an opportunity to react to the results of the investigation, the actuary would discuss the report with the insurer's senior management in advance of its submission to the board of directors or chief agent for Canada.

- .03 The report would be in writing, but an additional oral report that permits questions and discussions is desirable. An interpretative report would be more useful than a statistical report.
- .04 The report would be submitted within 12 months following each fiscal year-end.

2540 Opinion by the actuary

.01 The report should contain an opinion signed by the appointed actuary. [Effective April 15, 2017]

- .02 In this opinion, “future financial condition” has the same meaning as “financial condition.” The actuary may use the words “future financial condition” in order to comply with legislation or regulation in some jurisdictions.
- .03 The wording of the opinion follows: [insert appropriate wording where indicated by square brackets]

“I have completed my investigation of the [future] financial condition of [insurer name] as at [date] in accordance with accepted actuarial practice in Canada.

I have analyzed the forecasted financial positions of the insurer during the [number] year forecast period under a series of scenarios. A description of these scenarios and their impact on the insurer is included within this report.

The most significant assumptions are described within this report. The investigation incorporates assumptions relating to business growth, investments, [mortality, morbidity, claims frequency, capital injections, other policy-related experience] and other internal and external conditions during the forecast period.

My report includes the identification of key risk exposures [and corrective management actions that could be taken to mitigate the effect of plausible adverse scenarios].

In my opinion, the [future] financial condition of the insurer [is satisfactory or is not satisfactory for the following reason(s)...]”

[Montréal, Québec]
[Report date]

[Mary F. Roe]
Fellow, Canadian Institute of Actuaries

2600 Ratemaking: Property and Casualty Insurance

2610 Scope

- .01 Part 1000 applies to work within the scope of this section 2600.
- .02 This section 2600 applies to the derivation of indicated rates for an insurance contract of property and casualty insurance written by an insurer, a reciprocal insurance exchange, or an underwriting syndicate.
- .03 This section 2600 does not apply to the derivation of indicated rates for public personal injury compensation plans covered by the Practice-Specific Standards for Public Personal Injury Compensation Plans.
- .04 This section 2600 applies to the derivation of indicated rates for any entity, such as a residual market mechanism or an advisory organization, which derives indicated rates for an insurance contract to be written by an insurer, regardless of whether or not that entity is itself an insurer.
- .05 This section 2600 applies to the derivation of indicated rates, but not to the recommendation or selection of rates to be charged. The recommended or selected rates may reflect considerations beyond those set forth in this section 2600.
- .06 This section 2600 also applies to the derivation of indicated rates for insurance risks accepted by a property and casualty quasi-insurer, similar to insurance risks accepted under an insurance contract. In this section 2600, “property and casualty quasi-insurer” means an entity that assumes insurance risks that a property and casualty insurer may assume, without having the legal form of an insurer. Examples of property and casualty quasi-insurers include
- Federal or provincial crown corporations or agencies acting in a capacity similar to a property and casualty insurer;
 - Providers of extended warranties; and
 - Self-funding mechanisms, such as those created by members of a professional association, or entities that retain some or all of their property and casualty insurance risk.

2620 Method

- .01 The best estimate present value of cash flows relating to the revenue at the indicated rate should equal the best estimate present value of cash flows relating to the corresponding claim costs and expense costs, plus the present value of a provision for profit, over a specified period of time.
- .02 The actuary should select appropriate methods, techniques, and assumptions recognizing that such elements depend on the circumstances of the case and that a variety of actuarial methods may be appropriate to derive an indicated rate. [Effective April 15, 2017]

Data

- .03 The actuary would consider the availability and relevance of subject experience and related experience.

Credibility

- .04 The actuary would consider the blending of information from subject experience with information from one or more sets of related experience to improve the predictive value of estimates.

Changes in circumstances

- .05 The actuary would consider that the subject experience, related experience, and future cash flows may be affected by changes in circumstances that may affect expected claim costs, expense costs, and provision for profit.

.06 Relevant circumstances subject to change may include items that are largely under the control of the entity providing insurance, such as

- Underwriting practice;
- Distribution system;
- Claims handling and case estimate setting practice;
- Reinsurance arrangements;
- Data processing and accounting systems;
- Distribution or type of business written;
- Provisions of the insurance contract(s), when not legislated;
- Premium rates; and
- Rating variables;

as well as items that are largely not under the control of the entity providing insurance, such as

- Legislated coverage or benefits; and
- The economic, social, and legal environments.

Development

.07 The actuary would consider that subject experience and related experience may be subject to development over time.

Trend

.08 The actuary would consider that subject experience and related experience may be subject to trend over time.

Unusual events

.09 The actuary would consider that subject experience and related experience may or may not have been subject to catastrophes, large losses, or other unusual events.

Provision for expense costs

.10 The actuary would determine the provision for expense costs that is appropriate for the period during which the rates are expected to be in effect.

- .11 In selecting a provision for expense costs, the actuary would consider
- The various categories of expense costs that are incurred including, as may be applicable, residual market assessments, statutory assessments, policyholder dividends, and reinsurance costs;
 - That expense costs may not be directly proportional to premium; and
 - That one-time expense costs may need to be amortized.
- .12 The provision for expense costs, or other assumptions that are pertinent to its derivation, may be specified to the actuary under the terms of an appropriate engagement.

Provision for profit

- .13 An indicated rate would include a provision for profit.
- .14 The provision for profit, or other assumptions that are pertinent to its derivation, may be specified to the actuary under the terms of an appropriate engagement.

Time value of money

- .15 The investment return rate for calculating the present value of cash flows would reflect the expected investment income to be earned on assets that might be acquired with the net cash flows resulting from the revenue at the indicated rate.
- .16 Among various possible sets of such assets the actuary would consider
- Risk-free assets of appropriate duration;
 - Fixed-income assets of appropriate duration; and
 - Assets which are expected to be acquired.
- .17 The actuary would consider the fact that the provision for profit is not independent of the selected investment return rate and its associated uncertainty.

2630 Reporting

- .01 If an external user report is required and the actuary can report without reservation, the actuary's report should include the standard reporting language consisting of the following scope paragraph,
- I have derived the indicated rate(s) in accordance with accepted actuarial practice in Canada, on behalf of [entity commissioning the work], for the following insurance category(ies): [name of insurance category(ies)], to be effective Month XX, 20XX for new business and Month XX, 20XX for renewal business.
- .02 If an external user report is required and the actuary cannot report without reservation, the actuary should modify the standard reporting language accordingly. [Effective April 15, 2017]
- .03 An additional opinion paragraph may be included to conform to the requirements of an external user.

2700 Policyholder Dividend Determination

2710 Scope

- .01 Part 1000 applies to work within the scope of this section 2700.
- .02 Section 2700 applies to advice provided on policyholder dividend determination on individual life, annuity, and health policies.

2720 Report on policyholder dividends

- .01 There should be a written report which documents the advice on policyholder dividend determination, and which describes the framework of facts, assumptions, and procedures upon which the advice was based.
- .02 The report should include
 - A description of the process used to determine dividends;
 - The manner in which policy and experience characteristics are reflected in that process; and
 - The methodology used to calculate dividends, including specific factors used to reflect policy and experience characteristics.
- .03 The report should state whether or not the contribution principle has been followed, and, if it has not been followed, the report should describe any deviations and their rationale. [Effective April 15, 2017]