Canadian Institute of Actuaries
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Educational Note

Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between December 31, 2012, and December 30, 2013

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Educational Note

Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates Between December 31, 2012, and December 30, 2013

Committee on Pension Plan Financial Reporting

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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.

Memorandum

To: All Pension Actuaries

From: Bruce Langstroth, Chair
Practice Council

Gavin Benjamin, Chair
Committee on Pension Plan Financial Reporting

Date: June 10, 2013

Subject: **Educational Note—Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between December 31, 2012, and December 30, 2013**

This educational note provides guidance on assumptions to be used for hypothetical wind-up and solvency valuations for 2013. It confirms the initial guidance for 2013 assumptions that was provided in an announcement issued on February 13, 2013.

The Committee on Pension Plan Financial Reporting (PPFRC) is currently reviewing several aspects of group annuity purchase pricing that may result in revisions to future guidance, in particular the effect of duration, the basis for estimating the price of indexed annuities, the underlying indices used to express the guidance (e.g., currently CANSIM series V39062 is used for the non-indexed annuity guidance), and guidance related to alternative settlement methods. These areas of review are described in further detail in section 13 of this educational note. The PPFRC expects to implement any revisions to future guidance as soon as practical following the completion of these reviews.

This educational note has been prepared by the PPFRC in accordance with the Institute's Policy on Due Process for the Approval of Guidance Material Other than Standards of Practice, and has received final approval for distribution by the Practice Council effective June 10, 2013.

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 that 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."

The PPFRC would like to express its gratitude to BMO Assurance, The Co-Operators, Desjardins Financial Security, Great-West Life, Industrial Alliance, Manulife, Standard Life, and Sun Life for providing the committee with data.

Questions or comments regarding this educational note may be directed to Gavin Benjamin at gavin.benjamin@towerswatson.com.

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1. INTRODUCTION

According to paragraph 3330.16 of the Standards of Practice, the assumptions used for actual and hypothetical wind-up valuations would:

- In respect of benefit entitlements that are assumed to be settled by purchase of annuities, reflect single premium annuity rates;
- In respect of benefit entitlements that are assumed to be settled by lump sum transfer, reflect the standards in section 3500 respecting commuted values; and
- In respect of benefit entitlements that are assumed to be settled in some other manner, reflect the manner in which such benefits would be settled.

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 hypothetical wind-up and solvency valuations in respect of benefit entitlements that are assumed to be settled by purchase of annuities or by lump sum transfer with effective dates on or after December 31, 2012, and prior to or on December 30, 2013. For greater clarity, this document does not provide detailed guidance on selecting appropriate assumptions for hypothetical wind-up and solvency valuations in respect of benefit entitlements that are assumed to be settled in a manner other than the purchase of annuities or lump sum transfer.

This educational note confirms the initial guidance for 2013 assumptions that was provided in an announcement issued on February 13, 2013.

2. SETTLEMENT METHODS

To comply with paragraph 3330.16 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, commuted value transfer, or other manner of settlement. Typically, classes of plan members would 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;

- The postulated scenario upon which the hypothetical wind-up is based;
- 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 hypothetical wind-up valuations, of which solvency valuations are a subset, paragraph 3240.05 of the Standards of Practice states: "*For a hypothetical wind-up valuation, the actuary should assume that the wind-up date, the calculation date and the settlement date are coincident.*"

Accordingly, the hypothetical wind-up liabilities for benefits expected to be settled through the payment of a lump sum transfer would be determined in accordance with section 3500 of the Standards of Practice, applying the assumptions applicable at the particular valuation date.

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

Methodology

The PPFRC began collecting data from insurers on a quarterly basis in 2009. Six insurers agreed to provide quotes, 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. In late 2011, two additional insurers, BMO Assurance and The Co-Operators, agreed to provide quotes on the same basis.

