Educational Note

Actuarial Considerations Related to Property and Casualty Valuation Work Not Subject to IFRS 17

Committee on Property and Casualty Insurance Financial Reporting

August 2022

Document 222112

Ce document est disponible en français

The actuary should be familiar with relevant educational notes. Educational notes are not binding; rather they are intended to illustrate the application of the standards of practice. A practice that an educational note describes for a situation is not necessarily the only accepted practice for that situation nor is it necessarily accepted practice for a different situation. Responsibility for ensuring that work is in accordance with accepted actuarial practice lies with the actuary. As accepted actuarial practice evolves, an educational note may no longer appropriately illustrate the application of standards. To assist the actuary, the CIA website contains a reference of pending changes to educational notes.

MEMORANDUM

To: Members in the property and casualty insurance area

From: Steven W. Easson, Chair
Actuarial Guidance Council

Sarah Ashley Chevalier, Chair
Committee on Property and Casualty Insurance Financial Reporting

Date: August 4, 2022

Subject: **Educational Note: Actuarial Considerations Related to Valuation Work Not Subject to IFRS 17**

The Committee on Property and Casualty Insurance Financial Reporting (PCFRC) has prepared this educational note to provide guidance on various actuarial considerations related to work performed by actuaries for contract valuations and other obligations when compliance with IFRS 17 is not required.

This educational note will become effective on January 1, 2023, which corresponds to the effective date of IFRS 17.

This educational note is structured in sections as follows:

- Sections 1 and 2, respectively, provide an introduction and a definition of the terminology used in this educational note.
- Section 3 provides general comments on the valuation basis.
- Section 4 provides guidance related to discounting.
- Section 5 provides guidance related to margins for adverse deviations.
- Section 6 provides guidance related to premium liabilities.

The guidance provided in this educational note is mainly based on accepted actuarial practice in effect prior to the adoption of IFRS 17 along with application of suitable aspects of IFRS 17. It is written from the perspective of Canadian actuaries and is not intended to duplicate any other guidance.

A preliminary version of the educational note was shared with the following committees for their review and comments, and presented to the Actuarial Guidance Council (AGC) in the months preceding its approval:

- Committee on Life Insurance Financial Reporting (CLIFR)
- Committee on Risk Management and Capital Requirements

- Committee on the Appointed/Valuation Actuary
- International Insurance Accounting Committee
- Worker's Compensation Committee
- Group Insurance Practice Committee

The PCFRC is satisfied it has sufficiently addressed the material comments received by the various stakeholders, committees, and the AGC.

The creation of this cover letter and educational note has followed the AGC protocol for the adoption of educational notes. In accordance with the CIA's *Policy on Due Process for the Approval of Guidance Material other than Standards of Practice and Research Documents*, this educational note has been prepared by the PCFRC and has received approval for distribution from the AGC on June 14, 2022.

The actuary should be familiar with relevant educational notes. Educational notes are not binding; rather they are intended to illustrate the application of the standards of practice. A practice that an educational note describes for a situation is not necessarily the only accepted practice for that situation nor is it necessarily accepted practice for a different situation. Responsibility for ensuring that work is in accordance with accepted actuarial practice lies with the actuary. As accepted actuarial practice evolves, an educational note may no longer appropriately illustrate the application of standards. To assist the actuary, the CIA website contains a reference of pending changes to educational notes.

Questions or comments regarding this educational note may be directed to the Chair of the PCFRC at guidance.feedback@cia-ica.ca.

SWE, SAC

Table of contents

1. Introduction

In December 2021, the Actuarial Standards Board (ASB) released the final standards (CIA document 221137) to *Changes required by the adoption in Canada of IFRS 17 (Insurance Contracts)* into the Canadian Standards of Practice (SOP).

In that set of actuarial standards of practice, paragraph 2110.04 states:

> Where the valuation of insurance contracts and other obligations is not in accordance with IFRS 17, Sections 2200 and 2300 do not apply to the valuation and the valuation would be in accordance with any applicable accounting standards if the valuation is to be used for financial reporting, or the terms of the actuary's engagement or as mandated by law or as prescribed by practice-specific standards.

A group of several P&C actuaries involved with such valuations not in accordance with IFRS 17 reached out to the ASB to express concerns with this paragraph. The main concern is that actuaries would no longer have SOP to perform such valuations; the group proposed that the SOP at a minimum state the valuation basis which would remain the present value of future cash flows plus a provision for adverse deviations (PfAD). The ASB reviewed the practitioners' concerns but ultimately decided not to change the SOP proposed. Instead, the ASB suggested that an educational note be developed.

Consequently, the PCFRC has developed this educational note to provide guidance on various actuarial considerations related to work performed by actuaries for contract valuations and other obligations when compliance with IFRS 17 is not required.

This educational note centers mainly on three aspects of actuarial valuations: discounting, margins for adverse deviations, and premium liabilities. Guidance in this educational note comes mainly from the three corresponding educational notes that were in effect before the adoption of IFRS 17.

Scope and objectives

This educational note will be effective on January 1, 2023, which corresponds to the effective date of IFRS 17.

This educational note supplements the paragraphs relating to general SOP and actuarial valuations not subject to IFRS 17.

This educational note provides specific application guidance and illustrative examples, as well as background and general information, to help inform Canadian actuaries when working on the following types of mandates:

- Valuation mandates in accordance with accounting standards other than IFRS 17 and not subject to section 2000 of the SOP (e.g., accounting standard for private enterprises, accounting standard for private sector not-for-profit organizations, public sector accounting standard), where the obligations to be valued are in substance similar to insurance contracts and where the valuation approach to be followed is not otherwise mandated. Examples include valuations for financial reporting purposes for self-insured entities and certain captive entities.

- Mandates such as business acquisitions or portfolio transfers which may be valued more from an economic perspective and where IFRS 17 guidelines are not required, or relevant, given the nature of the work (e.g., discounting and treatment of expenses may be different). This may apply to mandates for insurance companies whose financial reporting would usually be subject to IFRS 17.

Examples of contracts that are not insurance contracts, and so not within the scope of IFRS 17, can be found in paragraph B27 of IFRS 17. Some of these contracts may already have prescribed measurement basis under other IFRS which would take precedent over the guidance in this educational note.

When performing a valuation using the guidance in this educational note, the actuary would ensure that the valuation meets the requirements of the accounting standards applicable to the mandate.

This educational note has two main goals:

- Ensure a continuity for non-IFRS 17 mandates by promoting practice guidelines in line with pre-IFRS 17 educational notes that are no longer applicable under IFRS 17.
- Narrow the range of practice for mandates where compliance with IFRS 17 is not required.

In writing this educational note, the PCFRC followed these guiding principles:

- Consider Canadian-specific perspectives.
- Develop application guidance that is consistent with the applicable Canadian actuarial SOP and educational notes.
- Consider practical implications associated with the implementation of potential approaches and methods; in particular, ensure that due consideration is given to options that do not require undue cost and effort to implement.

2. Definitions

While valuations of actuarial liabilities not subject to IFRS 17 may be for obligations which do not technically meet the definition of insurance contracts or insurance policies (for example, for quasi-insurers), reference to terms such as “entity,” “insurance contracts,” “policies,” “premiums,” and “claims” is made throughout this educational note for simplicity.

The following terminology is used in this educational note:

- **Actuarial present value (APV):** The sum of the present value of future cash flows and the provision for adverse deviations (i.e., APV = PV + PfAD).
- **Allocated loss adjustment expense (ALAE):** Expenses directly attributable to settling and defending specific claims and may include salaries of adjusters, legal fees, court costs, expert witnesses, and investigation costs.
- **Best estimate:** Without bias.

- **Claim liabilities:** The portion of insurance contract liabilities in respect of claims incurred on or before the balance sheet date. Claim liabilities include indemnity amounts and internal and external (allocated and unallocated) claims adjustment expense amounts.
- **Deferred policy acquisition expense (DPAE but also referred to as DPAC or DAC):** Prepaid acquisition expenses which relate to the unexpired portion of the policy. These expenses are paid up front when the policy is issued but are not expensed on the income statement until the premium is earned. A deferred asset may be set up for these prepaid expenses on the balance sheet. The DPAE is an asset which recognizes the prepaid expenses over the policy period provided that such costs are recoverable from the equity in the net unearned premium reserve (UPR), as evaluated by the actuary.
- **Discount rate:** Rate used to discount future cash flows to the valuation date. A discount rate may be a single rate, or a curve of rates varying by duration. "Discount rate curve" and "yield curve" are used interchangeably in this educational note.
- **Duration:** The weighted average timing of a series of future cash flows. Duration is often used as a measure of the sensitivity to change in interest rates on a series of cash flows.
- **Earning pattern:** Premiums would be earned on a basis consistent with the occurrence of losses. For most lines of business, losses are assumed to occur at a uniform rate during the year and premiums are earned on a pro rata basis over the term of the policy. However, for some lines of business where losses are seasonal or non-uniform over the policy term, this assumption is not appropriate.
- **Equity in the gross unearned premium:** Amount by which the gross unearned premium reserve (UPR) exceeds the gross policy liabilities in connection with unearned premium.
- **Equity in the net unearned premium:** Amount by which the net UPR plus unearned (reinsurance) commissions exceeds the net policy liabilities in connection with unearned premium.
- **General expenses:** These expenses include operational overhead and servicing expenses that are not related to the acquisition of new or renewal business and generally exclude loss adjustment and investment expenses.
- **Margin for adverse deviations (MfAD):** The difference between the assumption for a calculation and the corresponding best estimate assumption.
- **Payment pattern:** Expected pattern of payment of future cash flows.
- **Premium liabilities:** Premium liabilities are the portions of policy liabilities that are not claim liabilities. Premium liabilities include the expected costs in connection with the unexpired portion of the in-force insurance contract (i.e., incurred after the valuation date) and all other liabilities related to premium development adjustments (e.g., retro-rated premium and contingent profit commissions).
- **Premium deficiency:** A provision may be determined by the actuary when the equity in net UPR is negative. It is the amount which, when added to the net UPR and unearned

(reinsurance) commissions, makes an appropriate provision for future costs arising from the unexpired portion of in-force policies.

