# Educational Note

# Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates Between December 31, 2009 and December 30, 2010



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Seeing Beyond Risk — Canadian Institute of Actuaries — Institut canadien des actuaires — Voir au-delà du risque

# *Educational Note*

# Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates Between December 31, 2009 and December 30, 2010



## Committee on Pension Plan Financial Reporting

**April 2010**

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*Ce document est disponible en français*



*Members should be familiar with educational notes. Educational notes describe but do not recommend practice in illustrative situations. They do not constitute Standards of Practice and are, therefore, not binding. They are, however, intended to illustrate the application (but not necessarily the only application) of the Standards of Practice, so there should be no conflict between them. They are intended to assist actuaries in applying Standards of Practice in respect of specific matters. Responsibility for the manner of application of Standards of Practice in specific circumstances remains that of the members in the pension practice area.*

Seeing Beyond Risk Canadian Institute of Actuaries Institut canadien des actuaires Voir au-delà du risque

# Memorandum

**To:** All Pension Actuaries

**From:** Tyrone G. Faulds, Chairperson
Practice Council

Michael Banks, Chairperson
Committee on Pension Plan Financial Reporting

**Date:** April 13, 2010

**Subject:** **Educational Note—Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates between December 31, 2009 and December 30, 2010**



This educational note provides guidance on assumptions to be used for hypothetical wind-up and solvency valuations for 2010. It confirms the initial guidance for 2010 assumptions that was provided in an announcement issued on February 17, 2010.

The Committee on Pension Plan Financial Reporting (PPFRC) would like to express its gratitude to Desjardins Financial Security, Great-West Life, Industrial Alliance, Manulife, Standard Life and Sun Life for providing the committee with data.

The PPFRC has developed additional guidance on the assumptions to be used for hypothetical wind-up and solvency valuations for very large plans and plans with benefits indexed to the Consumer Price Index. This guidance involves complex issues and is presented in draft form as an appendix upon which comments are invited from pension actuaries and other interested parties.

In accordance with the Institute's Policy on Due Process for the Approval of Guidance Material other than Standards of Practice, this educational note has been prepared by the PPFRC and has received final approval for distribution by the Practice Council effective April 11, 2010.

As outlined in subsection 1220 of the Standards of Practice, "*The actuary should be familiar with relevant Educational Notes and other designated educational material.*" That subsection explains further that a "practice which the Educational Notes describe for a situation is not necessarily the only accepted practice for that situation and is not necessarily accepted actuarial practice for a different situation." As well, "Educational Notes are intended to illustrate the application (but not necessarily the only application) of the Standards, so there should be no conflict between them."

If you have any questions or comments regarding this educational note, please contact Michael Banks at his CIA Online Directory address, Michael.Banks@mercer.com. In particular, comments are sought with respect to the appended draft material regarding large annuities. Please forward such comments, as noted above, **by May 31, 2010**, following which consideration will be given to finalizing this additional guidance.

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## 1. INTRODUCTION

According to paragraph 3720.01 of the Standards of Practice, the assumptions used for actual and hypothetical wind-up valuations would

> *in respect of benefit entitlements that are expected to be settled by purchase of annuities, reflect single premium annuity rates, and*
>
> *in respect of benefit entitlements that are expected to be settled by lump sum transfer, reflect the recommendations respecting capitalized values.*

This document has been prepared by the Committee on Pension Plan Financial Reporting (PPFRC) and is intended to provide actuaries with guidance in selecting appropriate assumptions for these two assumed methods of settlement for hypothetical wind-up valuations and solvency valuations with effective dates between December 31, 2009 and December 30, 2010.

This educational note confirms the initial guidance for 2010 assumptions that was provided in an announcement issued on February 17, 2010.

## 2. SETTLEMENT METHODS

To comply with paragraph 3720.01 of the Standards of Practice, the actuary would make an assumption for each class of plan members as to the portion of liabilities settled by annuity purchase or commuted value transfer. Classes of plan members would typically include at least

- active members not eligible for retirement,
- active members eligible for retirement,
- retired members and surviving spouses, and
- deferred vested members.

In determining the appropriate assumption for the method of settlement, the actuary would consider

- any legislative requirements to offer specific settlement options to various classes of members,
- the settlement provisions of the plan and, in particular, the options to be provided to members upon plan wind-up,
- the benefit provisions of the plan, for example,
  - where a plan has generous ancillary benefits, an election to receive a commuted value transfer may be affected by the maximum transfer limits imposed under section 8517 of the Income Tax Act (Canada) Regulations, or

where a plan has inflexible retirement options and few optional forms of payment, a member may prefer to elect a commuted value transfer to increase flexibility in payment terms,

past experience of the plan, when relevant, and

any experience from actual wind-ups of comparable plans of which the actuary may be aware.

