

**2000—INSURANCE**

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**2100 INSURANCE CONTRACT VALUATION:  
ALL INSURANCE**

**2110 SCOPE**

- .01 Sections 2100, 2200 and 2300 apply to the valuation of the insurance contract liabilities and of the reinsurance recoverables in an insurer's financial statements when the intent is that those statements be in accordance with accounting principles generally accepted in Canada. Effective for financial years beginning on or after January 1, 2011, the Canadian Institute of Chartered Accountants Handbook will contain both Canadian generally accepted accounting principles applicable to publicly accountable enterprises (being International Financial Reporting Standards incorporated into the Canadian Institute of Chartered Accountants Handbook) and Canadian generally accepted accounting principles applicable to private enterprises.
- .01.1 Part 2000 does not apply to post-employment benefit plans covered by the Practice-Specific Standards for Post-Employment Benefit Plans and does not apply to personal injury compensation plans covered by the Practice-Specific Standards for Public Personal Injury Compensation Plans.
- .02 Section 2100 applies to all kinds of insurance.
- .02.1 Sections 2200 and 2300, following, apply respectively to  
property and casualty insurance, and  
life and health (accident and sickness) insurance; that is, to insurance with respect to the life and health of persons other than corporations.
- .03 Sometimes, however, techniques described in one section may be useful for the insurance to which the other section applies. For example, while a simple technique is usually appropriate for valuation of life and health insurance claim liabilities, the more sophisticated techniques for valuation of property and casualty insurance claim liabilities may be appropriate for life and health insurance whose claim development is complex. Another example is that a simple technique may be appropriate for travel insurance and other short-term policies sold by property and casualty insurers.

## 2120 EXTENSION OF SCOPE

- .01 Repealed
- .02 Repealed
- .03 Part 2000 also applies to the work of, and the report thereon prepared by, an actuary for purposes of the financial statements of an insurer that is not a publicly accountable entity, as long as the intent is that those financial statements be prepared in accordance with generally accepted accounting principles (GAAP) applicable to that insurer. The actuary would modify the standards to take account of any substantive difference between the insurer and a publicly accountable enterprise; for example the insurer's liabilities may be permitted to be less than fully funded. The actuary's report would describe the modifications to the standards and their implications.
- .04 Part 2000 also applies to the work of an actuary with respect to the valuation of policy liabilities where statutory or regulatory instructions require the actuary to do so, other than the preparation of financial statements in accordance with generally accepted accounting principles.
- .05 Since an insurer is defined as the party that has an obligation to compensate a policyholder if an insured event occurs, the legal form of the insurer is unimportant for purposes of the determination of the policy liabilities.
- .06 Part 2000 also applies to the work of, and the report thereon prepared by, an actuary with respect to the valuation of the policy liabilities of any party that
- has an obligation under a policy, and
  - has the intent to prepare financial statements in accordance with applicable Canadian generally accepted accounting principles (other than International Financial Reporting Standards).
- .07 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.

## 2130 METHOD

- .01 *The actuary should value the insurance contract liabilities and the reinsurance recoverables for the balance sheet and the changes in them for the income statement.*
- .02 *The actuary should co-ordinate 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 balance sheet*
- are consistent,*
  - avoid omission and double counting, and*
  - conform to the presentation of the income statement.*

- .03 *The relevant insurance contracts for the valuation are those that are in force, including those whose issue is then committed, at the balance sheet date, or that were in force earlier and that will generate cash flow after the balance sheet 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 balance sheet 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. [Effective January 1, 2011]*
- .06.1 *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 January 1, 2011]*

### **Terminology**

- .07 “Policy” includes an insurance contract and any other instrument that is substantively like a policy, such as a reinsurance agreement or an annuity contract, and includes a commitment to issue a policy.
- .08 Repealed
- .09 “Premiums” include income equivalent to premiums, such as management fees, and cost of insurance charges.

### **The insurer's accounting policy**

- .10 The preparers of the financial statements make a choice 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. Going concern accounting is appropriate for an insurer that is expected to remain open to new business and in satisfactory financial position indefinitely. 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, combination with another insurer in a satisfactory financial condition, or transfer of its policies to such an insurer brings financial relief.
- .11 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. What matters is that the actuary identify, value, and report on all of the liabilities and assets valued by the actuary, whatever they may be called in the financial statements. The differentiation between premium and claim liabilities is usually evident but is, in any case, less important than assurance that all insurance contract liabilities and reinsurance recoverable assets have been identified and valued.
- .12 Insurance contract liabilities and reinsurance recoverables consist of premium liabilities and claim liabilities. Claim liabilities are those in respect of cash flow after the balance sheet date from benefits and claims incurred on or before that date, and their related expenses and taxes; i.e., all of the cash flow, excluding the portion paid before the balance sheet date. Premium liabilities are those in respect of all other cash flow; i.e., that from premiums, benefits, claims, and their related expenses and taxes, incurred after the balance sheet date.
- .13 Insurance contract liabilities reported in the insurer's balance sheet would not be net of the value of recoveries that are expected from reinsurance ceded. The value of the reinsurance recoverables is recorded as an asset. Fair presentation of the reported insurance contract liabilities requires the amount of that asset to be appropriate. The recovery on account of reinsurance ceded 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.
- .14 The insurance contract liabilities reported in the insurer's balance sheet exclude deposit liabilities of segregated funds but include any related liabilities of the general fund, such as a liability for capital guarantees of amounts in segregated funds.

- .15 The insurer's accounting policy may report amounts related to the insurance contracts and the assets that support their insurance contract liabilities, such as
- 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,
  - asset impairment, and
  - deferred policy acquisition expenses,
- either as part of the insurance contract liabilities or as separate items in the balance sheet or as a mixture of the two. 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 (i.e., assets minus liabilities).
- .16 As respects consistency, the actuary would, for example, ensure that the insurance contract liabilities
- provide consistently for cash flow gross of reinsurance and reinsurance cash flow, except that reinsurance cash flow would also take account of the financial condition of the reinsurer.
- .17 As respects double counting and omission, the actuary would, for example, ensure that
- the same assets are not allocated twice to support liabilities, and
  - provision for asset depreciation (C-1 risk) in valuing the insurance contract liabilities does not duplicate any provision for asset depreciation deducted from the asset side of the balance sheet.

