Educational Note

Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates Between December 31, 2017 and December 30, 2018

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: Faisal Siddiqi, Chair
Practice Council

Mark Mervyn, Chair
Committee on Pension Plan Financial Reporting

Date: March 5, 2018

Subject: **Educational Note—Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between December 31, 2017 and December 30, 2018**

This educational note provides guidance on assumptions to be used for hypothetical wind-up and solvency valuations for 2018. It confirms the initial guidance for 2018 assumptions that was provided in an updated Preliminary Communication for Assumptions for Hypothetical Wind-Up and Solvency Valuations issued on January 29, 2018.

In accordance with the Institute'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 Committee on Pension Plan Financial Reporting (PPFRC) and has received final approval for distribution by the Practice Council on March 2, 2018.

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The PPFRC would like to express its gratitude to Brookfield Annuity, Canada Life, The Co-operators, Desjardins Financial Security, Industrial Alliance, RBC Insurance and Sun Life Financial for providing it with data.

Direct questions or comments regarding this educational note to Mark Mervyn, Chair of the PPFRC, at mark.mervyn@aon.com.

FS, MM

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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 of pension plans in respect of benefit entitlements that are assumed to be settled by purchase of annuities with effective dates on or after December 31, 2017 and prior to or on December 30, 2018. For greater clarity, this document does not provide detailed guidance on selecting appropriate assumptions for hypothetical wind-up and solvency valuations of pension plans in respect of benefit entitlements that are assumed to be settled in a manner other than the purchase of annuities.

This educational note confirms the initial guidance for 2018 assumptions that was provided in an updated Preliminary Communication for Assumptions for Hypothetical Wind-Up and Solvency Valuations issued on January 29, 2018.

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 member 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 the following:

- Active members not eligible for retirement;
- Active members eligible for retirement;
- Retired members and surviving spouses;
- Deferred vested members not eligible to commence a pension immediately;
- Deferred vested members eligible to commence a pension immediately; and
- Former members who have residual rights under the plan.

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

- 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 Regulations (Canada); 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.

3. Benefits Assumed to be Settled in a Manner other than Purchase of Annuities

For hypothetical wind-up valuations, of which solvency valuations are a subset, paragraph 3240.05 of the Standards of Practice states the following: "For a hypothetical wind-up valuation, the actuary may assume that the wind-up date, the calculation date and the settlement date are coincident."

Although the Standards of Practice contemplate that the wind-up date may differ from the calculation date, this would apply only if the valuation contemplates that benefits will be settled through the use of an alternative settlement method. Actuaries may refer to the educational note Alternative Settlement Methods for Hypothetical Wind-Up and Solvency Valuations in this case.

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 consistent with the valuation date.

4. Methodology in Developing Guidance for Benefits Assumed to be Settled by Purchase of Group Annuities

The PPFRC began collecting data from insurers on a quarterly basis in 2009. Seven insurers participated in the process as of December 31, 2017. Under the current process, the PPFRC obtained hypothetical quotes on non-indexed illustrative blocks of business of five different durations. The PPFRC added a lower and higher duration block to the original three illustrative blocks of business in 2017. The majority of the contributing insurers also provided hypothetical quotes for the illustrative blocks, determined as if the pensions were fully indexed to increases in the consumer price index (CPI).

Summary data in respect of the three central non-indexed illustrative blocks is as follows:

Duration	**Low**	**Medium**	**High**
Duration at December 31, 2017	8.6	11.1	13.6
Approximate premium at December 31, 2017	$18 million	$24 million	$25 million
Average monthly pension	$897	$897	$897
Approximate proportion of liability for deferred members	0%	4%	13%

For the purpose of this guidance, the durations of the non-indexed illustrative blocks shown above were determined by calculating the impact of a 0.01% change in the discount rate, using the following formula:

[(Estimated Purchase Price at 3.02% / Estimated Purchase Price at 3.03%) – 1] / 0.01%

where 3.02% is equal to the unadjusted average yield on Government of Canada marketable bonds with maturities over 10 years (CANSIM V39062) of 2.22% plus 80 basis points (bps) at December 31, 2017, being the guidance for the non-indexed illustrative block with medium duration (as described below). Note that the durations of the three illustrative blocks will change over time as discount rates change.