All requirements of the Standards of Practice with respect to the development and reporting of assumptions would apply to this assumption.

## 3. BENEFITS ASSUMED TO BE SETTLED BY LUMP SUM TRANSFER

For a hypothetical wind-up valuation, or a solvency valuation, paragraph 3740.05 of the Standards of Practice states, "*The actuary should assume that the wind-up date, the calculation date and the settlement date are coincident.*"

Accordingly, the wind-up liabilities for benefits expected to be settled through the payment of a lump sum transfer would be determined in accordance with section 3800 applying the assumptions consistent with the particular valuation date.

## 4. BENEFITS ASSUMED TO BE SETTLED BY PURCHASE OF NON-INDEXED GROUP ANNUITIES

### Methodology

Over the past few years, guidance regarding group annuity purchase discount rates has been provided on an annual basis, based on a survey of actual purchases that occurred in the previous year. In the April 9, 2009 educational note, the PPFRC observed that, given the significant change in annuity pricing that occurred in 2008, it was apparent that further significant change could occur at any time. Also, it appeared that annuity pricing was exhibiting considerable volatility in early 2009. As a result, during 2009 the PPFRC adopted a new methodology to obtain more frequent data.

For the new methodology, six insurers have agreed to provide quotes quarterly, on a confidential basis, on illustrative blocks of business. The insurers that agreed to provide this information are Desjardins Financial Security, Great-West Life, Industrial Alliance, Manulife, Standard Life and Sun Life Financial.

The PPFRC prepared data for two illustrative blocks of business for non-indexed pensions that were then provided to the insurers. One illustrative block is intended to be representative of a large purchase (i.e., with a total premium greater than $15 million) and the other illustrative block is intended to be representative of a small purchase (i.e., with a total premium less than $15 million).

The characteristics of the illustrative blocks of business are as follows:

**Large Purchase (approximately $35 million total premium)**

**Retirees**

- Number 229
- Average age 66
- Average monthly lifetime pension $700
- Number with bridge pension payable to age 65 44
- Average monthly bridge pension $322

**Deferred vested**

- Number 95
- Average age 46
- Average monthly lifetime pension at age 65 $642

**Small Purchase (approximately $5 million total premium)**

**Retirees**

- Number 24
- Average age 66
- Average monthly lifetime pension $71[illegible]
- Number with bridge pension payable to age 65 5
- Average monthly bridge pension $412

**Deferred vested**

- Number 37
- Average age 46
- Average monthly lifetime pension at age 65 $678

Using these data, the insurers indicated that they would provide realistic quotes (i.e., as though the quotes truly represent blocks of business they are bidding on) as of the agreed-upon dates. Based on the quotes, the PPFRC then calculated the implicit discount rate underlying each quote.

The insurers indicated that it would not be appropriate, for competitive reasons, for the PPFRC to disclose the individual discount rates underlying the insurer quotes, including the discount rate associated with the most competitive quote. Also, the insurers indicated that, in their view, it is not appropriate to rely solely on the most competitive illustrative quote for purposes of establishing group annuity purchase discount rate assumptions because the capacity at which group annuities can be transacted at the best illustrative price might be limited. For example, a particular insurer may not be transacting actual sales at a particular date, even though illustrative quotes are provided at that date, if the insurer has met its capacity limit.

After lengthy discussions, the PPFRC and the insurers agreed that, for purposes of providing guidance on group annuity purchase discount rates, it would usually be appropriate to reference the average of the discount rates for the three most competitive quotes. In reaching this conclusion, the PPFRC considered the magnitude of the spread between the illustrative quotes (which data is confidential). In the event that the spread between quotes increases substantially at the time of future updates to the guidance, the PPFRC would reconsider whether the methodology remains appropriate.

In accordance with the process described above, the insurers have provided quotes on the illustrative blocks of business based on pricing conditions as at July 31, 2009, September 30, 2009, and December 31, 2009.

For validation purposes, in developing the current educational note, limited data on the pricing of actual group annuity purchases during the fourth quarter of 2009 were obtained from three life insurers and certain actuarial consulting firms.

**Analysis**

The PPFRC has determined that it is appropriate to update the reference mortality tables to the UP94@2020 mortality tables in establishing suggested assumptions for use at December 31, 2009 and later dates. Previous analysis and guidance were provided in conjunction with the UP94@2015 mortality tables.