### **Relevant policies**

- .18 The relevant policies for the valuation are those that are in force at the balance sheet date, including those whose issue is then committed, or that were in force earlier and that will generate cash flow after the balance sheet date. There are no amounts included in insurance contract liabilities in the financial statements in respect of other policies expected to be issued after that date, whether or not they are expected to be profitable.
- .19 There usually are both premium liabilities and claim liabilities in respect of policies that are in force at the balance sheet date. There may be reinsurance recoverables in respect of insurance contracts that are in force at the balance sheet date.

- .20 There may be claim liabilities in respect of policies that are not in force at the balance sheet 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 balance sheet date as a result of outstanding claims incurred while they were in force.

### **Term of the liabilities**

- .21 The term of the liabilities of a property and casualty insurance policy ends at its expiry, which usually is within one year of the balance sheet date, unless for example
- the policy has been cancelled, in which case that term ends at the effective date of cancellation, or
  - the contractual term of the policy exceeds one year; for example, an extended warranty policy which provides coverage for several years after expiry of the basic warranty.

Paragraphs 2320.16 through 2320.27 provide guidance on determination of the term of the liabilities of a life or health insurance policy.

### **Cash flows comprising the insurance contract liabilities**

- .22 The insurance contract liabilities in respect of a relevant policy are comprised of all of that policy's cash flows after the balance sheet date, except for cash flows from premiums, benefits, claims, expenses, and taxes that are incurred after the term of the liability for that policy.
- .23 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.



- .24 The cash flows of which a policy is comprised may extend beyond the term of its liabilities as a result of lag between incurral and the 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**

- .25 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 credit risk of the policy owner.

**Experience rating refunds**

- .26 The liability for experience rating refunds would take account of
- the assumptions 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.
- .27 The experience rating refund element of the insurance contract liabilities would include provision for adverse deviations only for
- risk of misestimation (C-2 risk) of interest rates and risk of interest rate change (C-3 risk), and
  - uncertainty in the calculation of the experience rating refund.
- .28 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.
- .29 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**

- .30 The recovery on account of reinsurance ceded would take account of the financial condition of the reinsurer.
- .31 The actuary would assume that the insurer and the reinsurer each exercises its control over recapture, cancellation or commutation to its advantage.

- .32 The sign (positive or negative) of an assumption's margin for adverse deviations may depend on that assumption's effect on recapture, cancellation or commutation.

### **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 year-by-year forecast of the cash flows of which the insurance contract liabilities are comprised as an equivalent single amount at the balance sheet date. There are two methods of doing so – the Canadian asset liability method and the actuarial present value method. In the Canadian asset liability method, the amount of the insurance contract liabilities is the amount of their supporting assets, which reduce to zero at the last liability cash flow in the forecast of the cash flow from the assets and liabilities. The Canadian asset liability method is a “roll forward” method applicable to any scenario. The actuarial present value method is a “pull backward” method that produces the same result as the Canadian asset liability method for a particular scenario if present value factors,  $v^t$ , exist that replicate the investment return assumptions of that scenario. Such factors do not exist for complex scenarios; for example, a scenario that includes a spike in mortgage lending rates in forecast year 5.
- .38 The discount rates or the forecast of supporting assets, as the case may be, would take account of the supporting assets at the balance sheet date and the insurer’s policy for asset-liability management after that date, and/or assumptions about investment return after the balance sheet date.
- .39 The actuary would value the insurance contract liabilities and reinsurance recoverables so that, in the aggregate, they and the other policy-related items in the balance sheet take account of the time value of money.
- .40 In some cases, applicable regulation requires insurance contract liabilities and reinsurance recoverables to be valued without taking account of the time value of money; i.e., to be valued as the sum of, rather than the present value of, the cash flow after the balance sheet date. For such a case, the actuary would make a dual valuation of insurance contract liabilities and reinsurance recoverables:
- A in accordance with accepted actuarial practice, and
  - B in accordance with accepted actuarial practice but not taking account of the time value of money, with the provision for adverse deviations appropriately reduced.
- .41 If A is acceptable under the applicable regulation (which would usually be the case if A is greater than or equal to B), then the actuary would report A without reservation on account of the regulation.
- .42 If A is not acceptable under the applicable regulation (which would usually be the case if A is less than B), then the actuary would report B with reservation.

## Margin for adverse deviations

- .43 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.

## 2140 REPORTING

- .01 *The actuary's report should describe*
- the valuation and presentation of policy liabilities and reinsurance recoverables for the insurer's balance sheet and income statement,*
  - 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 financial statements (or their accompanying management discussion and analysis) describe the actuary's role in their preparation, and*
  - 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.*
- .03 *If not, the actuary should modify the standard reporting language to report with reservation.*  
[Effective January 1, 2011]
- .03.1 The actuary's report would conform to the requirements of relevant Canadian federal and provincial legislation that prescribe that the actuary value the policy liabilities, not only the insurance contract liabilities net of reinsurance recoverables. Policy liabilities other than insurance contract liabilities would be valued in conformity with applicable International Financial Reporting Standards and accepted actuarial practice, where the intent is that those financial statements be prepared in accordance with International Financial Reporting Standards.

### **Accounting in the balance sheet**

- .04 The amount of the insurance contract liabilities is usually the largest amount in the balance sheet, so that its itemization 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 balance sheet presents their total amount as a separate item.

### **Accounting in the income statement**

- .06 The standard reporting language implies that the income statement 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 accounting 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 income statement. 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 income statement. For example, the item, incurred claims, equals
- claims and claim expenses paid during the accounting period, plus
- claim liabilities (which are part of the policy liabilities) at the end of the accounting period, minus
- claim liabilities at the beginning of the accounting period.