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 $41 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 vesteds

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

Small Purchase (approximately $6.6 million total premium)

Retirees

• Number	24
• Average age	66
• Average monthly lifetime pension	$710
• Number with bridge pension payable to age 65	5
• Average monthly bridge pension	$412

Deferred vesteds

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

Based on current interest rate levels and assuming that the pensions are not indexed, the duration of the illustrative blocks are as follows:

	Large Purchase	**Small Purchase**
Retirees	11.2	11.0
Deferred vesteds	24.9	25.0
Combined	14.0	18.0

Using these data, the insurers provided quotes that they have indicated are realistic (i.e., as though the quotes truly represent blocks of business on which they are bidding) as of the agreed-upon dates. Based on the quotes, the PPFRC then calculated the implicit discount rate underlying each quote in conjunction with the UP94 generational mortality table (with the AA improvement scale).

The insurers have indicated that it is not 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 have 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 considers the magnitude of the spread between the illustrative quotes (which data are confidential).

The guidance contained in this educational note is partially based on quotes provided by the eight insurance companies on illustrative group annuity business using pricing conditions as at December 31, 2012. These data were collected on the same basis as the illustrative quotes as at December 31, 2011 (as described in the May 2012 educational note), and are consistent with the methodology adopted as of each quarter-end in 2012. Consistent with the analysis performed at previous quarter-ends, the illustrative quote information was supplemented with data on the pricing of actual group annuity purchases during the fourth quarter of 2012, as provided by certain actuarial consulting firms.

Analysis

The results of the illustrative non-indexed quotations at December 31, 2012, based on the UP94 generational mortality tables (with the AA improvement scale), are summarized below and compared to the previous illustrative quote information provided by the insurers as at September 30, 2012.

AVERAGE OF THE DISCOUNT RATES FOR THE THREE MOST COMPETITIVE QUOTES (USING UP94 GENERATIONAL MORTALITY TABLES)				
	Large Purchase		**Small Purchase**	
	30/09/2012	**31/12/2012**	**30/09/2012**	**31/12/2012**
Retirees • Discount rate • Spread over CANSIM V39062	2.86% + 0.64%	2.86% + 0.60%	2.94% + 0.72%	3.01% + 0.75%
Deferred vesteds • Discount rate • Spread over CANSIM V39062	3.21% + 0.99%	3.14% + 0.88%	3.23% + 1.01%	3.24% + 0.98%
Combined • Discount rate • Spread over CANSIM V39062	2.95% + 0.73%	2.92% + 0.66%	3.14% + 0.92%	3.15% + 0.89%

If considered in isolation, over the three-month period ending December 31, 2012, the illustrative quotes may indicate a slight decrease in the spread of the discount rates over CANSIM V39062.

The *actual* group annuity purchase data available to the PPFRC for the fourth quarter of 2012 were also considered. In particular, the data on the pricing of actual purchases of non-indexed annuities during the months of November and December 2012 showed an average spread of approximately 75 bps over CANSIM series V39062.

While the illustrative quotes indicate differences in the pricing for immediate and deferred annuities, some of the insurers provide their quotes on the basis that the immediate and deferred annuities are comingled in the same purchase. As such, the illustrative quotes are also shown above on a combined basis. This information would be interpreted with caution as the actual weighting between retirees and deferred annuitants varies by annuity purchase. In particular, the illustrative group for the small annuity purchase includes a high portion of deferred annuitants. As a result, and based on both the illustrative quotes and the actual group annuity data, the PPFRC has concluded that it is not appropriate at this time to differentiate the guidance on pricing of group annuities for immediate and deferred annuities.

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 Government of Canada long-term bonds (CANSIM V39062) increased arithmetically by 70 bps, in conjunction with the UP94 generational mortality tables (with the AA improvement scale). This guidance applies to both immediate and deferred annuities and also applies regardless of the overall size of a group annuity purchase.

Example

As at December 31, 2012, the unadjusted CANSIM V39062 rate was 2.26%. 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, 2012, and January 1, 2013, to be used in conjunction with the UP94 generational mortality tables (with the AA improvement scale). Prior to rounding, an applicable underlying discount rate would be determined as 2.26% + 0.70% = 2.96%.