- **Present value (PV):** Future cash flows discounted to the valuation date.
- **Provision for adverse deviations (PfAD):** Difference between the actual result of a calculation and the corresponding result using best estimate assumptions. It is the additional provision resulting from the application of a MfAD.
- **Unallocated loss adjustment expense (ULAE):** Expenses incurred that cannot be attributed to the processing of a specific claim and may include claim department salaries, travel, postage, rent, and equipment.
- **Undiscounted:** Future cash flows before recognizing the time value of money.
- **Unearned (ceded) commissions:** Unearned (reinsurance) commissions arise from commission revenue on reinsurance ceded premium. Quota-share reinsurance agreements generally provide for reinsurance commissions to be paid to the entity by the reinsurer on the ceded premium. The reinsurance commission relating to the unexpired portion of a policy (i.e., the reinsurance commission on the unearned ceded premium) is carried as a liability. These unearned commissions generally include a total provision for broker/agent commissions, premium taxes, and other acquisition and servicing expenses.
- **Unearned premium reserve (UPR):** The written premium associated with the exposure remaining on the unexpired portion of the policy under a contract of insurance. The UPR at the valuation date usually is established based on the written premium, the policy term, and an assumed earning pattern.

3. General comments

If the use of IFRS 17 is mandated by law or required under the terms of the engagement, the actuary would follow sections 2200 and 2300 of the SOP along with the supporting educational notes. If the use of IFRS 17 is neither mandated by law nor required under the terms of the engagement, the actuary would confirm the accounting standard applicable to the valuation. The actuary may either follow the general SOP along with this educational note, or follow IFRS 17 requirements. The actuary may do so for all aspects of the engagement that are not prescribed by any applicable accounting standard, practice-specific standard, or the engagement's terms. In most circumstances, the actuary may want to seek help from other stakeholders (auditors, accountants, management) to identify which standards and or guidance/laws are applicable to the engagement.

In the context of valuation mandates not subject to IFRS 17, Section 2200 and 2300 of the SOP do not apply. Instead, the work would be performed in accordance with the Section 1000 General SOP. The actuary's work may be performed under accounting standards other than IFRS, which would not have changed when IFRS 17 came into effect. Alternatively, the actuary may be completing a special mandate with a valuation component for an entity subject to IFRS 17, but that work may not be performed based on IFRS 17 requirements because it is neither required nor relevant given the nature of the work (e.g., business acquisition or portfolio transfer).

Guidance will still be required for engagements that fall outside the scope of IFRS 17. Consequently, the guidance in this educational note is mainly based on the following three educational notes which were used for valuations prior to January 1, 2023:

- *Discounting and Cash Flow Considerations for P&C Insurers* (May 2016, document 216058)
- *Margins for Adverse Deviations for Property and Casualty Insurance* (December 2009, document 209138)
- *Premium Liabilities* (July 2016, document 216076)

Actuaries may be required to value policy liabilities which may include claim liabilities, premium liabilities, or both. Claim liabilities are those in respect of benefits and claims incurred on or before the calculation date. The valuation of claims liabilities may reflect all cash flow related to such claims, including benefit payments, expenses and taxes occurring after the calculation date. Premium liabilities are the portion of policy liabilities that are not claim liabilities; they relate to premiums and all other benefits and claims, including their related expenses and taxes expected to be incurred after the calculation date on policies in force at the calculation date. Section 6 provides guidance on the calculation of premium liabilities.

3.1. Actuarial present value

The valuation basis for policy liabilities is the APV, which is based on the present value of future cash flows plus the PfAD.

The resulting APV of policy liabilities is computed as follows:

Gross APV	=	Gross PV
	+	PfAD for claims development (gross)
	+	PfAD for investment return rate (gross)
Ceded APV	=	Ceded PV
	+	PfAD for claims development (ceded)
	+	PfAD for investment return rate (ceded)
	-	PfAD for recovery from reinsurance ceded
Net APV	=	Net PV
	+	PfAD for claims development (net)
	+	PfAD for investment return rate (net)
	+	PfAD for recovery from reinsurance ceded

Each of the following elements is addressed in this educational note:

- The estimation of cash flows arising from the claim liabilities and premium liabilities (undiscounted value).
- The selection of discount rates.
- The calculation of the present value of the claim liabilities and premium liabilities.

- The PfAD that may increase claim liabilities and premium liabilities

3.2. Undiscounted cash flows

The undiscounted cash flows would be selected based on the actuary's best estimate of future cash flows. When selecting assumptions for the calculation of the claim and premium liabilities, the actuary would consider fact and circumstances as stated in paragraph 1620.02 of the SOP: "The actuary should select an appropriate model or data assumption for a matter as the best estimate assumption relating to that matter, modified, if appropriate, to make provision for adverse deviations. In selecting an assumption, the actuary should take account of the circumstances affecting the work, past experience data, the relationship of past to expected future experience, anti-selection, and the relationship among matters."

The actuary would coordinate the valuation with the entity's accounting policy so that the insurance policy liabilities, reinsurance recoverables, and other items in the statement of financial position are consistent, avoid omission or double-counting, and conform to the presentation of the financial statements.

The cash flows that comprise the insurance policy liabilities may 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.

3.3. Discounting

Paragraph 1620.35 of the SOP states:

> The use of a discount rate is inherent in the actuarial present value method. The discount rate may be constant or it may vary over time. In selecting the best estimate assumption for the discount rate, the actuary, consistent with the circumstances affecting the work, may either
>
> > Take into account the expected investment returns of the assets that support the liabilities; or
> >
> > Reflect interest rates on relevant fixed income reference securities.

Section 4 provides guidance on the selection of a discount rate/curve and the discounting of the policy liabilities.

3.4. Provision for adverse deviations

Paragraph 1630.01 of the SOP states: "The actuary should include a provision for adverse deviations in calculations only to the extent required by the terms of the actuary's engagement

or as mandated by law or as prescribed by practice-specific standards."

The SOP effective January 1, 2023 no longer has practice-specific standards mandating the use of PfAD. Therefore, the actuary would consider including a PfAD only to the extent required by the engagement or as mandated by law. There may be situations where, in the actuary's judgment, no PfAD is required.

Section 5 provides guidance on the selection of the PfAD.

The actuary may want to ensure that the inclusion of PfAD in the calculation policy liabilities results in an increase to the value of the liability net of reinsurance and that the resulting total PfAD from the application of all MfAD is appropriate in the aggregate.

3.5. Valuation bases

The following relationship applies whether estimates are on an undiscounted, PV, or APV basis:

Net = Gross – Ceded

Normally, amounts or assumptions are estimated directly on two of the three bases above, while the amounts or assumptions on the third basis are computed from the above relationship. The estimation of cash flows, for example, may generally be on a basis consistent with the analysis on an undiscounted basis of claim liabilities and premium liabilities. Regardless of which two of these bases are estimated directly, care may be taken to assess the reasonableness of the third estimate or set of assumptions computed from those on the first two bases. The following are considerations for selecting which two bases are to be estimated directly:

- Data availability: If there is sparse or limited data for ceded claims, it may not be possible or appropriate to directly estimate the present value of ceded cash flows.
- Cash flow volatility: Different approaches may be warranted for different segments of business depending on the volatility of cash flows by segment.
- Reinsurance held: Consideration may be given to the type and consistency of an entity's reinsurance held. For example, it may not be appropriate to use the net basis as a starting point if the entity's retention has changed significantly over the experience period.

Depending on the organization of the available data and the correspondence between the direct and reinsurance held groups, the actuary may choose to estimate the future cash flows pertaining to reinsurance contracts held by subtracting net future cash flows (i.e., net of reinsurance held) from gross future cash flows (i.e., insurance and reinsurance contracts issued). When doing so, the implied ceded cash flows would be assessed for reasonableness.

For mandates where the results of the valuation are used to complete a statement of financial position and/or a statement of income, presenting results on a gross and ceded basis separately, and not only on a net basis, may be required.

3.6. Actuarial opinion

There is no prescribed actuarial opinion for valuation mandates not subject to IFRS 17. Such mandates may be very diverse and, in some circumstances, may not require an actuarial opinion, for example if an opinion is not within the scope of the actuary's engagement.

Appendix H presents examples of actuarial opinions for valuation mandates not subject to IFRS 17.

3.7. Terminology and concept comparison

The following table presents a comparison of key terminology and concepts between this educational note and IFRS 17 requirements. This comparison is not exhaustive and additional differences may exist.