### **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 is a signal 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. Failing 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 on the actuary’s advice,
  - off-balance-sheet obligations, for example, contingent policy liabilities in connection with market conduct,
  - restatement of items for preceding accounting 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,
  - inconsistency among accounting periods,
  - 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 accounting period but that is expected to have an effect in future accounting periods,
  - allocation of expense or investment income to a participating account (if reported in the financial statements) other than in accordance with the method approved by the actuary and the insurer’s board of directors,
  - a subsequent event, and
  - a difference between the insurer’s present practice and that which the actuary assumed in valuing the policy liabilities.
- .10 An example of the last item is the actuary’s assumption of a policy for setting dividend scales that differs from the insurer’s current policy. The actuary would not, however, report the assumption of a dividend scale that is in accordance with an unchanged dividend policy. The same applies to a difference between current and assumed policy for setting non-guaranteed cash value scales and premium rates for adjustable policies.

### **Consistency across accounting periods**

- .11 Financial statements usually report results for one or more preceding accounting periods in addition to those for the current period. Meaningful comparability requires the financial statement items for the various periods to be consistent through the restatement of preceding period items if they were inconsistently reported in the preceding period financial statements. A less desirable alternative to restatement is disclosure of the inconsistency.
- .12 A change in the method of valuation creates an inconsistency. If a change in the assumptions for valuation reflects a change in the expected outlook, then it does not create an inconsistency although, if its effect is major, then fair presentation may require its disclosure.
- .13 A change in assumptions that results from the application of new standards may create an inconsistency.

### **Communication with the auditor**

- .14 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**

- .15 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.

.16 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 balance sheet 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 the requirements of relevant Canadian federal and provincial legislation that prescribe that the actuary value the policy liabilities, not only the insurance contract liabilities. Policy liabilities other than insurance contract liabilities would be valued in conformity with applicable International Financial Reporting Standards and accepted actuarial practice.

### **Standard reporting language**

.17 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

.18 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.



- .19 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**

- .20 The examples that follow are illustrative.

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

- .21 Here is an example of a report prepared for an under-funded 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 balance sheet 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**

- .22 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] balance sheet 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.

I became the [appointed actuary] during the year and was unable to confirm the appropriateness of the valuation for the preceding year.

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.

- .23 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**

- .24 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:

As explained in Note [XX], the method of valuation for the current year differs from that for the preceding year. In my opinion, except for that lack of consistency, 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.

- .25 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.

**Valuation does not take account of time value of money**

.26 If a regulation that some or all of the insurer's liabilities be valued without taking account of the time value of money requires a reservation, 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] balance sheet 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 the selection of appropriate assumptions and methods, except as described in the following paragraph.

In accepted actuarial practice in Canada, the valuation of policy liabilities [and reinsurance recoverables] reflects the time value of money. Pursuant to the authority granted by the Insurance Companies Act, the Superintendent of Financial Institutions has directed that the valuation of some policy liabilities [and reinsurance recoverables] not reflect the time value of money. My valuation complies with that directive.

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

### **Takeover of insurer with poor records**

.27 If the insurer took over another insurer with poor records, 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] balance sheet 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 over the assets, liabilities, and policies of [WWW Insurer], whose policy records are, in my opinion, unreliable. [The Company] is making but has not completed the necessary improvements. My valuation with respect to the policies taken over from [WWW Insurer] is therefore uncertain. Their policy liabilities [net of reinsurance recoverables] comprise [N]% of the 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**

.28 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 the greater liabilities, then the actuary would report as follows:

I have valued the policy liabilities [and reinsurance recoverables] of [the Company] for its [consolidated] balance sheet 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 subsections 2110 and 2120.
- .02 Repealed

**2220 CLAIM LIABILITIES**

- .01 *The amount of the claim liabilities should be equal to the present value, at the balance sheet date, of cash flow on account of claims (and of related expenses and taxes) incurred before that date. [Effective January 1, 2003]*
- .02 The amount of claim liabilities consists of the following components
  - the amount of the case estimates,
  - a provision (which may be positive or negative) for development on reported claims, including claim adjustment expenses, and
  - a provision for incurred but unreported claims, including claim adjustment expenses.
- .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 of the case. The actuary would usually consider several methods, each of which involves assumptions; e.g., an assumption that the settlement patterns of the available past claims experience are uniform and the same as those of the insurer's future claims experience. The actuary would, where practical, adjust the available past claims experience in order to recognize those assumptions.

- .07 The actuary would consider the circumstances of the case 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 insurers, 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 balance sheet date, of cash flow on account of premium development and of the claims, expenses, and taxes to be incurred after that date on account of the policies in force at that date or an earlier date. [Effective January 1, 2003]*
- .02 The actuary would consider the Standards of Practice for claim liabilities in selecting assumptions about claims.
- .03 Expenses include both claim adjustment expenses and the expense of servicing policies.
- .04 Premium development includes additional premiums such as reinstatement premiums and experience adjustments for policies with retrospective pricing.

## 2240 PRESENT VALUES

- .01 The expected investment return rate for calculation of the present value of cash flow is that to be earned on the assets, taking into account reinsurance recoverables, that support the insurance contract liabilities. It depends on
- the method of valuing assets and reporting investment income,
  - the allocation of those assets and that income among lines of business,
  - the return on the assets at the balance sheet date,
  - the yield on assets acquired after the balance sheet date,
  - the capital gains and losses on assets sold after the balance sheet date, and
  - investment expenses, and losses from default (C-1 risk).
- .02 The actuary need not verify the existence and ownership of the assets at the balance sheet 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 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 those considerations so vary. [Effective December 31, 2009]*

### **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 circumstances 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 default, and  
the external environment, for example, the effect of regulatory change on claim settlements.



.09 A consideration for an assumption generates a lack of 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

- 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.

Other significant considerations may exist, but would be tied to specific assumptions.