The guidance contained in this educational note is partially based on hypothetical quotes provided by the seven insurance companies on illustrative group annuity business using pricing conditions as at December 31, 2017. These data were collected on the same basis as the hypothetical quotes prepared quarterly since June 30, 2013. 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 mortality rates equal to the 2014 Canadian Pensioners' Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B) with no mortality adjustments (CPM2014Proj).

The participating insurers have requested, for competitive reasons, that the PPFRC not disclose the individual discount rates underlying the insurer quotes, including the discount rate associated with the most competitive quote.

The PPFRC and the insurers agreed that, for purposes of this educational note, it would be appropriate to disclose the average of the discount rates for the three most competitive hypothetical quotes. Regardless of this average however, in developing the guidance, the PPFRC considered all of the information received in the confidential hypothetical quotes.

Consistent with the analysis performed at previous quarter ends, the hypothetical quote information was supplemented with data on the pricing of actual group annuity

purchases and bona fide quotations in cases where the transaction did not proceed during the fourth quarter of 2017, as provided by several actuarial consulting firms. The total volume of data collected during calendar 2017 for buy-out and buy-in group annuity purchases in Canada was approximately $2.5B.

The PPFRC believes that rounding of the interest rate resulting from following the guidance outlined in this educational note to the nearest five or 10 basis points is a reasonable and appropriate approach. Each actuary would use discretion in determining whether to round the interest rate, and consistency in the application of such rounding would be followed.

The guidance outlined in sections 5 and 6 applies to both immediate and deferred pensions and also applies regardless of the overall size of the group annuity purchase. It applies to valuations with effective dates on and after December 31, 2017, up to December 30, 2018, pending any further guidance or other evidence of change in annuity pricing.

5. Non-indexed Pensions

Analysis

The table below provides the implicit discount rates as at December 31, 2017, underlying the average of the three most competitive hypothetical quotes, determined in conjunction with CPM2014Proj, and the spread of these implicit discount rates over the CANSIM V39062 yield. Comparable information is also shown as at September 30, 2017.

Average of the Three Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)						
	September 30, 2017			**December 31, 2017**		
	Low duration	**Medium duration**	**High duration**	**Low duration**	**Medium duration**	**High duration**
Discount rate	2.95%	3.09%	3.17%	2.78%	2.92%	2.96%
Spread over CANSIM V39062	+ 55 bps	+ 69 bps	+ 77 bps	+ 56 bps	+ 70 bps	+ 74 bps

The spread over CANSIM V39062 based on the average of the three most competitive hypothetical quotes did not change significantly during the quarter for each of the illustrative blocks. CANSIM V39062 rates decreased during the quarter, while credit spreads also declined during the quarter, affecting the dynamic for assets used by many insurers to back annuity purchases. The spreads for actual purchases and bona fide quotations during the quarter were higher than the averages quoted above.

Guidance for Non-indexed Pensions

In establishing the guidance, the PPFRC has given weight to the hypothetical quotes and to the data collected on actual annuity purchases and bona fide quotations.

As a result of this analysis, the PPFRC has concluded that effective December 31, 2017, the cost of purchasing non-indexed annuities, prior to any adjustment for sub- or super-standard mortality, would be estimated based on the following process:

1. Determine the duration *of the portion of the liabilities assumed to be settled through the purchase of annuities*, based on a discount rate of 3.02% (CANSIM V39062 plus 80 bps at December 31, 2017) and CPM2014Proj mortality rates.

2. Using the duration obtained in step 1, interpolate using the following table to determine the appropriate spread above unadjusted CANSIM V39062:

Illustrative block	**Duration based on 3.02% discount rate**	**Spread above unadjusted CANSIM V39062**
Low duration	8.6	+ 70 bps
Medium duration	11.1	+ 80 bps
High duration	13.6	+ 90 bps

   If the duration of the portion of the liabilities assumed to be settled through the purchase of annuities is lower than 8.6 or higher than 13.6, the actuary would make a reasonable assumption regarding the appropriate spread.