Current educational note	IFRS 17	Comments
Best estimate cash flows	Future cash flows	The IFRS 17 concept of probability-weighted cash flows is broadly aligned with the practice suggested in this educational note which is to determine best estimate cash flows. The main difference is in the scope of the cash flows included in the valuation. For example, IFRS 17 may encompass a broader scope of cash flows; mandates not subject to IFRS 17 may consider only uncertain cash flows and exclude items such as payables and receivables.
Discount rates	Discount rates	There are two main differences: - In this educational note, the discount rate is calculated based on the company's investment portfolio, while this may not be the case when the discount rate is calculated using IFRS 17 principles. - Under IFRS 17, the liquidity characteristics of the insurance contracts need to be determined and a liquidity premium is explicitly accounted for.
Provision for adverse deviations (PfAD)	Risk adjustment for non-financial risk (RA)	There are two main differences: - The RA only includes a provision for non-financial risk, while PfADs cover uncertainty in both economic and non-economic assumptions. - The RA depends on the entity's own compensation requirements for taking risk, while PfADs depend

		exclusively on the uncertainty of the estimated future cash flows.
Claim liabilities	Liability for incurred claims (LIC)	Both concepts are based on the present value of future cash flows related to claims incurred (which may be reported or unreported to the entity), to which is added: - PfAD for claim liabilities - RA for LIC
Premium liabilities	Liability for remaining coverage (LRC)	Both concepts relate to the valuation of liabilities for the unexpired portion of the insurance contracts, with the following differences: - LRC considers premium, claim and expense cash flows, while premium liabilities consider only claim and expense cash flows - Treatment of reinsurance - Treatment of expenses

4. Discounting

This section addresses the discounting aspect of the valuation of policy liabilities not subject to IFRS 17. This section applies to the selection of discount rates and actuarial present value of the policy liabilities on gross, ceded, and net bases.

4.1. Policy liabilities cash flows

The first step in deriving the actuarial present value is to estimate the cash flows associated with the claim or premium liabilities which are discounted to the valuation date to reflect the time value of money. Cash flows typically include expected claim and claim adjustment expense payments. For premium liabilities, additional components such as maintenance expenses may typically be considered.

4.1.1. Cash flow associated with claim liabilities

Expected claim payments are calculated by applying an expected payment pattern to the undiscounted unpaid claims. Loss payments and estimates of ultimate losses are generally divided into reasonably homogeneous business segments for the selection of payment patterns. Consideration may be given to:

- the business segments used for the analysis of the liabilities on an undiscounted basis;
- the payout period (i.e., the length of time over which payments are expected to be made for a group of claims); and
- the existence of a predetermined schedule of payments for a group of claims.

Selected payment patterns are normally derived from the entity's historical experience. To the extent that an entity's historical experience does not exist (e.g., for a new segment), is not relevant (e.g., changes in claims handling practices) or does not have a reasonable level of credibility (e.g., very low claims volume or significant volatility in claims experience), it may be necessary to evaluate other related or external experience. To the extent possible, such other experience may reflect the expected payment and timing characteristics of the segment under consideration.

Within a segment, payment patterns may vary by accident or underwriting period to reflect changes in legislation, mix of business, reinsurance, or operations (such as claims settlement practices).

Selected payment patterns may reflect the actuary's best estimate with regard to the timing and amount of payments including, where applicable, both indemnity and claims adjustment expenses. It may be appropriate to assume that the payment pattern for indemnity and/or external (allocated) claims adjustment expenses also applies to internal (unallocated) claims adjustment expenses.

The payment pattern reflects the timing of expected salvage, subrogation, reinsurance recovery, and loss transfer amounts as applicable. Cash flows may normally be consistent between the reinsurance contracts held and the underlying insurance contracts written on a direct or gross basis, subject to consideration of any significant recovery lag and the treatment of ceding commissions and ceded claims-related expenses. Consequently, gross, ceded, and net payment patterns are likely to be similar for a given line of business if the entity's reinsurance is in the form of quota-share reinsurance.

Expected payment patterns are frequently derived by segment based on a review of the historical ratios of paid claims to selected ultimate claims at successive maturity ages. Alternatively, the expected payment patterns may be derived directly from the selected paid development factors if such factors are consistent with the selected ultimate claims.

4.1.2. Cash flow associated with premium liabilities

Different payment patterns may be selected for each of the individual components of the premium liabilities, such as future claim costs, servicing or maintenance expenses, and future reinsurance costs.

For future claim costs, the payment patterns may normally be consistent with those associated with claim liabilities (refer to section 4.1.1). Adjustments may be required to reflect:

- the average accident date and average payment date underlying future claim costs;
- legislative or product changes; and
- other considerations similar to those affecting the payment patterns associated with claim liabilities.

Servicing or maintenance expenses are generally paid over the earning period of the unexpired term of in-force policies. The time value of money may not be material for such expenses and the APV of these items may be equal to the undiscounted value.

In determining the cash flow of future reinsurance costs the actuary may consider:

- the timing of the payment of applicable reinsurance premiums;
- the earning period of the unexpired portion of in-force policies; and
- the potential for future reinsurance costs to change (increase or decrease), due to market pressures, changes in the underlying portfolio, or other factors.

Generally, future reinsurance costs are paid over the earning period of the unexpired term of in-force policies. The time value of money may not be material for such expenses and the present value of these items may be equal to the undiscounted value.

4.2. Asset cash flow and discount rate

An example of a definition of a discount rate can be found in IAS 37, paragraph 47: "The discount rate (or rates) shall be a pre-tax rate (or rates) that reflect(s) current market assessments of the time value of money and the risks specific to the liability. The discount rate(s) shall not reflect risks for which future cash flow estimates have been adjusted."

The expected investment return rate for the calculation of the present value of cash flows, net of reinsurance, is that to be earned on the assets, taking into account reinsurance recoverables, that support the policy liabilities. The expected investment return depends on the items including but not limited to the following:

- the assets owned at the calculation date;
- the allocation of those assets and related investment income among lines of business;
- the method of valuing assets and reporting investment income;
- the yield on assets acquired after the calculation date;
- investment expenses; and
- losses from asset depreciation.

The expected investment return rate for calculation of the present value of ceded cash flows may be selected from the following or a combination thereof:

- The investment return rate selected for net present value net of reinsurance (i.e., as described above).
- A risk-free rate.
- The investment return rate used by the assuming company.

The actuary need not verify the existence and ownership of the assets at the calculation date but may consider their quality.

Investment return rates (discount rates) are on a pre-tax basis and are used to discount the expected future payment streams to their equivalent present value.

The discount rates may vary from one claim grouping to the next, from one future period to the next, or from one underlying accident or underwriting period to the next, although it is common to use a single rate for all years and product lines. The actuary may also select a discount rate curve which is consistent with the timing of the expected payments underlying the policy liabilities.

The following commentary addresses the derivation or estimation of a portfolio yield rate to determine the present value of the net policy liabilities and considerations affecting the selection of discount rates used to determine the present value of the ceded policy liabilities and gross policy liabilities.

4.2.1. Selection of portfolio

The assets that are included in the portfolio for the purpose of estimating a discount rate or discount rate curve may vary depending on the circumstance of the organization. Invested assets, such as those invested in fixed income securities, are commonly included as part of the portfolio. Other invested assets, such as those invested in non-fixed income securities, as well as assets such as cash or receivables may be excluded from the portfolio, subject to other considerations described below.

Invested assets may be segregated between investments supporting the policy liabilities (or a portion thereof) and the remaining investments supporting surplus (equity) and other liabilities as applicable, in accordance with the organization's investment policy. In such cases, the actuary may rely on the investment policy to segregate invested assets for inclusion in the selected portfolio. For example, the investment policy may dictate that invested assets be invested in fixed and non-fixed income securities in a ratio that mirrors the ratio of policy liabilities versus surplus. In this case, the actuary may elect to include only fixed income securities in the portfolio.

The actuary may also consider characteristics such as the credit rating, duration, and time to maturity of invested assets in selecting the portfolio.

In addition to the considerations listed above, the assets selected for the purpose of estimating a discount rate may meet the following criteria:

- The selected assets may be sufficient to support the net policy liabilities.
- The selected assets may generate a cash flow that is consistent with the cash flows associated with the net policy liabilities.

Although it is common practice to select a single discount rate to be applied to both net premium liabilities and net claim liabilities, the comments in this section may apply even if distinct discount rates were derived for purposes of discounting subsets of the overall net policy liabilities.

If the book value of the investment portfolio is insufficient to support the net policy liabilities, then the expected yield on other (non-investment) assets may be considered. A blended rate

may be estimated assuming an appropriate yield on such non-investment assets. The book value of an asset may be equal to the market value or the amortized value, depending on the accounting policy decisions of the organization.

The asset cash flow is made up of maturing values, liquidated values, income from dividends and coupons, cash including collection of receivables, and other asset-related income attributable to the selected portfolio. The asset cash flow is considered to be consistent with the relevant liability cash flow if the amount of the two cash flows is approximately the same in each period, in which case the average asset duration may be consistent with the average duration of the net policy liabilities.

Where matching is not evident, for example when an entity does not have a rigorous policy in place, the actuary may consider whether the cash flows are sufficient to warrant the use of the portfolio selected for the purposes of estimating a discount rate. If sufficient, the asset portfolio may be expected to give rise to cash flow in each period that may at least provide for the net liabilities cash flow in that period.

By definition, consistency of cash flows may be assessed through the application of a comprehensive cash flow matching model for purposes of deriving a discount rate. An example of such a model is described in Section 4.2.6.