## **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 December 31, 2009]

.02 The range of margin for adverse deviations would be,

	<u>High</u>	<u>Low</u>
claims <u>development</u>	20%	2.5%
recovery from reinsurance ceded	15%	0
investment return rates	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 cases of a reinsurer in runoff where all remaining treaties are commuted, or 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 December 31, 2009]*

.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 modeling 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 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 cases of a reinsurer in runoff where all remaining treaties are commuted, or of an insurer with aggregate stop loss coverage that is reserved at the stop loss limit.

**2300 INSURANCE CONTRACT VALUATION:  
LIFE AND HEALTH (ACCIDENT AND SICKNESS) INSURANCE**

**2310 SCOPE**

.01 This section 2300 applies in accordance with subsections 2110 and 2120.

**2320 METHOD**

.01 *The actuary should calculate insurance contract liabilities net of reinsurance recoverables by the Canadian asset liability method. For valuation of the general account insurance contract liability associated with segregated fund guarantees, the actuary should calculate the insurance contract liability for the guarantee elements by the Canadian asset liability method using stochastic modelling. [Effective January 1, 2011]*

.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 balance sheet date that are forecasted 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 balance sheet 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 the insurance contract liabilities, 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 2330.09.1,*  
*each of the prescribed scenarios in a deterministic application,*  
*ranges that comprehend each of the prescribed scenarios in a stochastic application, and*  
*other scenarios appropriate for the circumstances of the insurer. [Effective January 1, 2011]*
- .08.1 *For stochastic modelling of segregated fund guarantees, the development of scenarios of investment returns should consider*  
*selection of market indices and proxies,*  
*development of economic scenario generators and model parameters, and*  
*calibration of investment returns (i.e., equity returns, bond fund returns and money market returns).*
- .08.2 *If the bifurcated approach is used for valuation of the general account insurance contract liability associated with segregated fund guarantees, the allocation of future fee revenue between amortization of the allowance for acquisition expense and the guarantee should not change from period to period. [Effective January 1, 2011]*

### **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, that would not militate against 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.
- .10.1 For valuation of the general account insurance contract liability associated with segregated fund guarantees, 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.

- .10.2 Two approaches would be appropriate to value segregated fund policies where both additional benefits or guarantees are involved and the allowance for acquisition expense is being amortized.

For the bifurcated approach, management expense cash flow is allocated between recoverability testing of the allowance for acquisition expense and the liability for the guarantee. The portion allocated to the guarantee would generally be based on the additional charge priced into the product for that guarantee with the remainder applied to amortize the remaining unamortized allowance for acquisition expense. The insurance contract liability for the guarantee is calculated separately using the net cash flows available for the guarantee while the recoverability of the allowance for acquisition expense is tested excluding those revenues allocated to guarantee.

For the whole contract approach, all general account net cash flows associated with segregated funds are considered in calculating the total liability. This total liability will change over the reporting period as a result of market movements and other factors and, therefore, the approach may implicitly include a write-up of the balance of the allowance for acquisition expense.

### **Supporting assets**

- .11 In allocating assets to support liabilities, the actuary would preserve the connection between unamortized capital gains, both realized and unrealized, and the asset segments that generated them.
- .12 The value of the assets that support insurance contract liabilities at the balance sheet date would be their value in the insurer's financial statements; i.e., book value, taking account of accrued investment income and of adjustments for impairment, amortized unrealized capital gains, and amortized realized capital gains.
- .13 The forecasted cash flow of the assets would take account of any related, off-balance sheet, financial instruments.
- .13.1 For valuation of segregated fund guarantees, the value of the assets and forecasted cash flow would take account of the insurer's hedging instruments existing at the balance sheet 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 in accordance with tax law.

- .15 The assumed cash flow from policy dividends would avoid omission and double counting. For example, if the dividend scale includes distribution of a deferred realized capital gain (adjusted for any corresponding future tax asset or liability), then the assumed cash flow from policy dividends would exclude that distribution. In the opposite case, the assumed cash flow from policy dividends would provide for negative distribution of a deferred realized capital loss asset (net of any corresponding future tax liability). Such avoidance is appropriate only in the case of liabilities and would not be appropriate if the dividend scale included distribution of assets that support capital, or distribution of investment income on assets that support capital.

**Term of the liabilities**

- .16 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.
- .17 The term of a policy's liabilities is not necessarily the same as the contractual term of the policy.
- .18 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 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.
- .19 The term of a policy's liabilities takes account of all renewals and adjustments before the balance sheet date. Depending on the circumstances, that term may also take account of one or more renewals or adjustments after the balance sheet date.

- .20 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.
- .21 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.
- .22 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 balance sheet date at which there is no constraint, and
  - the renewal or adjustment date after the balance sheet date that maximizes the insurance contract liabilities.

An exception to the above would exist for the liabilities for guarantees of the fund value for segregated fund annuities where the contracts contain material constraints. In this situation, the term of the liability ends at the date after the valuation date which maximizes the insurance contract liabilities, consistent with the treatment for contracts with no material constraints.

- .23 The actuary would extend such term 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
  - 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 balance sheet presentation is consistent with market movements over the reporting period, and
    - where such extension would be subject to constraints on the amount of cash flow capitalized, consistent with an unhedged position.
- .24 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 balance sheet date, and where not fully recoverable at the balance sheet date, is written down to the recoverable amount, with the expected amount of write-down in each future period proportionately reduced.
- .25 That implies that the term ends at
- the balance sheet date if the policy is continually renewable or adjustable without constraint,
  - the first renewal or adjustment after the balance sheet date if there is no constraint at that renewal or adjustment, and
  - a renewal or adjustment determined by testing for any other policy. The actuary would calculate the insurance contract liabilities assuming that the term of its liabilities ends at each renewal or adjustment at or after the balance sheet date up to and including the first renewal or adjustment at which there is no constraint, and would select the term corresponding to the largest insurance contract liabilities.



- .26 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.
- .27 For example, the term of the liabilities ends at
- the balance sheet 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 balance sheet 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 (usually one year after the previous 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**

- .28 The insurer's policies define contractually 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.
- .29 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.