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 actual annuities indexed to the Consumer Price Index (CPI) are extremely limited. In most cases, the contributing insurers did provide illustrative quote data for the sample blocks on a CPI-indexed basis. It may be noted that the premiums for the illustrative quotes on this and prior occasions are substantially higher than the guidance provided by prior educational notes.

The PPFRC is conducting further research regarding the pricing of indexed annuities. The analysis includes confirmation as to whether the insurers would be willing to actually transact on the basis reflected in the illustrative annuity quotes. This research may result in the revision of future guidance for estimating the cost of purchasing indexed annuities.

Accordingly, an acceptable proxy for estimating the cost of purchasing a group annuity where pensions are fully indexed to the rate of change in the CPI would be the unadjusted yield on Government of Canada real return long-term bonds (CANSIM series V39057) in conjunction with the UP94 generational mortality tables (with the AA improvement scale). This guidance applies to both immediate and deferred annuities and also applies regardless of the overall size of a group annuity purchase. As at December 31, 2012, the unadjusted CANSIM V39057 rate was 0.38%.

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. Since there are significant variations in the types of partially-indexed provisions, it is not feasible to provide guidance that would apply in all possible circumstances. However, in a simplest case, where the indexation is a percentage of CPI without any offsets, caps, or floors, an appropriate implicit discount rate would be determined as follows:

(Indexation %) · Fully-indexed proxy + (1- Indexation %) · Non-indexed proxy

For example, for a plan which provides indexing based on 75% of the CPI increase without any offsets, caps, or floors, an appropriate discount rate as at December 31, 2012, would be determined as 75% · 0.38% + (1 - 75%) · 2.96% = 1.025%.

Where offsets, caps, or floors apply, the actuary would adjust the discount rates otherwise applicable, based on the likelihood of these features causing a material change in the pension payable in any year. In determining such likelihood, the actuary would be guided by the current economic environment as well as long-term historical experience.

6. ACTUAL ANNUITY PRICING

The purpose of this educational note is to provide actuaries with guidance related to the establishment of assumptions for hypothetical wind-up and solvency valuations. It is worth noting that the pricing for an actual group annuity purchase depends on many factors, with the result that the actual price may differ from the guidance provided herein. Some of the factors that may affect pricing of a particular purchase include, but are not limited to:

- The duration of the pensions being purchased;
- The proportion of deferred vested members included in the group being purchased;
- The average pension amount for the pensions being purchased;
- The mortality experience anticipated by the insurance companies bidding on the purchase; and
- Competitive pressures in the group annuity market at the time of the purchase.

7. 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 a lesser 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.

8. LARGE PLANS

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, it is the PPFRC's understanding that during the past few years total transactions in the Canadian group annuity market were less than $1.5 billion annually. Also, as discussed above, the availability of CPI-indexed annuities of any size may be severely limited.

It may be possible for large plans to market annuities as a series of small annuities over a reasonable period of time, thereby enabling a plan with greater annuity liabilities to fully annuitize the liabilities. However, this approach may not be suitable, or even possible, in every instance. For example, it may not be possible to settle annuity liabilities exceeding approximately $500 million over a reasonable period of time, even through a series of smaller annuities. Further, large plans with inflationary increases tied to an external index (i.e., CPI related) would likely have difficulty in settling liabilities through a group annuity purchase.

It is very difficult to predict how the benefits of members in receipt of a pension would be settled for large plans with, effectively, no access to group annuity markets. In such circumstances, the actuary would formulate a reasonable hypothesis about the manner in which the benefits may be settled. In formulating such a hypothesis, the actuary would consider relevant legislative requirements and regulatory guidance. Based on this hypothesis, the actuary would then develop appropriate assumptions.

Note that, in most circumstances where a plan wind-up is hypothesized, the principles underlying the determination of annuity prices would continue to apply. For example, if it is hypothesized that liabilities are to be settled through an establishment of a replicating portfolio, an actuary would be guided by the underlying philosophy used by insurance companies in pricing group annuities (i.e., that high-quality fixed income assets with characteristics similar to the liabilities are used to "immunize" the purchase, with further adjustments for expenses and possibly margins for adverse deviations).