   The PPFRC has been monitoring actual purchases and bona fide quotes of very low duration annuities and has determined that a refinement to the guidance is warranted. The PPFRC believes that the discount rate for estimating the cost of purchasing a very low duration (lower than 8.6) non-indexed annuity by using the low duration spread may no longer be a reasonable approach. As at December 31, 2017, the PPFRC believes that one reasonable approach would be to derive the spread for durations lower than 8.6 by extrapolating downwards from the spreads at the low and medium durations. Other approaches may also be reasonable.

   The PPFRC believes that groups with durations higher than 13.6 would likely include a large proportion of deferred vested members. While the higher duration, in isolation, would be expected to result in lower pricing, the PPFRC believes that this would be offset by added administrative costs and risk premiums that insurers would incur in assuming these obligations. As at December 31, 2017, the PPFRC believes that a reasonable spread for durations higher than 13.6 is +90 bps. Other approaches may also be reasonable.

3. Estimate the cost of purchasing annuities using an interest rate determined as the unadjusted CANSIM V39062 increased arithmetically by the spread calculated in step 2, in conjunction with CPM2014Proj.

Example

As at December 31, 2017, the unadjusted CANSIM V39062 was 2.22%; therefore, the guidance for the medium duration would be 3.02% (i.e., + 80 bps). Using the process described above, if the duration of the liabilities assumed to be settled through the

purchase of annuities is determined to be 12 based on a change in discount rate of 0.01% from 3.02%, the appropriate spread above the unadjusted CANSIM V39062 would be determined as

[Medium spread x (High duration – 12) + High spread x (12– Medium duration)]/ [High duration – Medium duration]

[80 bps x (13.6 – 12) + 90 bps x (12 – 11.1)] / [13.6 – 11.1] = 84 bps

Prior to rounding, an applicable underlying discount rate would then be determined as 2.22% + 0.84% = 3.06%.

6. Indexed Pensions

Analysis

The hypothetical quotes for the medium-duration illustrative block as at September 30, 2017 and December 31, 2017, are summarized as follows:

Average of the Three Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)		
	September 30, 2017	**December 31, 2017**
Discount rate	- 0.01%	- 0.24%
Spread over CANSIM V39057	- 83 bps	- 81 bps

Based on the average of the three most competitive hypothetical quotes, the spreads below the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM V39057) for the medium-duration illustrative block did not change significantly during the quarter. The absolute values of the spread on the low and high duration blocks were both higher than for the medium duration block. In addition, significant variation between the hypothetical quotes was observed.

While there is some indication that the pricing of CPI-indexed annuities may also vary by duration, the PPFRC has concluded that there are insufficient data at this stage to introduce this level of refinement. Consequently, the guidance contained herein is applicable to CPI-indexed annuities regardless of their duration.

There were limited quantitative data obtained on actual fully indexed annuity purchases and bona fide quotations in cases where the transaction did not proceed during the fourth quarter of 2017. The spreads for this data were higher than the averages quoted above.

Guidance for Fully CPI-Indexed Pensions

Based on the pricing received, the PPFRC has determined that an appropriate proxy for estimating the cost of purchasing a group annuity, prior to any adjustment for sub- or super-standard mortality, where pensions are fully indexed to the rate of change in the CPI would be determined using an interest rate equal to the CANSIM V39057 yield reduced arithmetically by 70 bps, in conjunction with CPM2014Proj.

Example

As at December 31, 2017, the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) was 0.57%. Therefore, prior to rounding, an applicable underlying discount rate would be determined as 0.57% - 0.70% = -0.13%.

Partially Indexed Annuities

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 consistent with the guidance provided in this educational note.

The difference between the discount rate used to estimate the cost of a non-indexed annuity and the cost of a fully indexed annuity can be broken down into two components: the best estimate of the indexing produced by the formula, and a risk premium. The risk premium represents the additional cost of purchasing a fully indexed annuity over the cost that would be charged if the insurer priced indexed annuities based only on a best estimate fixed rate of indexation. The risk premium exists in part due to insurers' difficulty in immunizing indexed annuities, the increased risk borne by insurers when providing indexed annuities, and the lack of a fully competitive market for indexed annuities. In estimating the cost of a partially indexed annuity, the actuary would normally consider both the best estimate of the indexing produced by the formula and the risk premium.