- .30 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 in its behalf.
- .31 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.
- .32 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.
- .33 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.
- .34 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**

- .35 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.
- .36 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  
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 exclude the portion of that  
excess that is included in the dividend scale.

- .37 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 provoke a change in it.
- .38 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.
- .39 An assumption of cash dividends to all policy owners is appropriate only if the alternative options to cash have equivalent value, failing which, 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**

- .40 In calculating insurance contract liabilities, the actuary would allocate assets to the liabilities at the balance sheet 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.
- .41 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**

- .42 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”).

- .43 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 accounting period after the balance sheet 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 in 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.
- .44 An example of a temporary difference is a difference between insurance contract liabilities and the corresponding tax liabilities.
- .45 An example of a permanent difference is a preferential tax rate on the investment income on a class of assets.
- .46 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 balance sheet date, and of alternative taxes incurred after the balance sheet date.
- .47 The resulting insurance contract liabilities make appropriate provision for cash flow on account of such taxes. If the insurer's balance sheet 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 the future tax asset and downward to reflect the existence of future tax liability.
- .48 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**

- .49 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.

### **Adoption of a scenario**

- .50 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, provided, however, that the insurance contract liabilities would not be less than those in the prescribed scenario with the largest insurance contract liabilities.
- .51 If the selection of scenarios is stochastic, then the actuary would adopt a scenario whose insurance contract liabilities are within the range defined by
- the average of the insurance contract liabilities that are above the 60<sup>th</sup> percentile of the range of insurance contract liabilities for the selected scenarios, and
  - the corresponding average for the 80<sup>th</sup> percentile.

### **Scenario-tested assumptions**

- .52 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**

- .53 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.
- .54 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**

- .55 The margin for adverse deviations would be at least the average of the applicable high and low margin 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 balance sheet date and the last cash flow,
- an investment strategy, and
  - an interest rate for each risk-free asset and the corresponding premium for each asset subject to default.
- .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, default risk classification, and term of the invested assets that support insurance contract liabilities. Assumption of the insurer's current investment strategy implies investment decisions of reinvestment and disinvestment in accordance 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. The insurance contract liabilities would, therefore, make no provision for any increased risk that may result from a change in that policy.
- .06 When using non-debt instruments, the actuary would ensure that the proportion of non-debt instruments, at each duration, would be in accordance with the insurer's current investment policy (regardless of whether net cash flows for the period are positive or negative). This review would be performed without taking into consideration any business that could be issued after the valuation date (new sales) even for a valuation done on a going concern basis as stipulated in paragraph 2130.02. In the case where the investment policy limits are set on a going concern basis, the actuary would be satisfied that the projected proportion of non-debt assets is appropriate to support only the inforce business at the valuation date, and does not explicitly or implicitly assume any future new business. This may create a situation where the actuary would have to assume that non-debt instruments would be divested. This disinvestment is not limited to non-debt instruments acquired after the valuation date.
- .07 The number of assumed terms of 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 A scenario for a foreign country's interest rates would be formulated independently of that for Canadian interest rates unless their positive historical correlation is expected to continue.
- .09 The importance of the assumptions for a particular forecast period depends on the magnitude of the net forecasted cash flow for that period.

### Base scenario

- .09.1 The interest rates for investments purchased or sold would be based on the following interest rate scenario using the insurer's current investment strategy,
- risk-free interest rates effective after the balance sheet 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 balance sheet date,
  - at or after the 40<sup>th</sup> anniversary from the balance sheet date, risk-free interest rates would be equal to the sum of ½ of the 60-month and 120-month moving averages of historic long-term Canadian risk-free bond yields (V122544 term-to-maturity>10 years), annualized and rounded to the nearest 10 basis points, and
  - between the 20<sup>th</sup> and 40<sup>th</sup> anniversary, the forward risk-free interest rates would be determined using a uniform transition,
- and the premiums for default risk at all durations, would be consistent with the current investment strategy and risk premiums available in the market at the balance sheet date.

- .09.2 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

- .10 Because future investment returns and inflation rates are so conjectural, it is desirable that the calculation of insurance contract liabilities for all insurers take account of certain common assumptions. There are, therefore, nine prescribed scenarios as presented below.
- .11 The prescribed scenarios apply to debt investments acquired or sold after the balance sheet date.
- .12 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 2330.14, and then would
- assume the reinvestment of any remainder in debt investments, except that, in lieu of debt investments, the actuary may assume reinvestment in non-debt investments
  - not to exceed their proportion of investments at the balance sheet date if the insurer controls investment decisions and if such reinvestment is consistent with its investment policy, or
  - in the proportion expected to be selected by policy owners if policy owners control investment decisions.

- .13 The limitation on reinvestment in non-debt instruments is intended to apply in situations where reflecting increased utilization of these instruments would reduce the insurance contract liabilities.
- .14 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 soon repayable by subsequent positive forecasted net cash flow.
- .15 The prescribed scenarios provide guidance on interest rates for sale and purchase of investments and on the type and term of investments purchased, but provide no guidance on the type and term of investments sold.
- .15.1 The prescribed range of short-term Canadian risk-free interest rates for the ultimate forecast period is calculated as follows (but see also paragraph 2330.15.3 below for limitations). The lower bound of the short-term rates is determined as the lesser of 3%, and the rate determined by taking 90% of the sum of 1/2 of the 60-month and 120-month moving averages of historic 91-day Canadian risk-free interest rates. The upper bound of the short-term rates is determined as the greater of 10%, and 110% of the sum of 1/2 of the 60-month and 120-month moving averages of historic 91-day Canadian risk-free rates. These range bounds are rounded to the nearest 10 basis points. The 91-day Canadian risk-free interest rate is defined as the effective annual rate equivalent to the Short Rate: V122531 - Government of Canada 91-Day Treasury Bill Yield rate, which is compounded quarterly.
- .15.2 The prescribed range of long-term Canadian risk-free interest rates for the ultimate forecast period is calculated as follows (but see also paragraph 2330.15.3 below for limitations). The lower bound of the long-term rates is determined as the lesser of 5%, and the rate determined by taking 90% of the sum of 1/2 of the 60-month and 120-month moving averages of historic long-term Canadian risk-free bond interest rates (term-to-maturity >10 years). The upper bound of the long-term rates is determined as the greater of 12%, and 110% of the sum of 1/2 of the 60-month and 120-month moving averages of historic long-term Canadian risk-free bond interest rates (term-to-maturity >10 years). These range bounds are rounded to the nearest 10 basis points. The long-term Canadian risk-free bond interest rate (term-to-maturity >10 years) is defined as the effective annual rate equivalent to the Long Rate: V122544 - Government of Canada Benchmark Bond Yield – Long-Term rate, which is compounded semi-annually.
- .15.3 The width of the prescribed range of interest rates is exactly 7%. As a result, if the lower bound of the range is below 3% (short-term) or 5% (long-term), the upper bound of the range will be adjusted to be exactly 7% larger than the lower bound. Similarly, if the upper bound of the range is above 10% (short-term) or 12% (long-term), the lower bound of the range will be adjusted to be exactly 7% less than the upper bound.