Below is an example of a simple approach for assessing the sufficiency of the asset cash flow when a comprehensive cash flow matching model is not used. In this context, the net cash flow in a period is computed as the asset cash flow in that period less the liabilities cash flow in that period. Appendix A summarizes the scenarios presented in Appendices B, C, and D. Each of Appendices B, C, and D provide "a more detailed example" as referenced here.

	Net cash flow			
Period	**Asset cash flow**	**Liabilities cash flow**	**Net cash flow**	**Cumulative cash flow**
t+1	33,000	26,000	+7,000	+7,000
t+2	13,000	9,800	+3,200	+10,200
t+3	6,000	4,800	+1,200	+11,400
t+4	2,500	3,100	-600	+10,800
t+5	2,900	2,200	+700	+11,500
Total	**57,400**	**45,900**	**+11,500**	**-**

Ideally, the net cash flow in each period may be positive. The actuary may consider the timing and magnitude of any negative values for net cash flow (such as in period t+4, above), and the extent to which such incremental negative values may cause the cumulative net cash flow to be negative. In this case, it is obvious that positive net cash flows in the first three periods are more than sufficient to cover the negative cash flow in period t+4, without consideration of the expected rate of return on reinvested assets.

For more complex cases, refer to Section 4.2.3 for a discussion of reinvestment of positive cash flows, and liquidation of assets to address negative cash flows.

4.2.2. Portfolio yield rate

A portfolio yield rate is the internal rate of return (IRR) at which the present value of all future cash flows is equal to the current book value of the portfolio, reflecting current market assessments. The portfolio yield rate to maturity of a single Government of Canada bond, for example, may be the IRR such that the current book value of the bond is equal to the sum of the present value of future coupons, and the present value of the par value of the bond (i.e., the book value at maturity).

In some cases, an entity's investment specialist will provide the actuary with an estimate of the portfolio IRR.

The actuary may not have available detail regarding the characteristics of each investment required to precisely determine the asset cash flows in order to estimate the portfolio IRR. A weighted average of the yield rates of individual assets may be used as an approximation of the portfolio IRR if, for example, the weights applied to each asset are equal to the product of the duration and the book value of that asset.

A simple example of an IRR calculation is shown in Appendices B, C, and D, along with the approximation referred to above.

Fixed income securities

The following elements may be considered when calculating the IRR of fixed income securities:

- T-Bills are sold at a discount and mature at par value. T-Bill "coupon rates" are generally the nominal simple discount rate quoted in most publications. This is the normal convention used for these and similar instruments in Canada. The market convention may be different in other countries.
- It is common for the yield on a bond portfolio to be quoted as a nominal yield, compounded semi-annually. If so, the actuary may need to convert this rate to an equivalent annual effective interest rate.
- Some bonds have call features that result in redemption prior to maturity, which may impact their valuation.
- Accrued investment income is often held by a company in a separate account, but may be included by the actuary in the book value of bonds.
- Retractable preferred shares, and preferred shares with rate reset options, may lend themselves to the same IRR treatment as bonds.

Non-fixed income securities

The following educational notes issued by the Committee on Life Insurance Financial Reporting (CLIFR) may provide useful guidance regarding the calculation of IRR on non-fixed income securities held by P&C insurers:

- *Investment Return Assumptions for Non-Fixed Income Assets for Life Insurers* (March 2011)
- *Investment Assumptions Used in the Valuation of Life and Health Insurance Contract Liabilities* (September 2014)

These educational notes were developed for financial reporting of life and health entities prior to IFRS 17. In applying the underlying concepts to P&C entities' valuations, consideration may be given to characteristics of the entity's claim liabilities, such as the estimated duration of those liabilities, that distinguish them from those of a life and health entities.

Listed below are illustrations of considerations pertaining to life and health insurance that might be applicable to P&C insurance:

- The actuary's best estimate of investment return on a non-fixed income asset may not be more favourable than a benchmark based on historical performance of assets of its class and characteristics.
- The longest possible historical period could be the most appropriate for determining the best estimate of investment return, because the projection period for life and health valuations is very long and possibly even longer than the longest reliable historical period.

Assets with 0% IRR

Typically, the IRR associated with cash and cash equivalents is 0%. If the level of cash held at the valuation date is unusually large, however, it may be appropriate to assume that excess cash will be invested in accordance with the company's investment strategy.

Other assets for which the IRR is normally considered to be 0% include receivables from agents and brokers, policyholders, instalment premiums, and other entities.

When uncollected premiums (accounts receivable) are included in the assets backing the premium liabilities, it may be appropriate to assume that these amounts will be invested when collected at some future date, and thus will generate investment income over the remaining duration of the premium liabilities.

4.2.3. Discount rate – present value of net policy liabilities

For the purposes of financial reporting, a portfolio yield rate may be used as the basis for selecting a pre-tax discount rate for estimating the PV of net policy liabilities, where the time value of money is material. Normally, the same discount rate may be used in the estimation of the PV of both net premium liabilities and net claim liabilities.

Reinvestment risks and liquidation of assets

Unless the asset cash flow is consistent with the liability cash flow, the actuary may consider the effect of reinvesting positive net cash flow, or the effect of the liquidation of assets to address negative net cash flow.

To the extent that reinvestment is required, the actuary may consider the expected future reinvestment rate for new money and the company's investment strategy. For example, the actuary may consider the following: whether the entity's strategy is one of growth, or a "buy and hold" strategy; whether reinvestment is expected to be in the form of Government of Canada bonds; or whether the entity has a policy for reinvestment of dividends received.

The actuary may also consider whether it will be necessary to liquidate a portion of invested assets by determining whether the current or future asset portfolio has appropriately scheduled maturity dates and sufficient liquidity to cover the future payments needed.

As an alternative to liquidation of existing assets in the event of negative net cash flow, the actuary may consider expected cash flow from future business. Such cash flow may be the net cash flow after consideration of the payout of expected claims and expenses, as well as the receipt of premiums and other revenue items. In this context, future business may be limited to future renewals on existing in-force policies, after consideration of the company's expected retention rate.

After consideration of future reinvestment and liquidation of assets, the selected discount rate may be a blended rate based on the current portfolio yield rate, expected future reinvestment rates, and the expected capital gain or loss arising from premature liquidation.

Refer to Section 4.2.1 for a discussion of cash flow consistency. Section 4.2.6 provides an illustration of the use of a comprehensive cash flow matching model for the purposes of selecting a discount rate.

Investment expenses

The actuary may consider the expected expenses to be incurred in connection with the investment of assets. It may be reasonable, for example, to reduce the discount rate based on historical investment expenses.

Asset depreciation risk

The actuary may consider reducing the discount rate to reflect expected losses due to credit-related events, including default, impairment, or restructuring of obligations by the issuer of the invested assets. The actuary may consider the impact that a concentration of investments might have on such expected asset depreciation risk. Unexpected asset depreciation risk may be considered by the actuary in the context of selection of the credit risk component of the investment return rate MfAD.

4.2.4. Discount rate – present value of ceded policy liabilities

Ceded liabilities are shown as recoverable amounts (assets) in the balance sheet. As such, they are not supported by a company's investments. It is reasonable to assume that liabilities ceded to another entity are supported by assets held by that entity. Normally, it may be appropriate to reflect the time value of money, if material, in the estimation of ceded liabilities. The discount rate used to determine the PV of ceded policy liabilities may be selected from the following or a combination thereof:

- The pre-tax discount rate selected for the estimation of the PV of net policy liabilities (i.e., a portfolio yield rate).
- A risk-free rate.
- The pre-tax discount rate used by the assuming company, such as in the case of cessions to an affiliated company.

The use of a rate based on the portfolio yield for the estimation of the PV of ceded policy liabilities may be appropriate if the company's investments are sufficient to support its gross policy liabilities, or if the assets held by the assuming company to support its net policy liabilities are considered to be similar to the ceding company's investment portfolio. In cases where a high proportion of a company's policy liabilities are ceded to other entities, the actuary may give more weight to the other bases shown above, i.e., a risk-free rate, or a discount rate used by the assuming company.

The use of a risk-free rate may reflect the current or new money investment return rate for a risk-free or other prudently invested portfolio of assets with appropriate duration. For example, the risk-free rate may be determined using the average market yield on a series of government bonds that match the expected liability duration.

4.2.5. Discount rate – present value of gross policy liabilities

If it is determined that it is appropriate to use the same discount rate for estimating the PV of ceded policy liabilities as was used to estimate the PV of net policy liabilities, then the PV of gross policy liabilities may be estimated directly using that same discount rate, where the effect of time value of money is material.

If the PV of ceded policy liabilities is estimated using a risk-free rate, or the assuming company's discount rate, then the implied rate underlying the estimation of the PV of the gross policy liabilities is not necessarily equal to the selected portfolio yield rate underlying the PV of net policy liabilities. In such cases, the implied gross discount rate may be computed from the PV (ceded PV + net PV) and the cash flows (ceded cash flows + net cash flows) pertaining to the gross policy liabilities.

4.2.6. Discount rate based on a comprehensive cash flow matching model

Section 4.2.2 describes the selection of a discount rate based on a portfolio yield rate. This approach may be refined by incorporating a comprehensive cash flow matching model. An example is presented in Appendices B and D. In the model shown, the net cash flow for each period is computed as the asset cash flow less the policy liabilities cash flow for that period. A positive net cash flow in a period is reinvested, but only to the extent required to offset negative net cash flows in future periods. Any excess cash flows (i.e., positive cash flows in excess of the amounts required to offset negative cash flows over the course of all periods) are removed from consideration. The discount rate is then determined as the IRR from the market value of initial asset and the total outflow, either from claim payment or the cash withdrawal.