Calculation of Best Estimate of Future Inflation

As an example, one reasonable approach to determine the best estimate of future inflation is through comparing the unadjusted average yield on Government of Canada marketable bonds over 10 years (i.e., CANSIM series V39062) to the unadjusted yield on Government of Canada real-return long-term bonds (i.e., CANSIM series V39057). At December 31, 2017, the best estimate of future inflation under this approach would be 1.65%, determined by comparing the unadjusted CANSIM series V39062 yield of 2.22% to the unadjusted CANSIM series V39057 yield of 0.57%. Other approaches to determine the best estimate of future inflation may also be reasonable.

Calculation of Inflation Risk Premium

One reasonable approach to determine the inflation risk premium would be as the difference between (1) and (2), where (1) is the difference between the discount rate used to estimate the cost of non-indexed annuities and the discount rate used to estimate the cost of fully indexed annuities and (2) is the best estimate of future inflation. For example, as at December 31, 2017, the difference between discount rates for non-indexed and indexed annuities with respect to an annuity with a duration of 12 is 3.06% - (-0.13%) = 3.19%; therefore, the inflation risk premium would be determined as 3.19% - 1.65% = 1.54%.

Sample Partial Indexation Provisions

Where offsets, caps, or floors apply, the actuary would adjust the implicit discount rates otherwise applicable, based on the likelihood of these features causing a material

change in the pension payable in any year, guided by the current economic environment, economic expectations, and long-term historical experience. The actuary may consider the use of stochastic analysis for this purpose.

Since there are significant variations in the types of partial indexation provisions and limited data on actual purchases, it is not feasible to provide guidance that would apply in all possible circumstances. However, common indexation provisions are often based on one, or a combination, of the following four scenarios:

a) *Fixed rate increases*: If the pension increase is based on a fixed rate per year, the expected increase in the pension amounts payable is known. An appropriate discount rate would be equal to the discount rate determined as if the pension were not indexed, less the fixed increase percentage. For example, as at December 31, 2017, a 2% fixed indexation rate for an annuity with duration of 12 would result in a discount rate of 1.06% (3.06% - 2%).

b) *Percentage of CPI*: Where the indexation is a percentage of CPI without any offsets, caps, or floors, the expected pension amounts payable can be allocated between a fully indexed pension and a non-indexed pension; an appropriate implicit discount rate may be determined as follows:

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

   For purposes of determining the non-indexed proxy in the above formula, the duration of the portion of the liabilities assumed to be settled through the purchase of annuities would be determined as if the pensions were **not** indexed.

   For example, for a plan that provides indexing based on 75% of the CPI increase without any offsets, caps, or floors, and where the duration of the group expected to be settled through the purchase of annuities (determined as if the pensions were not indexed) is 12, an appropriate discount rate as at December 31, 2017, would be determined as 75% x -0.13% + (1 - 75%) x 3.06% = 0.67%.

c) *CPI, subject to a fixed cap:* If the cap is significantly greater than the best estimate of future inflation, the assumed discount rate would approach that of a fully indexed pension. If the cap is relatively low compared to the best estimate of future inflation, the assumed discount rate would approach that of a fixed rate increase where the fixed rate is equal to the cap. For caps that are neither relatively high nor relatively low compared to the best estimate of indexing produced by the formula, an appropriate discount rate would be equal to that of a non-indexed pension reduced by the best estimate of the indexing produced by the formula and a portion of the inflation risk premium. The higher the cap, the higher the portion of the inflation risk premium that would be reflected, due to the increased variability in the level of indexing that would be provided.

d) *CPI, less an offset:* An appropriate discount rate would be equal to that of a fully indexed pension increased by a portion of the offset. Typically, the discount rate would not be increased by the full amount of the offset, since insurers would

have difficulty immunizing the expected pension amounts given their need to protect against inflation at higher levels. For example, if the best estimate of future inflation is moderately below the offset, it would not be reasonable to assume a discount rate equivalent to a non-indexed pension, as there would be a significant likelihood that the inflation rate would exceed the offset in a number of future years, and insurers would also be expected to embed a cost associated with the risk of high-inflation environments. The use of a non-indexed discount rate in this case would incorrectly assign no value to the indexation feature. Consider, for example, a plan with indexation based on the CPI increase less 2%, with a minimum of 0%. At December 31, 2017, the offset is in excess of the best estimate of future inflation of 1.65%. In this circumstance, it would not be appropriate to estimate the cost of purchasing this annuity as if it were non-indexed.