- .16 The parameters in the prescribed scenarios apply to investments denominated in Canadian dollars. For 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.
- .17 For each of prescribed scenarios 1 to 6, the insurer's reinvestment strategy for debt instruments by type and term
- at the balance sheet date is the distribution that the insurer is then purchasing,
  - at and after the 20<sup>th</sup> anniversary of the balance sheet date is risk-free coupon bonds with a term of 20 years or less, and
  - between those two dates is according to a uniform transition from the balance sheet date distribution to risk-free coupon bonds with a term of 20 years or less.

### **Prescribed scenario 1**

- .18 The risk-free interest rates for investments purchased or sold
- at the balance sheet date are those for the distribution of investments that the insurer is then making,
  - at the first anniversary from the balance sheet date are 90% of the risk-free rates at the balance sheet date,
  - at and after the 20<sup>th</sup> anniversary of the balance sheet date are the lower bounds of the short-term and long-term rates as described in paragraphs 2330.15.1 through 2330.15.3, and
  - between the last two dates are determined according to a uniform transition from the first anniversary rates to the lower bounds of the prescribed range.
- Interest rates between the short-term and long-term bounds 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-term and long-term interest rates.

### **Prescribed scenario 2**

- .19 This scenario is the same as prescribed scenario 1, with the 90% replaced by 110% and with the short-term lower bound replaced by the short-term upper bound and the long-term lower bound replaced by the long-term upper bound.

### **Prescribed scenario 3**

- .20 The long-term risk-free interest rate moves cyclically in 1% steps between the long-term lower and upper bounds of the prescribed range determined in paragraphs 2330.15.1 through 2330.15.3. The first cycle is irregular; at the first anniversary of the balance sheet date, the rate is

the next step higher, such that the interest rate is an integral difference from the bounds of the range, if the actual rate at the balance sheet date is less than the long-term upper bound, with the rate at subsequent anniversaries increasing in 1% steps to the long-term upper bound, at which point the cycle continues regularly, and

the next step lower, such that the interest rate is an integral difference from the bounds of the range, if the actual rate at the balance sheet date is equal to or greater than the long-term upper bound, with the rate at subsequent anniversaries decreasing in 1% steps to the long-term upper bound, at which point the cycle continues regularly.

- .21 The short-term risk-free interest rate changes uniformly over a period, usually not more than three years, from that at the balance sheet date to 60% of the corresponding long-term interest rate, and thereafter remains at 60% of the corresponding long-term interest rate.
- .22 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**

- .23 This scenario is the same as prescribed scenario 3, except that the first irregular cycle reaches the long-term lower bound rather than the long-term upper bound.

### **Prescribed scenario 5**

- .24 This scenario is the same as prescribed scenario 3, except that the short-term interest rate at an anniversary of the balance sheet date is a percentage of the corresponding long-term interest rate. That percentage moves cyclically in 20% annual steps from 40% to 120% and back. The first cycle is irregular; at the first anniversary, the percentage is

the next step above the actual percentage at the balance sheet date if that actual percentage is less than 120%, and

120% otherwise,

after which the cycle continues regularly.

### **Prescribed scenario 6**

- .25 As respects long-term interest rate, this scenario is the same as prescribed scenario 4.
- .26 As respects short-term interest rate, this scenario is the same as prescribed scenario 5, except that, at the first anniversary of the balance sheet date, the percentage is
- the next step below the actual percentage at the balance sheet date if that actual percentage is more than 40%, and
- 40% otherwise.

### **Prescribed scenario 7**

- .27 The interest rates for investment purchased or sold are 100% of the base scenario at the balance sheet date and 90% of the base scenario at the first anniversary from the balance sheet date and all following durations.

### **Prescribed scenario 8**

- .28 The interest rates for investment purchased or sold are 100% of the base scenario at the balance sheet date and 110% of the base scenario at the first anniversary from the balance sheet date and all following durations.

### **Prescribed scenario 9**

- .29 This scenario assumes continuance of risk-free interest rates and the premiums for default risk consistent with the current investment strategy and risk premiums available in the market at the balance sheet date.

### **Other scenarios**

- .30 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 of the case. If current rates are near or outside the limits of the prescribed ranges defined, then some scenarios would include rates that, in the near term, would be outside the prescribed ranges. 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. The scenarios would include those in which the premiums for default risk range from 50% to 200% of the actual premiums at the balance sheet date.

- .31 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 is loose, or flexibility to manage assets or liabilities is limited.

### **Stochastic scenarios**

- .32 If stochastic modeling is performed for other than segregated fund guarantees, the actuary would ensure that the stochastic model includes scenarios that generate insurance contract liabilities outside the range produced by application of the prescribed deterministic scenarios.