Unless the model is refined to include investment expenses, the resulting IRR may be reduced to reflect the expected level of investment expenses.

If the asset cash flow and policy liabilities cash flow are perfectly matched, the IRR based on this comprehensive cash flow matching model may be the same as the portfolio rate of return described in Section 4.2.2.

4.3. Comparison with the May 2016 *Discounting and Cash Flow Consideration for P&C Insurers* educational note.

The guidance provided in sections 4.1 to 4.2 and Appendices A, B, C, and D presents no substantive difference with the guidance in the *Discounting and Cash Flow Considerations for P&C Insurers* educational note that was in effect before the adoption of IFRS 17.

5. Margins for adverse deviations

This section provides guidance to actuaries in the selection of MfAD for valuations of policy liabilities that are not subject to IFRS 17.

5.1. Desirable risk margins characteristics

In the Second Liabilities Paper (2006, paragraph 57) by the International Association of Insurance Supervisors (IAIS), IAIS identified the following five characteristics of risk margins:

- The less that is known about the current estimate and its trend; the higher should be the risk margins
- Risks with low frequency and high severity should have higher risk margins than risks with high frequency and low severity
- For similar risks, contracts that persist over a longer timeframe should have higher risk margins than those of shorter duration
- Risks with a wide probability distribution should have higher risk margins than those risks with a narrower distribution
- To the extent that emerging experience reduces uncertainty, risk margins should decrease, and vice versa.

In addition, the IAA Risk Margin Report [1] states:

A risk margin methodology should:

1. Apply a consistent methodology for the entire lifetime of the contract;
2. Use assumptions consistent with those used in the determination of the corresponding current estimates;
3. Be determined in a manner consistent with sound insurance pricing practices;
4. Vary by product (class of business) based on risk differences between the products;
5. Be easy to calculate;

[1] Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margins, prepared by the Risk Margin Working Group (RMWG) of the International Actuarial Association (IAA).

6. Be consistently determined between reporting periods for each entity that is, the risk margin varies from period to period only to the extent that there are real changes in risk;
7. Be consistently determined between entities at each reporting date, that is, two entities with similar business should produce similar risk margins using the methodology;
8. Facilitate disclosure of information useful to stakeholders;
9. Provide information that is useful to users of financial statements;
10. Be consistent with regulatory solvency and other objectives; and
11. Be consistent with IASB objectives."

5.2. Category and range of risk margins

Prior to the adoption of IFRS17, for P&C insurance, the SOP had set three categories of MfAD and a specific range for each category, as follows:

- Claims development: the margin for claims development is a percentage of the claim liabilities excluding provision for adverse deviations.
- Recovery from reinsurance ceded: the margin for recovery from reinsurance ceded is a percentage of the amount deducted on account of reinsurance ceded in calculating the premium liabilities or the claim liabilities, excluding provision for adverse deviations.
- Investment return rates: the margin for investment return rates is a deduction from the expected investment return rate.

The range for each MfAD was as follows:

Category	Low margin	High margin
Claims development	2.5%	20%
Recovery from reinsurance ceded	Zero	15%
Investment return rates	25 basis points	200 basis points

While the ranges above provide guidance in selecting the MfADs, the actuary is not limited to margins within the range. In general, a larger MfAD is appropriate if:

1. the actuary has less confidence in the best estimate assumption;
2. an approximation with less precision is being used;
3. the event assumed is farther in the future;
4. the potential consequence of the event assumed is more severe; or
5. the occurrence of the event assumed is more subject to statistical fluctuation.

A smaller MfAD is generally appropriate if the opposite is true.

The selected MfAD may 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.

The actuary may select and evaluate considerations for each assumption that are appropriate to the circumstances of the entity, including entity practices, data, reinsurance, investments, and external environment.

A consideration for an assumption reduces confidence in that assumption as a result of past or future instability of the consideration or a shortcoming in its quality, quantity, or performance. Significant considerations indicating difficulties in properly estimating the best estimate assumption may include, but may not be limited to:

- instability in the guideline 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.

5.3. Margin for adverse deviations using a deterministic analysis

The following pages present numerous examples of considerations for the actuary when selecting MfADs. These considerations should not be viewed as an exhaustive list of all considerations, but rather as representative of key issues that the actuary may consider when selecting margins for each of the three categories. In some circumstances, the listed consideration may not be relevant or applicable. An actuary may often derive unique considerations specific to the organization for which he or she works.

For each consideration, there is a spectrum between the situation necessitating a low margin or a high margin. For many entities, the particular circumstances for any one consideration may dictate the selection of a margin between the low and high values. When an actuary is faced with a situation in which some considerations indicate a low margin and others indicate a high margin, the actuary may use professional judgment to determine the priority of considerations and the resulting final margin.

5.3.1. Margin for claims development

For the claims development margin, considerations are related to entity's operations (claims management, underwriting, and other), data on which the estimate is based, and business segment. The following tables present considerations for the actuary when selecting the margin for claims development:

TABLE 5.1 Claims development

Considerations related to operations – claims management		
	Low margin situation	**High margin situation**
Systems affecting claims handling procedures	Stable and consistent	Significant changes in coding procedures, kind of loss codes, claims processing system, other
Claims management - leadership - personnel	Stable and strong	Lack of consistent leadership, high turnover of personnel
Adequacy of staffing	Stable and adequate, consistent use of internal and external adjusters	Inadequate staffing, shift from internal to external adjusters (or vice-versa)
Guidelines for claims handling	Specific and consistent guidelines	Absence of guidelines, significant changes
Procedures for/philosophy regarding: - opening claims - minor claims - major claims - defending claims - closing claims - claims expenses	Specific and consistent guidelines	Absence of guidelines, significant changes
Procedures for establishing case outstanding	Specific and consistent guidelines	Absence of guidelines, significant changes
Relative adequacy of case outstanding	Stable and consistent	Significant changes

Considerations related to operations – underwriting		
	Low margin situation	**High margin situation**
Systems affecting underwriting	Stable and consistent	Significant changes
Underwriting: - leadership - personnel	Stable and strong	Lack of consistent leadership, high turnover of personnel
Adequacy of staffing	Stable and adequate	Inadequate staffing

Guidelines for underwriting	Specific and consistent guidelines	Absence of guidelines, significant changes

Considerations related to operations – other

	Low margin situation	**High margin situation**
Technology and processing systems	Stable and consistent	Significant changes
Internal controls	specific and consistent controls	Absence of controls, significant changes
Accounting systems	Stable and consistent	Significant changes

Considerations related to the data on which the estimate is based

	Low margin situation	**High margin situation**
Volume of losses and premiums in each period	Stable, high volume	Volume changes significantly from period to period
Homogeneity in data grouping	Significant homogeneity	Limited homogeneity
New exposure	Credible historical experience available	Absence of credible historical experience
For reinsurers: - relationships with ceding companies - types of treaties - attachment points - limits	Stable	High turnover or significant changes
History of credible loss development experience	Available	Unavailable or limited
Mix of business	Stable	Significant changes
Stability of historical loss development experience	High	Low
Potential influence of large losses	Limited effect on loss	Significant effect on loss experience

Considerations related to the business segment

	Low margin situation	**High margin situation**
Environment i. legislative ii. judicial iii. government	Stable, no changes expected, or no recent changes	Recent changes or changes likely

Length of tail	Short	Long
Latent claims	Low potential for latent claims	High potential for latent claims
Liability exposure	Limited or none	High
Excess of loss exposure	Limited or none	High
Coverage and/or policy form	Stable	Significant changes
Compensation system (e.g., tort or no-fault)	Stable	Significant changes
Retention of the entity	Stable	Change over the experience period

5.3.2. Margin for recovery for reinsurance ceded

The following table presents considerations for the actuary when selecting the MfAD for recovery from reinsurance ceded.

TABLE 5.2 Recovery from reinsurance ceded

	Low margin situation	**High margin situation**
Proportion of related party reinsurance	Low	High
Ceded loss ratio	Low	High
Ceded commission rate	Low	High
Unregistered reinsurance	None	Significant
Reinsurers under receivership or liquidation	None	Significant
Reinsurers with weak financial condition	None	Significant
Signed reinsurance contract/cover notes	Yes	No
Claim coverage disputes with reinsurers	None	Significant
Reliance on reinsurance	Limited or none	Significant

5.3.3. Margin for investment return rates

The MfAD for investment return rates addresses several different types of risk, such as:

1. mismatch risk between payment of claims and availability of liquid assets;
2. error in estimating the payment pattern of future claims; and
3. asset risk including credit/default risk and liquidity risk.

The following table summarizes considerations related to the selection of an explicit margin for investment return rates.

TABLE 5.3 Investment return rates

	Low margin situation	High margin situation
Matching of assets and liabilities	Cash flows are well-matched	Significant mismatch of cash flows
Quality of assets	High	Low
Reliance on capital gains	Minimal	High
Capital losses	Minimal	High
Length of claim settlement period	Short	Long
Claim payment pattern	Stable	Significant variability
Determination of interest rate	Based on entity's asset portfolio	Not based on entity's asset portfolio
Projected cash flow	Positive	Negative
Asset default risk	Low	High
Asset valuation issues	None	Significant
Concentration by type of investments	Not a concern	Significant concern
Concentration within types of investments	Not a concern	Significant concern
Current economic conditions	Strong economy	Recession
Investment expenses	Low	High

It is important for actuaries to recognize that in an economic environment of low interest rates, mismatch risk, and credit/default risk remain nevertheless. While following the SOP, an actuary could derive a discount rate adjusted by MfADs that is less than 0%. In practice, actuaries may limit the discount rate to 0% in such situations.