The results of the illustrative non-indexed quotations at December 31, 2009, based on the UP94@2020 mortality tables, are summarized below and compared to the previous illustrative quote information provided by the insurers as at September 30, 2009, restated from that previously reported to reflect the UP94@2020 mortality tables.

Also provided for comparison purposes are the prior results as at September 30, 2009 and as at July 31, 2009, based on the UP94@2015 mortality tables.

| **AVERAGE OF THE THREE MOST COMPETITIVE QUOTES (USING UP94@2020 MORTALITY TABLES)** | | | | |
|---|---|---|---|---|
| | **Large Purchase** | | **Small Purchase** | |
| | **30/09/2009** | **31/12/2009** | **30/09/2009** | **31/12/2009** |
| **Retirees**<br>• Discount rate<br>• Spread over CANSIM V39062 | 4.14%<br>+ 0.27% | 4.51%<br>+ 0.42% | 4.25%<br>+ 0.38% | 4.52%<br>+ 0.43% |
| **Deferred vesteds**<br>• Discount rate<br>• Spread over CANSIM V39062 | 4.14%<br>+ 0.27% | 4.46%<br>+ 0.37% | 4.14%<br>+ 0.27% | 4.40%<br>+ 0.31% |

| **AVERAGE OF THE THREE MOST COMPETITIVE QUOTES (USING UP1994@2015 MORTALITY TABLES)** | | | | |
|---|---|---|---|---|
| | **Large Purchase** | | **Small Purchase** | |
| | **31/07/2009** | **30/09/2009** | **31/07/2009** | **30/09/2009** |
| **Retirees**<br>• Discount rate<br>• Spread over CANSIM V39062 | 4.51%<br>+ 0.50% | 4.06%<br>+ 0.19% | 4.54%<br>+ 0.53% | 4.18%<br>+ 0.31% |
| **Deferred vesteds**<br>• Discount rate<br>• Spread over CANSIM V39062 | 4.54%<br>+ 0.53% | 4.10%<br>+ 0.23% | 4.46%<br>+ 0.45% | 4.09%<br>+ 0.22% |

The pricing information for actual group annuity purchases during the fourth quarter of 2009 varied considerably. In some cases, the discount rate underlying the actual purchase was more than 100 basis points (bps) above the prevailing unadjusted yield on Government of Canada (GoC) long-term bonds (CANSIM V39062). In other cases, the discount rate underlying the actual purchase was lower than the prevailing CANSIM V39062 yield. None of the data obtained by PPFRC for actual group annuity purchases had a total premium in excess of $15 million. Overall, the PPFRC concluded that the actual purchase data did not exhibit any pattern that invalidates the information contained in the illustrative quotes, especially given the fact that the actual purchase data were very limited in quantity.

As with the July 31, 2009 and September 30, 2009 illustrative quotes, the quotes at December 31, 2009 did not reveal material differences between:

- the discount rates underlying immediate versus deferred pensions, or
- the discount rates underlying large versus small purchases.

It is recognized that, depending on market conditions, group annuity pricing may differ between immediate and deferred pensions. Also, it is likely that pricing becomes somewhat less favourable for very small group annuity purchases. However, given the recent trend in the illustrative quotes and the volatility that group annuity pricing has exhibited over the past 18 to 24 months, the PPFRC has concluded that, at this time, refinements to the discount rate to reflect immediate versus deferred pensions or large versus small purchases are not warranted.

**Guidance for Non-Indexed Pensions**

Based on the analysis described above, the PPFRC has concluded that an appropriate discount rate for estimating the cost of purchasing a non-indexed group annuity would be determined as the unadjusted yield on GoC long-term bonds (CANSIM V39062) increased arithmetically by 40 bps, in conjunction with the **UP94@2020** mortality tables. This guidance applies to both immediate and deferred pensions and also applies regardless of the overall size of a group annuity purchase.

**Example**

As at December 31, 2009, the unadjusted CANSIM V39062 rate was 4.09%. This rate would form the basis for developing an appropriate underlying discount rate for valuations of non-indexed group annuities with effective dates of December 31, 2009 and January 1, 2010 to be used in conjunction with the UP94@2020 mortality tables. Prior to rounding, an applicable underlying discount rate would then be determined as 4.09% + 0.40% = 4.49%.

Each actuary would use discretion in determining whether to round discount rates to the nearest multiple of five, 10 or 25 basis points. Consistency in the application of such rounding would be followed.