## **2340 OTHER ASSUMPTIONS: ECONOMIC**

### **Margin for adverse deviations**

- .00.1 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-passthrough structure with a repackaging of the credit risk that is difficult to understand,
  - the asset held is from a lower quality tranche of a non-passthrough structure that repackages credit risks,
  - there is uncertainty about the counterparty credit, or
  - there is no netting of the aggregate exposure with a counterparty.

.00.2 Other significant considerations indicative of a potential deterioration of the best estimate assumption would include

there is significant concentration of risks and/or lack of diversification, or  
operational risks are present such that the likelihood of continuing to obtain the best estimate assumption is adversely impacted.

**Fixed income assets: Investment return**

.01 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**

.02 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 investments, to the extent that it is indicative of the future, 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.

.03 Asset depreciation comprises that of both assets that are impaired at the balance sheet date and assets that become impaired after the balance sheet date, and includes loss of interest, loss of principal, and expense of managing default.

.04 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.

.05 The actuary would not necessarily assume that the best estimate of asset depreciation is less than the premium of an asset's investment return over the corresponding default-free interest rate.

.06 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.

.07 Repealed

#### **Fixed income assets: Exercise of borrower and issuer options**

.08 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.

.09 The assumed exercise may depend on the interest rates in the scenario. Anti-selection by commercial borrowers and issuers would usually be intense.

.10 Forecasted cash flows would include any penalty generated by exercise of an option.

#### **Non-fixed income assets: Investment return**

.11 The actuary's best estimate of investment return on a non-fixed income asset would not be more favourable than a benchmark based on historical performance of assets of its class and characteristics.

.12 The low and high margins for adverse deviations in the assumptions of common share dividends and real estate rental income would be respectively 5% and 20%.

.13 The margin for adverse deviations in the assumption of common share and real estate 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 25% to 40% depending on the relative volatility of the two portfolios.

.14 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.

### **Taxation**

.15 The best estimate would be for continuation of the tax regime at the balance sheet 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**

.16 The needed assumptions would include foreign exchange rates when insurance contract liabilities and their supporting assets are denominated in different currencies.

.17 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.

.18 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.

.19 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 five percent 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 lack homogeneity,
  - operational risks adversely impact the likelihood of obtaining best estimate assumption, or
  - the derivation of the best estimate assumption is unrefined.
- .03.1 Other 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.

- .04 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.

### **Insurance mortality**

- .05 The actuary's best estimate of insurance 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.



- .05.1 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.
- .06 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.
- .07 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.

.08 Repealed

#### **Annuity mortality**

- .09 The actuary's best estimate assumption of annuity 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.
- .10 The insurance underwriting in a "back-to-back" insurance/annuity package may unfavourably affect the best estimate.
- .11 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.
- .12 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.

- .13 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**

- .14 The actuary's best estimate of insurance 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.
- .15 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.
- .16 Repealed
- .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
- the contract wording not tight enough to protect against medical advances,
  - definitions of claim events 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.
- .19.1 For the valuation of segregated fund guarantees, the actuary's best estimate of withdrawal rates would also 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.
- .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.
- .26.1 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

- .27 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.
- .28 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.
- .29 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.
- .30 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**

- .31 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 balance sheet 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.
- .32 The assumption would provide for future expense inflation consistent with that in the interest rate scenario.
- .33 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).
- .34 A particular insurer may have an expectation of reduced expense rates, but the actuary would anticipate only a reduction that is forecasted with confidence.
- .35 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.
- .36 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.

- .37 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.
- .38 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.
- .39 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**

- .40 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.
- .41 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.

.42 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.

.43 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.

#### **Maturities**

.44 For valuation of segregated fund guarantees, 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.

#### **Management expense ratios and/or charges**

.45 For valuation of segregated fund guarantees, 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.

#### **Fund transfers (switching/exchanges)**

.46 For valuation of segregated fund guarantees, 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.



### **Future optional deposits**

- .47 For valuation of segregated fund guarantees, 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.

### **Ratchet and reset rates**

- .48 For valuation of segregated fund guarantees, the actuary's best estimate of rates at which ratchet and reset options are exercised by policy owners would depend on

extent to which the guaranteed values are greater than the market value of the funds,

the relationship of the fund value and guaranteed benefit amounts,

term to maturity, and

growth of funds.

- .49 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.

## **2360 SCENARIO ASSUMPTIONS FOR VALUATION OF SEGREGATED FUND GUARANTEES**

### **Model calibration**

- .01 *It is prescribed that the actuary's calibration of stochastic models used in the valuation of segregated fund guarantees should meet the criteria for investment returns as promulgated from time to time by the Actuarial Standards Board. [Effective January 1, 2011]*

- .02 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 segregated funds being modelled.

### **Random number generators**

- .03 The random numbers generated by computer algorithms are called pseudo-random 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 pseudo-random 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.

.04 It would be preferable for the results from stochastic modelling to be reproducible, so that a repeatable pseudo-random number generator would be available to an auditor.

### **Number of scenarios**

.05 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.

.06 The actuary may consider scenario reduction techniques, such as stratified sampling, to reduce the number of scenarios on a sound statistical basis.

### **Modelling period**

.07 The actuary would use a modelling period that is not longer than one month unless testing shows that the liability for segregated fund guarantees is not sensitive to the frequency of election of benefits or features.

### **Economic scenario generators**

.08 The actuary would develop stochastic models for each market index or proxy that is constructed for the segregated funds.

.09 The actuary would select economic scenario generators for stochastic models that are robust and statistically sound.

### **Model parameter estimation**

.10 The actuary would estimate model parameters based on historical market data as opposed to recent market performance. Due to the long-term nature of the segregated fund guarantee, 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.

.11 The actuary would update model parameters regularly to reflect recent changes in market conditions.

.12 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.

.13 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**

- .14 To develop investment returns for a specific fund, an appropriate proxy for the segregated 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 segregated funds.

### **Discount rates**

- .15 The actuary would select discount rates (or accumulation rates) to determine the asset balance necessary to support the liabilities using the assets allocated to support the segregated fund guarantees.

### **Base scenario**

- .16 The base scenario for calculating the provision for adverse deviations would be defined as the average of the insurance contract liabilities for all investment return scenarios.