Two alternative formula-based approaches for deriving the margin for investment return are described below. These approaches should not be considered to be an exhaustive list of acceptable methods, but rather as examples of the types of quantitative approaches actuaries could consider when determining the explicit margin for investment returns. These formulas assume a non-stochastic approach and the actuary could consider limiting the resulting margins within the range of 25 bp to 200 bp as in the explicit margin approach.

5.3.3.1. Weighted formula

The weighted formula relies on defined variables,

iPM = interest rate for discounting based on notional matching of the individual entity's portfolio of assets to claim liabilities prior to MfADs

iAM = interest rate for discounting after MfADs

iRFM = interest rate of risk-free bonds, which reasonably match the payout of the claim liabilities, at least as measured by duration

k = a factor between 0% and 100% to reflect a reasonable estimate as to the percentage by which iRFM may need to be adjusted to reflect a plausible shortening of the uncertain duration of the claim liabilities due to mis-estimation of the payment pattern coupled with a plausible shift in the yield curve.

The formula for iAM, the interest rate for discounting after margin is

iAM = minimum (iPM, iRFM x (1.00 – k)),

and, thus, the margin for investment return rate is defined to be

MfAD = iPM – iAM = iPM – minimum (iPM, iRFM x (1.00 – k)).

This approach treats the market spread between the return on matched risk-free bonds and other investments as a risk premium (whether from liquidity risk, default risk, or other risks) which may be removed for discounting purposes. A high value of k would result in a higher MfADs, and a low value of k would result in a lower margin.

5.3.3.2. Explicit quantification – three margins

This approach estimates the margin for investment return as the sum of three margins,

i. asset/liability mismatch risk margin

ii. timing risk margin

iii. credit risk margin

i. Asset/liability mismatch risk margin

The asset/liability mismatch risk margin is based on the following formula,

coverage ratio

× (asset duration – liability duration)/liability duration

× interest rate movement in run-off period

where coverage ratio = $\frac{\text{premium liability + claim Liability}}{\text{Supporting assets (bonds, instalment premiums, etc.)}}$

The actuary could estimate the interest rate movement in the run-off period based on a review of the interest rate movement over an extended period of time (e.g., twenty-five to fifty years).

For example, assume the liability duration is two years. The actuary could then review the two- year change in investment rates as follows:

Y*i* = base year yield,

Y*i+2* = yield two years after *i,*

(Y*i+2* –Y*i*) / Y*i* = two-year change.

The interest rate movement in the run-off period could be estimated by multiplying the base year yield for a risk-free bond with similar duration to the liabilities by one standard deviation

of the change for the same duration. For example, assume that the base year yield for three-year Government of Canada bonds is 2.68% and one standard deviation of the two-year changes is 29%. Then the interest rate movement in the run-off period is equal to 78 basis points (2.68% x 29%). If the coverage ratio is 100%, the asset duration is five years, and the liability duration is two years, then the asset/liability mismatch risk margin based on the formula is 117 basis points.

[100% coverage ratio × ((5 years – 2 years) / 2 years) × 78 interest rate movement]

ii. Timing risk margin

The timing risk margin could be estimated using the formula for determining discounted liabilities.

$$\textbf{Present Value} = \sum_{t}^{\infty} \frac{L_t}{(1+d)^t} \textit{ where } L_t = \textbf{paid losses in t}$$

$$d = \textbf{discount rate}$$

$$\sum_{t}^{\infty} L_t = L = \frac{L}{(1.00+d)^D} \text{ ; where D = duration of liabilities}$$

If the duration of liabilities, *D*, is shortened by 10%, then the reduction in discount is equivalent to decreasing the discount rate (*d*) by approximately 10%. More precisely:

$$\frac{L}{(1.00+\hat{d})^D} = \frac{L}{(1.00+d)^{0.90D}} \text{ ; where } \hat{d} \text{ is the discount rate adjusted for timing risk}$$

If the liability duration is two years and the discount rate is 3.50%, then $\hat{d}$ is 3.1445%, and consequently, the timing risk margin is 36 basis pointed (3.50% -3.1445%).

iii. Credit risk margin

The final component of this approach is the credit risk margin. The credit risk margin could be estimated by comparing the yield curves of high quality bonds, such as federal, provincial, municipal, utilities, the big five Canadian banks, and other corporate organizations. If a bond produces a higher yield than a risk-free government bond with similar maturity (i.e., a corporate bond generates higher yield than a Government of Canada bond with similar maturity), the investors in the bond market conclude that the issue of that corporate bond has credit risk. The extra yield on the corporate bond represents what the market considers to be credit risk spread; the latter is usually measured in basis points over the government bond with similar maturity.

For illustration purposes, assume that the portfolio has a credit risk margin of 40 basis points.

Total margin

The total margin for investment return is equal to:

Asset/liability mismatch risk margin + timing risk margin + credit risk margin

= 117+ 36 + 40 = 193 basis points

5.3.4. Other considerations

If the liabilities in a foreign currency are greater than the supporting assets in that foreign currency, then foreign exchange risk may be considered. The actuary may also consider the ability to sustain current bonds spreads in the selection of the MfAD.

5.4. Stochastic techniques

It is not the intent of this educational note to present a detailed discussion of statistics. It is expected that actuaries using stochastic methods for the determination of MfADs have expertise in the fundamentals of statistical modelling, which are not addressed in this educational note.

Actuaries using stochastic techniques for developing MfADs may also take into account the considerations presented in Section 5.3 of this educational note. For example, if an actuary's stochastic analysis resulted in a claims development MfAD of 5%, while a review of the considerations related to operations, data, and the line of business resulted in a high margin assessment, the actuary may then reconsider the selection of a 5% MfAD. Similarly, if an actuary's stochastic analysis resulted in a claims development MfAD of 20%, while a review of the considerations related to operations, data, and the line of business resulted in a low margin assessment, the actuary may then reconsider the selection of a 20% MfAD.

When using stochastic models, it is important for the actuary to recognize that the PfADs do not cover the inherent or statistical volatility arising from a particular model. It is expected that large and small entities would generate similar MfAD when using the same model. The provisions do, however, cover the uncertainty in whether the actuary has the "right" model or "right" parameters. Thus, an actuary working with large volumes of data or more years of experience will likely have more confidence that the selected model provides a reasonable representation of possible future events, and the resulting margins will likely be lower for larger volume or more established data than for smaller volume or less reliable data.

5.5. Comparison with the December 2009 *Margins for Adverse Deviations for Property and Casualty Insurance* educational note

The guidance provided in Sections 5.1 to 5.4 presents no substantive differences with the guidance in the *Margins for Adverse Deviations for Property and Casualty Insurance* educational note that was in effect before the adoption of IFRS 17, with the exception that discussion of stochastic techniques is limited in this educational note.

6. Premium liabilities

This section describes considerations with respect to premiums liabilities. Premium liabilities include all policy liabilities except those in respect of claims incurred on or before the valuation date (i.e., claim liabilities).

Specifically, premium liabilities include the expected costs in connection with the unexpired portion of the in-force contracts (i.e., incurred after the valuation date) and all other liabilities related to premium development adjustments (e.g., retro-rated premium, contingent profit commissions).

Elements to consider when analyzing premium liabilities may include:

- UPR;
- DPAE;
- Unearned (ceded) commission;
- Premium deficiency;
- Ceded deferred premium tax (applicable for inter-company pooling arrangements);
- Anticipated broker/agent commission;
- Expected adjustments (plus or minus) to swing-rated policies;
- Expected changes to premiums as a result of audits, late reporting, or endorsements; and
- Expected commission adjustments on policies with variable commissions.

The premium liabilities are usually based on the estimates of future cash flows which are typically determined by applying payment patterns to selected estimates of future unpaid losses (prior to consideration of the time value of money) on an accident year, policy year, or underwriting year basis using a set of actuarial assumptions and methods.

In determining the APV of the premium liabilities, the PfAD may be calculated by applying selected margins to the PV of the estimated future claim and claim adjustment expenses. Typically, no PfAD is applied to other components such as maintenance expenses. The calculation of the PfAD associated with premium liabilities may be similar to the calculation of the PfAD associated with claim liabilities as described in Section 5.3 above. The actuary may consider different MfADs if premium liabilities and claim liabilities exhibit different levels of uncertainty. It is also important to note that there may be greater uncertainty for claims that have yet to occur, such as those arising from the unexpired portion of in-force business, than for claims that occurred in a prior period.

6.1. Policy liabilities in connection with unearned premium

The largest component of the policy liabilities in connection with unearned premium relates to future claims and adjustment expenses. They are estimated by applying a selected expected loss ratio to the UPR. This evaluation is generally undertaken by line of business or using a business segmentation that is consistent with the analysis of claim liabilities.

6.1.1. Expected losses

The evaluation of future expected loss ratios in connection with the unexpired portion of in-force policies of a given entity is a critical aspect of determining the future expected losses. Many valuation methods may be used depending on the valuation circumstances. Projected loss ratios may be based on other work done by/for the entity: the actuary's valuation of claim liabilities, the entity's budget, the results of a ratemaking analysis or on an ad hoc analysis, as considered appropriate. Generally, future expected losses are based on the entity's recent experience adjusted to the period during which the unearned premium will be earned. The

actuary may consider the earning pattern underlying the calculation of the UPR, assess whether it reflects the exposure to risk, and select assumptions accordingly.