## 5. INDEXED PENSIONS

As in prior years, data regarding the pricing of annuities indexed to the Consumer Price Index (CPI) are extremely limited. None of the data obtained regarding actual annuity purchases during the fourth quarter of 2009 pertains to indexed annuities. The contributing insurers did provide illustrative quote data for the sample blocks on a CPI indexed basis. However, the illustrative quotes are either qualified to the effect that the insurer would not actually transact on that basis and/or the premiums quoted are substantially higher than would be suggested by prior educational notes.

Nevertheless, the PPFRC has concluded that it is helpful to actuaries to provide guidance and it would be appropriate at this time that such guidance be similar to that provided in 2009, without differentials between immediate versus deferred pensions or large versus small purchases.

Accordingly, an appropriate proxy for estimating the cost of purchasing a group annuity where pensions are fully indexed to the rate of change in the CPI is the unadjusted yield on Government of Canada real return long-term bonds (CANSIM V39057) in conjunction with the **UP94@2020** mortality tables. As at December 31, 2009, the unadjusted CANSIM V39057 rate was 1.53%.

In situations where pensions are partially indexed, indexed to a measure other than the CPI or contain a deferred component, the actuary would make appropriate provisions for such situations consistent with the guidance provided in this educational note and other relevant educational notes.

## 6. INDIVIDUAL ANNUITY PRICING

The PPFRC observes that, particularly during a period of capital market turbulence, the pricing of individual and group annuities can differ for reasons such as,

- there is a greater risk of anti-selection for individual annuities,
- the size of the average monthly pension is usually larger for individual annuities,
- individual annuities may have less complex ancillary features,
- the ability to find appropriate fixed income investments to back the annuity obligation may be less of an issue for individual annuities due to the relatively small premium size, particularly during a period in which many fixed income instruments are highly illiquid, and
- the group annuity pricing is underwritten at the time of the quote, while individual annuity pricing for a particular quote may be “automated”.

As a result of these factors, the pricing of individual and group annuities can differ significantly, as occurred in late 2008 and early 2009. Where an actuary considers that a plan’s hypothetical wind-up or solvency obligations could be settled by the purchase of individual annuities, yields based on relevant individual annuity quotations could be reflected in establishing the annuity purchase discount rate assumption.

## 7. ALTERNATIVE SETTLEMENT METHODOLOGIES

As noted in prior educational notes, due to capacity constraints within the Canadian group annuity market, it is possible that large plans would not be able to purchase annuities upon plan wind-up. While the capacity of the group annuity market is not clearly known, the PPFRC believes groups representing non-indexed annuity liabilities exceeding approximately $500 million may have difficulty in effecting a purchase. Also, as discussed above, the availability of CPI indexed annuities of any size may be severely limited.

The PPFRC has developed additional guidance on the assumptions to be used for hypothetical wind-up and solvency valuations for very large plans and plans with benefits indexed to the CPI. This guidance involves complex issues and is appended in draft form upon which comments are invited from pension actuaries and other interested parties.

## 8. MORTALITY

Whether or not the actuary is considering a settlement mechanism other than the purchase of annuities, the mortality experience of pensioners can be a factor in developing an appropriate basis. The determinant is whether there is credible and persistent mortality experience demonstrating pensioner mortality higher or lower than standard.

There is evidence that insurers may consider demonstrable substandard mortality experience submitted when establishing the pricing basis for specific group annuities. Insurers may also consider occupational or pension size data in establishing mortality assumptions for specific group annuities. The actuary would consider an adjustment to regular annuity purchase assumptions where there is demonstrated substandard mortality or where an insurer might be expected to assume significantly shorter or longer than normal longevity based on occupational or demographic factors. In such cases, the actuary would be expected to make provisions for future improvements in mortality in a manner consistent with the mortality improvement inherent in the assumed annuity purchase basis.



## 9. WIND-UP EXPENSES

Unless the actuary is satisfied that the expenses of wind-up are not to be charged to the pension fund, the actuary would make an assumption regarding these expenses and the assumption would be explicit. Expenses normally include such items as fees related to preparation of the actuarial wind-up report, fees imposed by a pension supervisory authority, legal fees, costs related to the purchase of annuities and administrative costs related to the settlement of benefits. Actuaries may refer to the Educational Note, Expenses in Funding Valuations for Pension Plans for further guidance (http://www.actuaries.ca/members/publications/2007/207010e.pdf).