9. MORTALITY BASIS

The mortality table and assumed future improvements used to calculate the implicit annuity purchase discount rates are the UP94 generational mortality tables in conjunction with the AA improvement scale, irrespective of the basis used by insurers when submitting quotes. Preliminary results from longevity research indicate that observed pension plan member mortality experience and improvement rates may result in greater longevity in comparison to this table and improvement scale. However, the UP94 generational mortality table in conjunction with the AA improvement scale has continued to be used in this guidance in order to provide a common basis with the required mortality table for determining benefits assumed to be settled by a lump sum transfer in accordance with section 3500 of the Standards of Practice. Also, the PPFRC does not have access to the mortality assumptions used by insurers for purposes of pricing group annuities.

Paragraph 1720.01 of the Standards of Practice states: "*The assumptions that the actuary selects or for which the actuary takes responsibility, other than alternative assumptions selected for the purpose of sensitivity testing, should be appropriate in the aggregate. These assumptions should also be independently reasonable unless the selection of assumptions that are not independently reasonable can be justified*."

A relevant explanation and example are provided in paragraph 1720.04, which states: "If the use of assumptions that are not independently reasonable could be justified, inappropriateness in a particular assumption could be offset by the inappropriateness in another, for example if one is conservative and the other is not conservative, then they may be appropriate in the aggregate. For example, in a pension plan valuation, group annuity purchase costs may be calculated using mortality and interest rates that would be different from the rates used by an insurance company to price the annuity, but may still provide a reasonable cost for the annuity."

10. MORTALITY ADJUSTMENTS

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 future pensioner mortality would be expected to be materially higher or lower than average either due to credible and persistent experience or due to occupational or demographic factors.

There is evidence that insurers may consider demonstrable substandard mortality experience submitted when establishing the pricing basis for specific group annuities. Insurers also increasingly appear to be considering 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 or super-standard mortality or where an insurer might be expected to assume significantly shorter or longer than average pension plan 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 improvements inherent in the assumed annuity purchase basis.

11. 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.

12. RETROACTIVE APPLICATION

If an actuary has already prepared a funding valuation report with an effective date on or after December 31, 2012, before the publication of this guidance, the actuary would consider paragraphs 1820.33 through 1820.36 of the Standards of Practice to determine whether it is necessary to withdraw or amend the report.

13. 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, 2012, up to December 30, 2013, pending any further guidance or other evidence of a change in annuity pricing.

Given the volatility in group annuity pricing that has occurred in the past few years, it is possible that revised guidance may be 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 such 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.

Moreover, actuaries would consider the volatility in group annuity prices and pricing factors when communicating advice related to future hypothetical wind-up and solvency valuations.

The PPFRC is reviewing several aspects of group annuity purchase pricing which may result in revisions to future guidance. In particular:

- **Duration**: the PPFRC has observed that the duration of obligations being purchased may have had a significant effect on annuity pricing during 2011 and 2012. The differential in the hypothetical annuity quotes between deferred vested and retired members may be related to differences in the duration of the obligations of each group. Future guidance may better reflect the effect of the duration of the obligations being valued.
- **Indexed annuities**: the PPFRC's review includes confirmation as to whether the insurers would be willing to actually transact on the basis reflected in the illustrative annuity quotes for indexed pensions provided to the PPFRC and the relationship between indexed annuity premiums and yields on Government of Canada real-return long-term bonds.

- **Underlying basis**: currently, the annuity guidance is expressed as a spread over yields on Government of Canada long-term bonds in conjunction with the UP94 generational mortality tables (with the AA improvement scale), irrespective of the basis used by insurers when submitting quotes. The PPFRC is exploring whether other bases may be more appropriate to provide more stability in the resulting spread.
- **Alternative settlement methods**: on December 14, 2012, the CIA published a draft educational note on alternative settlement methods for hypothetical wind-up and solvency valuations, which may result in revisions to future guidance for plans affected by capacity constraints within the Canadian group annuity purchase market.

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