## 2400 THE APPOINTED ACTUARY

### 2410 DEFINITIONS

- .01 In sections 2400 and 2500, “senior management” means
- in the case of a Canadian insurer, both the chief executive officer and the chief financial 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 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.

### 2430 EXTENSION OF SCOPE

- .01 This section 2400 does not apply to an actuary who is not an appointed actuary unless that actuary has the access to information and protection against civil liability equivalent to that which the federal Insurance Companies Act grants to an appointed actuary.

### 2440 ACCEPTING AND CONTINUING AN ENGAGEMENT

- .01 *Section 1400 applies rigorously to the engagement.* [Effective January 1, 2003]

### **Qualifications, experience, and knowledge**

- .02 As respects Rule 2 (Qualification Standards), the necessary qualifications, experience, and knowledge go beyond technical understanding and include the awareness that comes with maturity, communications 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
- 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,
  - claims settlement practice (including case estimate practice) and cost,
  - asset-liability management practice, and
  - capital management practice.

- .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*.

## **2450 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 any such matter which requires rectification to the senior management and, in the case of a Canadian insurer, send a copy of the report to the directors. 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 January 1, 2003]*
- .02 The sensitivity of financial condition to adverse conditions and events varies among insurers. For example, an increase in withdrawal rates among policies may be devastating in one life insurer and may be beneficial in another. Financial condition and hence, the magnitude of the conditions and events that may threaten it, also varies among insurers.
- .03 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.
- .04 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.
- .05 That report would describe the threatening condition or event and the methods and assumptions in the actuary's investigation of it. It is desirable that the report includes recommendations for its rectification.
- .06 The deadline would allow time, that is reasonable in the circumstances to arrange rectification.
- .07 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.

## **2460 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 December 1, 2011]*

### **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)**

- .03.1 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**

- .04 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**

- .05 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**

- .06 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]

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

### **2470 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.

### **2480 CERTIFICATION OF CAPITAL FILINGS AS REQUIRED BY THE REGULATOR**

- .01 This subsection 2480 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.*

#### **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 methodologies and judgments that were applied. The report should be completed before the provision of a signed opinion pursuant to subsection 2480. [Effective February 8, 2013]*
- .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 methodologies 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, should 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 2480. [Effective February 8, 2013]*

.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 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 INVESTIGATION

- .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 also make an interim investigation if there is a material adverse change in the insurer's circumstances.*
- .04 *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 December 31, 2011]*
- .05 The actuary's investigations would be done with a frequency sufficient to support timely corrective actions by management and the board of directors or chief agent for Canada.

#### **Recent and current financial position**

- .06 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**

- .07 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.
- .08 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.

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

### **Satisfactory financial condition**

- .10 The insurer's financial condition would be satisfactory if throughout the forecast period, 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, and under the base scenario, the insurer meets the supervisory target capital requirement.

### **Data, methods and assumptions**

- .11 The actuary would start the forecast period using the data as of the most recent available fiscal year-end balance sheet date.
- .12 The methods and assumptions would reflect up-to-date studies and analysis available to the actuary.
- .13 The policy liabilities would be revalued at the end of the first financial year of the forecast period if a change in method or assumptions that is expected to be made by the insurer would result in a material change to the financial position of the insurer.
- .14 The actuary would consider recent events and recent operating results of the insurer up to the date of the report.
- .15 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**

- .16 The forecast period would begin at the most recent available fiscal year-end balance sheet date. 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**

- .17 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 (for example, the operations of an insurer's trust company subsidiary).

### **Base scenario**

- .18 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**

- .19 A plausible adverse scenario would be a scenario of adverse, but plausible, assumptions about matters to which the insurer's financial condition is sensitive. Plausible adverse scenarios vary among insurers and may vary over time for a particular insurer.
- .20 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 it 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**

- .21 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,
  - persistence and lapse,
  - cash flow mismatch (C-3 risk),
  - deterioration of asset values (C-1 risk),
  - new business,
  - expenses,
  - reinsurance,
  - government and political issues,
  - counterparty,
  - off-balance-sheet items, and
  - related companies.



- .22 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**

- .23 In many cases, plausible adverse scenarios would be associated with a low probability of occurrence. In such cases, it would usually not be necessary for the actuary to construct integrated scenarios by combining two or more low-probability adverse scenarios.
- .24 In some cases, however, the probability associated with a plausible adverse scenario may be close to the probability associated with the base scenario. For example, a significant asset on the balance sheet may be showing early signs of distress. In such cases, an integrated scenario would be constructed by combining each more probable adverse scenario with a low-probability adverse scenario. The low-probability adverse scenario selected would be the one that has the greatest effect on the insurer's financial condition and is plausible when combined with the more probable adverse scenario.
- .25 An integrated scenario would be included in the minimum of three plausible adverse scenarios required by paragraph 2520.33 if the integrated scenario was found to be one of the three most adverse scenarios.

### **Ripple effects**

- .26 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.

- .27 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.
- .28 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.
- .29 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**

- .30 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.
- .31 Consideration would also be given to the effectiveness of planned management actions in a volatile or stressed environment.

### **Scope of the investigation and report**

- .32 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.
- .33 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.
- .34 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.
- .35 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 report the corrective management action so that users may consider its practicality and adequacy.
- .36 The report would present the financial position of the insurer at each fiscal year-end throughout the forecast period.

### **Revaluation of the policy liabilities**

- .37 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.

### **Interim investigation**

- .38 In rare cases, a material adverse change in the insurer's circumstances since the last investigation may be so far-reaching 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 make an immediate report urgent. In such a case, the actuary would undertake and report on an interim investigation.

## **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 December 31, 2011]*
- .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 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. 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 December 31, 2011]*
- .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 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.
- .02 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.
- .03 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.
- .04 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.
- .05 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 January 1, 2012]*

**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
- default-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 January 1, 2012]*

- .03 An additional opinion paragraph may be included to conform to the requirements of an external user.