## 10. RETROACTIVE APPLICATION

If an actuary has already prepared a funding valuation report with an effective date on or after December 31, 2009 before the publication of this guidance, the actuary would consider paragraph 1820.33 of the Standards of Practice, which states that a report may be invalidated if additional information becomes available about the entity as it was at the calculation date. The actuary would also consider paragraph 1520.07 of the Standards of Practice, which offers examples of events that provide additional information about an entity as it was at the calculation date. One of the examples cited in paragraph 1520.07 of the Standards of Practice is the publication of an experience study that provides information for the selection of assumptions. Finally, paragraph 1820.04 of the Standards of Practice states an actuary should withdraw or amend a report if information that invalidates it comes to hand subsequent to the report date. The actuary would consider these sections of the Standards of Practice in determining how to proceed.

## 11. FUTURE GUIDANCE

The PPFRC intends to continue monitoring group annuity pricing on a quarterly basis. Actuaries may use the spreads indicated above for valuations with effective dates on and after December 31, 2009 up to December 30, 2010, pending any further guidance or other evidence of change in annuity pricing.

Given the volatility in group annuity pricing which has occurred in 2008 and 2009, it is entirely possible revised guidance could become necessary during the year and if that occurs there will necessarily be some delay (such as 60 to 90 days) between the effective date of data collection and the publication of revised guidance. When reporting results of a valuation, within a period of 60 to 90 days of the effective date of the valuation, the actuary may wish to alert users of the report to the possibility that revisions could be needed in the event of new guidance being published.

Responsibility for the manner of application of Standards of Practice in specific circumstances remains that of the member in the pension practice area.

## APPENDIX—ALTERNATIVE SETTLEMENT METHODOLOGIES (DRAFT)

Due to capacity constraints within the Canadian group annuity market, it is possible large plans would not be able to purchase annuities upon plan wind-up. While the capacity of the group annuity market is not clearly known, the PPFRC believes groups representing non-indexed annuity liabilities exceeding approximately $500 million may have difficulty in effecting a purchase. Also, as discussed above, the availability of CPI indexed annuities of any size may be severely limited.

It may be possible to market a large non-indexed annuity as a series of smaller annuities over a period of time, thereby enabling a plan with greater annuity liabilities to access the annuity market anyway. In this event, it would be reasonable to apply the guidance provided in this educational note for smaller annuities, notwithstanding the deferred settlement likely to be experienced in practice. However, this approach may not be suitable, or even possible, in every instance.

It is very difficult to predict how the benefits of members in receipt of a pension would be settled for large non-indexed plans or indexed plans with effectively no access to group annuity markets. In the absence of any practical experience, the actuary would make a reasonable hypothesis for the manner in which the benefits may be settled. In making such a hypothesis, the actuary would consider relevant legislative requirements and any relevant regulatory guidance.

The actuary would develop assumptions consistent with the selected hypothesis.

Possible alternative settlement methods might include mandatory cash payments to plan beneficiaries or the establishment of a replicating portfolio in trust to provide for the payment of pension benefits over an extended period of time.

If contemplating cash settlements, the actuary would consider whether the amounts provided would be higher than the minimum commuted values provided for under section 3800 of the Standards of Practice, to allow for

- the guaranteed nature of the benefit the plan beneficiary would be entitled to if an annuity had been purchased as compared to the best estimate valuation used for optional commuted value transfers under section 3800, and
- the commuted value to be sufficient for a plan beneficiary to purchase their own annuity on an individual basis without substantial loss from their original entitlement.

If contemplating a replicating portfolio, the actuary would consider:

- the very high degree of security required regarding the funding of members' pensions, without further recourse to the plan sponsor, to provide a result comparable to a purchased annuity,
- the use of fixed income investments of sufficiently high quality for appropriate matching of the liabilities,
- the use of plan specific mortality experience plus allowance for future mortality improvement in developing the expected cash flows to be immunized,

the expenses associated with maintaining such a portfolio, and

appropriate provisions for adverse deviations to reflect risks such as credit risk, longevity risk and asset-liability mismatch risk.

For CPI indexed annuities, a further settlement method which might be contemplated would be to substitute a fixed annual percentage increase for CPI indexing. The fixed percentage indexed annuities could then be assumed to be purchased based on non-indexed annuity pricing assumptions. Under this methodology, the actuary would need to consider the value of the protection a CPI indexed annuity provides against higher-than-expected inflation. For example, a fixed increase percentage higher than the inflation rate implicit in real return versus nominal bond yields may be appropriate to compensate for CPI based inflation protection.