7. Actual Annuity Pricing

The purpose of this educational note is to provide actuaries with guidance related to establishing assumptions for hypothetical wind-up and solvency valuations. 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. In addition to the duration of the purchase, other factors that may affect pricing of a particular purchase include, but are not limited to, the following:

- The factors outlined in section 11 titled “Mortality Adjustments”;
- The overall size of the purchase;
- The proportion of deferred vested members included in the group being purchased;
- Broad capital market conditions at the time of the purchase; and
- Competitive pressures in the group annuity market at the time of the purchase.

The actuary may make adjustments for the factors listed above, or for other factors, with appropriate justification.

8. Individual Annuity Pricing

The PPFRC observes that the pricing of individual and group annuities can differ for various reasons such as the following:

- 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".

Where an actuary considers that a plan's benefit obligations would be settled by the purchase of one or more individual annuities, yields based on relevant individual annuity quotes may be reflected in establishing an appropriate assumption for determining the hypothetical wind-up or solvency liabilities of the plan.

9. Large Plans

Due to capacity constraints within the Canadian group annuity market, pension plans with very large liabilities may have difficulty purchasing a single group annuity to settle their immediate and deferred pension liabilities in the event of a plan wind-up.

The educational note Alternative Settlement Methods for Hypothetical Wind-Up and Solvency Valuations notes that groups with non-indexed annuity liabilities exceeding approximately $500 million may have difficulty effecting a single annuity purchase to settle their liabilities. Capacity constraints to purchase annuities that are partially or fully indexed to the CPI are significantly more acute; groups with indexed annuity liabilities exceeding approximately $200 million may have difficulty in settling their liabilities through a single annuity purchase.

The Canadian group annuity market continues to evolve. While it may be possible for a single annuity purchase to exceed the amounts noted above (and in fact, one such non-indexed annuity purchase occurred in 2017), the PPFRC continues to believe that groups with annuity liabilities exceeding these amounts would still have difficulty effecting such a purchase. Consequently, the PPFRC believes these amounts remain appropriate thresholds to begin considering whether it is reasonable to assume that liabilities for a particular plan would be settled through means other than a single annuity purchase. Over recent years the PPFRC has observed an increase in the volume of large transactions and will continue to monitor such transactions to determine if an increase to the above amounts is warranted.

While size of purchase is a significant factor in making this determination, the PPFRC believes it is not the only factor, and the actuary may consider others. Furthermore, the actuary would give significant consideration to the actual annuity market as of the valuation date.

It is difficult to predict how the benefits of members who are entitled to an immediate or deferred pension would be settled in the event of an actual wind-up for plans with liabilities significantly greater than the amounts noted above.

Paragraph 3240.05.1 of the Standards of Practice states: *"*For a hypothetical wind-up valuation, the actuary may assume that benefits would be settled by the purchase of annuities regardless of any limitation of capacity in the market for group annuity contracts.*"*

Thus, in performing a hypothetical wind-up or solvency valuation of such a plan, the actuary may assume that the benefits would be settled through a single annuity

purchase, even if such a purchase would not be practical. Alternatively, the actuary may make a reasonable hypothesis for the manner in which the benefits may be settled, which would be consistent with the postulated wind-up scenario. Actuaries may refer to the educational note Alternative Settlement Methods for Hypothetical Wind-Up and Solvency Valuations for further guidance.

10. Mortality Basis

The PPFRC does not have access to the mortality assumptions used by insurers for purposes of pricing group annuities. The assumed mortality table and assumed future mortality improvements used to establish the discount rate guidance in this educational note are the 2014 Combined Canadian Pensioners' Mortality Table (CPM2014) in conjunction with the CPM Improvement Scale B (CPM-B) with no mortality adjustments (CPM2014Proj), irrespective of the basis used by insurers when submitting quotes. This is the current mortality table promulgated for the computation of pension commuted values in accordance with subsection 3530 of the Standards of Practice. The choice of the mortality assumption used for this guidance is unlikely to materially affect the estimated cost of purchasing an annuity, since the guidance is derived by solving for the discount rate that along with the selected mortality table produces the price of an annuity.