Examples of adjustments to the historical experience could include, but are not limited to, the following:

- Loss trends applied to adjust historical cost levels to the average accident date underlying the UPR.
- Expected legislative change impacts (including mandated benefit modifications).
- Recent court decision impacts relating to insurance coverage.
- Mix of business change impacts.
- On-level factors applied to adjust historical experience to the rate level underlying the UPR.
- Catastrophe and large losses loadings.
- Seasonality adjustments to the indicated expected loss ratios may need to be applied if the claims occurrence pattern is not uniform throughout the exposure period of the UPR (e.g., seasonal occurrences of hurricanes). Depending on the line of business, the seasonality adjustment may not be significant. However, for some portfolios (e.g., property catastrophe treaty reinsurance) seasonality may be a meaningful consideration.
- Policy term assumptions taking into account the term of the policy and the future period covered by the UPR. For example, for policies with a term longer than 12 months (such as warranties or multi-year contracts), assumptions for the expected loss ratio need to take into consideration trends that are expected over the remaining term of these polices.

6.1.2. Loss adjustment expenses

If applicable, actuaries may choose to include ALAE in their estimation of losses. If ALAE is not included with losses, an estimate of future ALAE may be derived by the actuary by applying an approach similar to the expected loss approach, or on another suitable basis consistent with the actuary's valuation of claim liabilities.

Similarly, the actuary may choose to include ULAE in their estimation of losses. If ULAE is not included with losses, an estimate of future ULAE may be derived by the actuary on a suitable basis consistent with the actuary's valuation of claim liabilities. A typical calculation is to apply a ULAE ratio based on historical experience reflecting any expected changes in claims practices to the expected losses.

6.1.3. Expected reinsurance costs

For the net policy liabilities in connection with unearned premium, in addition to the above considerations, the actuary may also consider any expected reinsurance costs. The manner to properly reflect reinsurance costs will depend on the type of reinsurance treaty and its terms and conditions.

For example, for a line of business covered by a proportional reinsurance treaty, the net unearned premium will be lower than the gross unearned premium and the loss ratio will be the same on a gross and net basis. For a line covered by an excess of loss treaty expiring at the valuation date, the gross and net unearned premium are the same and the ceded unearned premium is $0 at the end of the contract period. However, the cost of reinsurance in relation to the unexpired portion of the policies may be taken into account. The assumptions used may reflect the reinsurance rates and expected recoveries consistent with the reinsurance structure in place over the exposure period of the unearned premium.

6.1.4. Maintenance expenses

Maintenance expenses also need to be included to reflect the future cost of servicing the policies in force. These expenses include expenses associated with endorsements, mid-term cancellations, changes in reinsurance contracts, etc. Maintenance expenses are generally expressed as a percentage of gross UPR and are evaluated as a portion of general expenses with typical ratios ranging from 25% to 50%.

Maintenance expense assumptions are usually consistent from year to year, but may vary in the event of rapid growth or changes in the entity's operations.

6.1.5. Discounting for time value of money

Premium liabilities may be calculated on an APV basis, consistent with Sections 2, 3, and 4 of this educational note. The APV reflects the time value of money and includes PfAD.

With regards to the time value of money, the cash flows other than losses and loss adjustment expenses (i.e., reinsurance costs and maintenance expenses) may also be considered but are not generally material to the calculation of the premium liabilities.

The discount rate or curve for premium liabilities may generally be consistent with the discount rate or curve used for discounting the claim liabilities.

The payment pattern for discounting premium liabilities may normally be consistent with that used for claim liabilities. As illustrated in Appendix F, sheet 5, a future accident period payment pattern (for a given line of business) may typically be discounted to the valuation date for claim liabilities purposes. However, an adjustment may be required to reflect differences in the average accident date (AAD) of a future accident period versus the average accident date underlying the UPR (which is a partial accident period).

An example of the calculation of a premium liability present value factor is show in Appendix E.

Section 4 of the current note provides additional guidance on discounting.

6.1.6. Margins for adverse deviations

The selected MfADs may vary between premium and claim liabilities. The actuary may consider different MfADs if premium liabilities and claim liabilities exhibit different levels of uncertainty. Generally, there may be more uncertainty for claims that have yet to occur such as those underlying the unearned premiums.

Section 5 of the current note provides additional guidance on the selection of MfADs.

Examples

Illustrative examples of the evaluation of premium liabilities, gross and net, are presented in Appendices G and H.

The key concepts discussed above are illustrated in these exhibits, including the derivation of losses and ALAE by line of business, the addition of ULAE, the estimated cash flows on a discounted basis (using a single discount rate, not a curve), and the addition of PfAD. In the net calculation of the amount of the expected loss and ALAE, the cost of reinsurance coverage in relation to the unexpired portion of the policies in force is explicitly subtracted from the UPR before applying the expected loss ratio.

Further details regarding the calculation of the expected gross loss ratios, maintenance expenses, and discount factors are presented in Appendix F, sheets 4, 5, and 6. A similar exercise may be followed for the net assumptions presented in Appendix G.

These examples are for illustrative purposes only. Other approaches to estimate the various components of the policy liabilities in connection with unearned premium may be appropriate. For example, premium liabilities for a block of business that is renewing on a single date may have average payment dates different than in the examples presented.

6.2. Premium deficiencies and deferrable policy acquisition expenses (DPAE)

A premium deficiency exists when the net policy liabilities in connection with unearned premium exceed the sum of net UPR and unearned (reinsurance) commissions. In this situation, a premium deficiency liability is established in the amount by which the estimated premium liabilities exceed the sum of the net UPR and unearned (reinsurance) commissions. Therefore, a premium deficiency corresponds to a negative equity in net UPR.

The balance sheet presentation may depend on the entity's accounting policy, as well as whether a premium deficiency exists.

If there is no premium deficiency (i.e., the equity in net UPR is positive), the entity deferring policy acquisition expenses may usually book a DPAE asset amount to the extent that it does not exceed the equity in net UPR.

If a premium deficiency exists (i.e., the equity in net UPR is negative), then the initial booked DPAE would be reduced to zero and the premium deficiency amount would be carried as a liability on the balance sheet.

The table below presents a numerical example of the scenarios described above:

Scenario description	Net UPR (1)	Net premium liabilities (2)	Unearned (ceded) comm. (3)	Equity in net UPR (4)	Max. allowable DPAE (5)	Initial DPAE (6)	Booked DPAE (7)	Premium deficiency liability (8)
Max DPAE > Initial DPAE	110,000	90,000	5,000	25,000	25,000	20,000	20,000	0
0 < Max DPAE < Initial DPAE	110,000	100,000	5,000	15,000	15,000	20,000	15,000	0
Max DPAE = 0	110,000	120,000	5,000	(5,000)	0	20,000	0	5,000

Notes:

(4) = (1)-(2)+(3) (7) = Min[(5), (6)] → Balance sheet asset

(5) = Max[0, (4)] (8) = If[(4) < 0, -(4) , 0] --> Balance sheet liability

A different presentation of the assets and liabilities is possible given a variety of accounting practices. The actuary would refer to the applicable accounting standard.

For example, if an entity records a DPAE amount that exceeds the equity in net UPR, then a liability covering the difference would also be booked as shown in the table below.

Scenario description	Net UPR (1)	Net premium liabilities (2)	Unearned (ceded) comm. (3)	Equity in net UPR (4)	Max. allowable DPAE (5)	Initial DPAE (6)	Booked DPAE (7)	Premium deficiency liability (8)
Booked DPAE > Max DPAE	110,000	100,000	5,000	15,000	15,000	20,000	20,000	5,000

Notes:

(4) = (1)-(2)+(3) (7) = (6) --> Balance sheet asset

(5) = Max[0, (4)] (8) = (–) - (5) --> Balance sheet liability

Example

The example in the appendices demonstrates the general calculation of premium liabilities, the maximum policy acquisition expenses deferrable and determination of the premium deficiency on both a gross and net of reinsurance basis for a company that is required to book a premium deficiency on its balance sheet:

- Appendix F, sheets 1–3 illustrate the gross premium liabilities calculations. Although a gross premium deficiency is indicated, it is not reported on the balance sheet, however, these exhibits may still be useful for discussion with management.
- Appendix F, sheets 4–6 illustrate the supporting loss ratios, discount factor and maintenance expense ratio calculation for a given class of insurance (personal property) on a gross of reinsurance basis.
- Appendix G illustrates the net premium liabilities calculations. As seen on sheet 3, the initial DPAE would be reduced to zero in column (33) and a premium deficiency reserve,

shown in column (34), would be posted equal to the amount by which the net premium liabilities exceed the sum of the net UPR and unearned (ceded) commissions.

6.3. Other net liabilities and unearned (reinsurance) commissions

Other net liabilities can be grouped into two major categories: those which relate to commission adjustments, and those which relate to premium adjustments, each of which may be booked as a separate accrued liability on the balance sheet.

Contingent commissions (profit sharing commissions) are commissions that entities pay their agents or brokers based on the profitability and the volume of business of individual producers (agents/brokers). These agreements vary by company and are often established over one- to three-year periods. Some commissions may be incurred as of the statement date and may need to be accrued.

Swing-rated contracts generate premium adjustments between entities and reinsurers which are payable based on a pre-determined target loss ratio and the actual loss ratio of the book of business reinsured. An example of a swing-rated contract giving rise to other net liabilities is provided below:

> A reinsurance contract for a long-tail line of business incepting on October 31, 2021, has a 3% swing rate adjustment payable by the entity to the reinsurer if the loss ratio exceeds 73% and a 3% swing rate adjustment payable by the reinsurer to the entity if the loss ratio is below 67%. Payment is due three years following contract inception.
>
> Assuming the reinsurance premium subject to the 3% adjustment is $1,000,000, the maximum swing rate adjustment would be in the amount of $30,000.
>
> As at December 31, 2023, for example, the actuary may evaluate the other net liabilities related to this contract. If the actuary evaluates that the ultimate loss ratio subject to the reinsurance contract is 75%, then the other net liabilities would equal the future swing rate adjustment payable to the reinsurer of $30,000.

A provision for retro-rated policy liabilities is booked when entities issue policies for which the premium is adjusted yearly based on the actual experience on the policy. The final premium is not known until all losses are reported and settled. The provision to be accrued is equal to the difference (either positive or negative) between the estimated final premium and the cumulative paid premium at the valuation date.

Other examples of premium development to be evaluated as part of the premium liabilities are:

- audit premiums where the final premium is not known until the coverage expires;
- premium development on reinsurance assumed; and
- premium development on retro-rated reinsurance ceded.

Communication with the accounting department is needed to ensure that the actuary's adjustments and the entity's accounting policy are consistent.

The sources of development on reinsurance assumed or ceded to be considered include, but are not limited to:

- changes in subject matter premium which is usually unknown until the end of the contract period;
- swing-rated excess of loss treaties which call for a rate adjustment based on the loss experience during the coverage period; and
- reinstatement premium for catastrophic or other layer (additional premium to be paid when the limit of coverage provided by the layer has been exhausted unless netted from expected claims recovery).

Some entities with large quota share treaties may have significant unearned (reinsurance) commissions on their ceded unearned premiums. The unearned (reinsurance) commissions are booked as a liability and are earned pro rata over the terms of the policies.

6.4. Subsequent event application in the case of premium liabilities

A subsequent event is defined in the SOP as "an event of which an actuary first becomes aware after a calculation date but before the corresponding report date." The treatment of a subsequent event in the actuary's work is described as follows:

> 1430.02 For work with respect to an entity, the actuary should take a subsequent event into account (other than in a pro forma calculation) if the subsequent event
>
> - provides information about the entity as it was at the calculation date,
> - retroactively makes the entity different at the calculation date, or
> - makes the entity different after the calculation date and a purpose of the work is to report on the entity as it will be as a result of the event.

Subsequent events need to be analyzed in the context of claim liabilities and premium liabilities. Some subsequent events will be taken into consideration in the same manner in both claim and premium liabilities, while some events may only need to be taken into consideration in premium liabilities. For example, the educational note Subsequent Events discusses the case of the 1998 ice storm. The event occurred on January 5, 1998; it did not make the entity different at the valuation date of December 31, 1997, and therefore did not need to be recognized in claim or premium liabilities. However, it was recognized that the actual premium liabilities could be materially different from the expected premium liabilities and that this would be disclosed as a note to the financial statements.

6.5. Comparison with the July 2016 *Premium Liabilities* educational note

The guidance provided in sections 6.1 to 6.4 and Appendices E, F and G present no substantive differences with the guidance in the *Premium Liabilities* educational note that was in effect before the adoption of IFRS 17.

Appendix E – Premium liabilities present value factor

Assuming premium writings occur uniformly in a calendar year and the corresponding losses are also incurred uniformly throughout the year, the mean earning date and the mean accident date of a future accident year occurs at 0.50 years or halfway through the year. However, for the expected losses underlying the UPR, the average accident date is not as straightforward a calculation. This exercise involves calculating a weighted average or mean of the future accident dates using uniformly declining exposures as weights.

The average accident date or earning date of the UPR can be calculated by using integrals in calculating the weighted average.

Let *x* = future accident date underlying the UPR relating to 12-month policies

Let *f(x)* = the loss exposure earned on a given future accident date

= 1 – x; where 0≤ x ≤1

And x = 0 is the valuation date and x = 1 is one year later (assuming annual policies) i.e., the last date the loss exposure exists.

Let the average accident (or earned) date equal $\int_x f(x)$ integrating over the values 0 through 1, divided by the sum of the probability.

$$= \frac{\int_0^1 x\, f(x)dx}{\int_0^1 f(x)dx} = \frac{1}{3} \text{ year}$$

Thus, the average accident date or earning date of the UPR can be calculated as one-third of a year or four months (May 1 assuming a December 31 year end).

If the calculation were to be repeated for six-month policies, the results would show an average accident period of two months (or March 1 assuming a December 31 year end).

The median may be a reasonable approximation of the mean accident date. The median accident date is calculated using simple trigonometry assuming premiums and losses are uniformly distributed and the sides of the UPR triangle are set equal to 1.00. The equation to solve for the length of the triangle sides, x, that yields half the area of the triangle or ¼ would be ½ x^2 = ¼ or x = √0.5. Note that the length of the triangle side is defined here as the time from the median accident date to the end of the period or time 1. Therefore, the desired timing from time 0 (or the valuation date) to the median accident date would be the complement or 1 - √0.5 or 0.2929 years.

Once the average accident date underlying the UPR is determined, the present value may be derived directly from the present value of a future accident year, as illustrated in Appendix B, sheet 5, by assuming that the present value of an average loss discounted to the accident date is equivalent to the present value of the UPR's expected losses at its average accident date. The final adjustment is to then discount from the average accident date back to the valuation date. A mathematical proof for this approximation is shown below.

Assume the following:

- Let i = discount rate used in the valuation of claim liabilities based on a cash flow model that includes consideration of any premium payment lags (e.g., monthly installment plans).
- PV_{AY} represents the present value of the future accident year losses to January 1 divided by the ultimate losses.
- PV_{UPR} represents the present value of the losses underlying the UPR to January 1 divided by the ultimate losses.
- PV represents the present value of an average loss discounted to the accident date divided by the amount of the ultimate loss.
- $0<PV\leq 1$.
- Assume losses are uniformly distributed and premiums are annual and evenly distributed.

$$PV_{AY} = \int_0^1 PV\,(1+i)^{-t}dt$$

where $\int_0^1 (1+i)^{-t}\,dt = \int_0^1 (1 - ti + (t)(t+1)i^2 + \cdots)\,dt$

$$\approx \int_0^1 (1-ti)\,dt = 1 - i/2$$

$PV_{AY} \approx PV\,[\,1 - i/2\,]$

$PV_{UPR} = \frac{\int_0^1 PV(1-t)(1+i)^{-t}dt}{\int_0^1 (1-t)dt}$

$= 2\,PV\,[\int_0^1 (1+i)^{-t}dt - \int_0^1 t\,(1+i)^{-t}dt\,]$

where $\int_0^1 t\,(1+i)^{-t}dt \approx \int_0^1 t\,(\,1-ti)\;\;dt$

$$= \int_0^1 (t - t^2 i)\,dt = \left[\frac{t^2}{2} - \frac{t^3 i}{3}\right]\Bigg|_0^1 = \frac{1}{2} - \frac{i}{3}$$

$PV_{UPR} \approx 2\,PV\,[1 - \frac{i}{2} - \frac{1}{2} + \frac{i}{3}\,] \approx PV\,[1 - \frac{i}{3}\,]$

- Substituting the value of PV from above we can solve for the PV_{UPR} in terms of PV_{AY}

$$PV_{UPR} \approx PV_{AY} \frac{\left[1-\frac{i}{3}\right]}{\left[1-\frac{i}{2}\right]} \approx PV_{AY}[1 + i/6\,] \approx PV_{AY}(1+i)^{x}$$

where x = difference between the *mean* average accident date of an accident year and that of the UPR of 1/6 (i.e., 1/2 less 1/3).

If, however, the cash flow model used to derive the discount rate underlying the claim liabilities does not incorporate premium payment lags, then the following adjustment is required to the discount rate to reflect the decrease in anticipated investment income:

- Let k = the portion of the unearned premium supported by invested assets (or % of portfolio paid in full at inception) as of the valuation date.
- Let j = k x i , 0% ≤ k ≤ 100%.
- k = 100% if all policies are paid in full at inception then j = i.
- k = 0% if all policies are on an installment payment plan then j = 0 and no additional discount is needed to the valuation date.

$$PV_{UPR} \approx PV_{AY}(1+i)^{.5}\,(1+j)^{-.33}$$

Appendix H – Examples of actuarial opinions

Example 1: Valuation of insurance policy liabilities for financial reporting purposes

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

Example 2: Valuation of insurance policy liabilities for purposes other than financial reporting

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.

The results of my valuation are the following:

[Results]

[Montréal, Québec] [Mary F. Roe]
[Report date] Fellow, Canadian Institute of Actuaries

Example 3: Certification of the amount of deposits in a reserve account

I have valued the reserve amount required to cover the cost of future claims on contracts issued by Company X and still in-force as at [31 December XXXX]. The reserve was evaluated in accordance with accepted actuarial practice in Canada including selection of appropriate assumptions and methods.

The results of my valuation are the following:

[Results]

[Montréal, Québec] [Mary F. Roe]
[Report date] Fellow, Canadian Institute of Actuaries