11. Mortality Adjustments

The hypothetical quotes were requested to be based on an assumption that the priced group's life expectancy is typical of a group annuity purchase. The hypothetical quotes were also requested to be based on typical pension sizes, irrespective of the underlying data. That is, no adjustments for sub- or super-standard mortality were to be made due to the size of the pensions, or other factors, in the illustrative block.

Insurers are increasingly considering occupational and demographic factors in establishing mortality assumptions for the pricing basis of specific group annuities, as are pension actuaries for establishing liabilities for other purposes, including going concern valuations. The factors an insurer may consider are similar to those that pension actuaries consider in establishing liabilities, such as the credibility of experience, the experience of similar plans, published mortality studies, plan provisions that expose the group to anti-selection or tail risk, and possible adjustments based on characteristics such as collar type, industry, and pension size.

An adjustment to regular annuity purchase assumptions would be expected where there is demonstrated sub-or super-standard mortality versus a typical group annuity purchase, or where an insurer might be expected to assume significantly shorter or longer-than-average pension plan longevity based on the above factors. In such cases, the actuary would be expected to make an adjustment to the mortality assumption in a manner consistent with the underlying annuity purchase basis. The adjustment may include using a different underlying mortality table, developing a broad adjustment to the underlying mortality table (e.g., 90 percent or 110 percent of the standard table

rates), or, in some cases, different adjustment factors may be used for a range of ages. Other approaches for making an adjustment may also be reasonable.

Further guidance on the nature of adjustments for plan characteristics can be found in the second revision of the educational note Selection of Mortality Assumptions for Pension Plan Actuarial Valuations.

12. 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 explicit assumption regarding these expenses. 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.

13. Retroactive Application

If an actuary has already prepared a funding valuation report with an effective date on or after December 31, 2017, before the publication of this guidance, the actuary would consider paragraphs 1710.36 through 1710.43 of the Standards of Practice to determine whether it is necessary to withdraw or amend the report.

14. Recent Developments and 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, 2017, up to December 30, 2018, 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 30 to 60 days) between the effective date of data collection and the publication of such revised guidance. When reporting the results of a valuation within a period prior to 60 days of the effective date of the valuation, the actuary may wish to alert users of the report to the possibility that revisions to the report may be needed if new guidance is 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.

In addition to monitoring group annuity pricing on a quarterly basis, the PPFRC intends to continue reviewing the methodology used in establishing the guidance on an ongoing basis. Issues monitored include the underlying economic and mortality basis used to express the guidance, the impact of block size and the composition of the blocks.

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

Appendix A – Summary and Links for Historical Guidance

The following is a summary of the historical guidance issued by the PPFRC. The summary is provided for reference, and actuaries are directed to refer to the respective published educational note or educational note supplement.

Educational Note / Supplement	**Mortality table**[1]	**Non-indexed Immediate and Deferred** *Duration: Spread relative to unadjusted CANSIM V39062*			**Fully CPI-Indexed** *Spread relative to unadjusted CANSIM V39057*
		Low duration	**Medium duration**	**High duration**	**All durations**
Dec 31, 2017	CPM2014Proj	8.6: + 70 bps	11.1: + 80 bps	13.6: + 90 bps	- 70 bps
Sep 30, 2017	CPM2014Proj	8.5: + 60 bps	11.1: + 70 bps	13.5: + 80 bps	- 70 bps
Jun 30, 2017	CPM2014Proj	8.6: + 60 bps	11.2: + 80 bps	13.8: + 90 bps	- 70 bps
Mar 31, 2017	CPM2014Proj	8.5: + 70 bps	11.0: + 100 bps	13.5: + 110 bps	- 60 bps
Dec 31, 2016	CPM2014Proj	8.5: + 70 bps	11.0: + 90 bps	13.5: + 100 bps	- 60 bps
Sep 30, 2016	CPM2014Proj	8.7: + 80 bps	11.4: + 110 bps	14.0: + 120 bps	- 70 bps
Jun 30, 2016	CPM2014Proj	8.6: + 90 bps	11.3: + 120 bps	13.8: + 130 bps	- 70 bps
Mar 31, 2016	CPM2014Proj	8.5: + 90 bps	11.1: + 120 bps	13.6: + 130 bps	- 70 bps
Dec 31, 2015	CPM2014Proj	8.5: + 60 bps	11.1: + 100 bps	13.6: + 110 bps	- 70 bps
Sep 30, 2015	CPM2014Proj	8.4: + 80 bps	11.0: + 110 bps	13.4: + 120 bps	- 70 bps
Jun 30, 2015	UP94Proj	8.3: - 20 bps	10.9: + 30 bps	13.6: + 60 bps	- 120 bps
Mar 31, 2015	UP94Proj	8.5: + 0 bps	11.3: + 30 bps	14.0: + 60 bps	- 120 bps
Dec 31, 2014	UP94Proj	8.2: + 0 bps	10.9: + 30 bps	13.5: + 60 bps	- 120 bps
Sep 30, 2014	UP94Proj	8.1: + 0 bps	10.6: + 30 bps	13.2: + 50 bps	- 120 bps
Jun 30, 2014	UP94Proj	8.0: + 0 bps	10.5: + 40 bps	12.9: + 60 bps	- 110 bps
Mar 31, 2014	UP94Proj	7.7: + 50 bps	10.1: + 80 bps	12.3: + 100 bps	- 100 bps
Dec 31, 2013	UP94Proj	7.6: + 50 bps	9.9: + 70 bps	12.1: + 80 bps	- 110 bps
Sep 30, 2013	UP94Proj	7.6: + 60 bps	9.9: + 80 bps	12.2: + 90 bps	- 100 bps
Jun 30, 2013	UP94Proj	7.8: + 40 bps	10.2: + 60 bps	12.5: + 70 bps	- 120 bps

Educational Note / Supplement	**Mortality table**[1]	**Non-indexed** *Spread relative to unadjusted CANSIM V39062*		**Fully CPI-Indexed** *Spread relative to unadjusted CANSIM V39057*
		Immediate	**Deferred**	**All purchase sizes**
Mar 31, 2013	UP94Proj	+ 70 bps		+ 0 bps
Dec 31, 2012	UP94Proj	+ 70 bps		+ 0 bps
Sep 30, 2012	UP94Proj	+ 70 bps		+ 0 bps
Jun 30, 2012	UP94Proj	+ 80 bps		+ 0 bps
Mar 31, 2012	UP94Proj	+ 90 bps		+ 0 bps
Dec 31, 2011	UP94Proj	+ 90 bps		+ 0 bps

[1] "CPM2014Proj": 2014 Canadian Pensioners' Mortality Table (CPM2014), combined with mortality improvement scale CPM Improvement Scale B (CPM-B) with no adjustments for sub- or super-standard mortality; "UP94Proj", "UP94@2020", "UP94@2015": UP94 mortality table, combined with mortality improvement scale AA on fully generational basis or static basis to indicated year

Sep 30, 2011	UP94Proj	+ 90 bps		+ 0 bps
Jun 30, 2011	UP94Proj	+ 70 bps		+ 0 bps
Mar 31, 2011	UP94Proj	+ 70 bps		+ 0 bps
Dec 31, 2010	UP94@2020	+ 100 bps		+ 0 bps
Sep 30, 2010	UP94@2020	+ 110 bps		+ 0 bps
Jun 30, 2010	UP94@2020	+ 70 bps		+ 0 bps
Mar 31, 2010	UP94@2020	+ 40 bps		+ 0 bps
Dec 31, 2009	UP94@2020	+ 40 bps		+ 0 bps
Jul 31, 2009	UP94@2015	+ 10 bps to + 50 bps[2]		- 40 bps to + 0 bps[2]
Oct 31, 2008	UP94@2015	+ 100 bps to + 140 bps[2]	+ 100 bps	- 40 bps to + 0 bps[2]
Feb 29, 2008	UP94@2015	+ 70 bps to + 110 bps[2]	+ 70 bps	- 40 bps to + 0 bps[2]

[2] Higher (Lower) rate applies to purchases with a total premium over $15 (of $0) million at the valuation date. Linear grading of the 40 bps difference applies for purchases with a premium under $15 million.