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## Educational Note Supplement

**Guidance for Assumptions for  
Hypothetical Wind Up and Solvency  
Valuations Update – Effective March 31,  
2017, and Applicable to Valuations with  
Effective Dates Between March 31, 2017  
and December 30, 2017**

Document 217050

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# MEMORANDUM

**To:** All Pension Actuaries

**From:** Pierre Dionne, Chair  
Practice Council

Simon Nelson, Chair  
Committee on Pension Plan Financial Reporting

**Date:** May 7, 2017

**Subject:** **Educational Note Supplement: Guidance for Assumptions for Hypothetical Wind-Up and Solvency Valuations Update – Effective March 31, 2017, and Applicable to Valuations with Effective Dates Between March 31, 2017 and December 30, 2017**

*Document 217050*

The most recent guidance from the Committee on Pension Plan Financial Reporting (PPFRC) regarding assumptions for hypothetical wind-up and solvency valuations was provided in the [educational note](#) dated March 1, 2017. This guidance applied for valuations with effective dates on and after December 31, 2016 (but no later than December 30, 2017).

The PPFRC has conducted its quarterly review of group annuity pricing conditions as at March 31, 2017 and has determined that a revision to its previous guidance regarding assumptions for hypothetical wind-up and solvency valuations is appropriate for valuations with effective dates on or after March 31, 2017 (but no later than December 30, 2017).

Additional information is contained in this educational note supplement. The guidance contained in this educational note supplement is consistent with the [preliminary communication](#) dated April 21, 2017.

## **Due Process**

The Policy on Due Process for the Approval of Guidance Material Other than Standards of Practice and Research Documents was followed in the development of these revisions.

## **Contact Information**

Questions should be addressed to Simon Nelson, Chair of the PPFRC, at [snelson@eckler.ca](mailto:snelson@eckler.ca).

PD, SN

## Non-indexed Annuity Proxy

### Previous Guidance

The most recent guidance from the Committee on Pension Plan Financial Reporting (PPFRC) concluded that for valuations with effective dates on or after December 31, 2016 (but no later than December 30, 2017), an appropriate discount rate for estimating the cost of purchasing a non-indexed group annuity, prior to any adjustment for sub- or super-standard mortality, would be determined as the unadjusted average yield on Government of Canada (GoC) marketable bonds with maturities over 10 years (CANSIM series V39062) increased arithmetically by between 70 to 100 basis points (bps), in conjunction with the 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 (CPM2014Proj). The spread above the CANSIM series V39062 would be determined based on the duration of the liabilities expected to be settled through the purchase of a group annuity.

This guidance was based on hypothetical quotes provided by six insurance companies on illustrative blocks of business using pricing conditions as at December 31, 2016, supplemented by data from certain actuarial consulting firms on actual group annuity purchases and bona fide quotations during the fourth quarter of 2016. Furthermore, this guidance applied to both immediate and deferred pensions, and also applied regardless of the overall size of the group annuity purchase.

### Analysis

The PPFRC obtained hypothetical quotes as of March 31, 2017 from six insurance companies on the same illustrative blocks of business used to develop the previous guidance. The characteristics of the three illustrative blocks are as follows:

Duration	Low	Medium	High
Duration at March 31, 2017	8.5	11.0	13.5
Approximate premium at March 31, 2017	\$18 million	\$24 million	\$25 million
Average monthly pension	\$897	\$897	\$897
Proportion of liability for deferred members	0%	4%	12%

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

$$\left[ \frac{\text{Estimated Purchase Price at 3.17\%}}{\text{Estimated Purchase Price at 3.18\%}} - 1 \right] / 0.01\%$$

where 3.17% is equal to the CANSIM V39062 yield of 2.17% at March 31, 2017 plus 100 bps and where the estimated purchase price is calculated using mortality rates equal to the 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

(CPM2014Proj), being the guidance for the 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 PPFRC also obtained data from certain actuarial consulting firms on actual group annuity purchases and bona fide quotations in cases where the transaction did not proceed during the first quarter of 2017.

The hypothetical quotations at December 31, 2016 and March 31, 2017 may be summarized as follows:

<b>Average of the Three Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)</b>						
	<b>December 31, 2016</b>			<b>March 31, 2017</b>		
	<b>Low duration</b>	<b>Medium duration</b>	<b>High duration</b>	<b>Low duration</b>	<b>Medium duration</b>	<b>High duration</b>
<b>Discount rate</b>	2.93%	3.07%	3.18%	2.87%	3.13%	3.24%
<b>Spread over CANSIM V39062</b>	+ 72 bps	+ 86 bps	+ 97 bps	+ 70 bps	+ 96 bps	+ 107 bps

The spread over CANSIM V39062 based on the average of the three most competitive hypothetical quotes increased by 10 bps at the medium and high durations during the quarter and was effectively unchanged at the low duration. As of March 31, 2017, the variability between the most competitive hypothetical quotes was small, but the variability decreased since the previous quarter. In addition, the average spreads for actual purchases and bona fide quotations during the quarter were generally more favourable than the averages quoted above for the low and medium durations and less favourable for the high duration.

Based on the above information, the PPFRC has concluded that a revision to the guidance is appropriate. In establishing the guidance, the PPFRC has given some weight to the hypothetical quotes and to the data collected on actual annuity purchases and bona fide quotations.

#### **Guidance for Non-indexed Pensions**

The PPFRC has concluded that effective March 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 3.17% (CANSIM V39062 plus 100 bps at March 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:

<b>Illustrative block</b>	<b>Duration based on 3.17% discount rate</b>	<b>Spread above unadjusted CANSIM V39062</b>
Low duration	8.5	+ 70 bps
Medium duration	11.0	+ 100 bps
High duration	13.5	+ 110 bps

If the duration of the portion of the liabilities assumed to be settled through the purchase of annuities is lower than 8.5 or higher than 13.5, the actuary would make a reasonable assumption regarding the appropriate spread.

The PFFRC believes that groups with durations higher than 13.5 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 PFFRC believes that this impact would be offset by added administrative costs and risks that insurers would incur in assuming these obligations. The PFFRC also believes that it is rare that a group would have a duration materially lower than 8.5. As of March 31, 2017, the PFFRC believes that one reasonable approach would be to assume that the spread for durations lower than 8.5 is +70 bps, and the spread for durations higher than 13.5 is +110 bps. Other approaches may also be reasonable.

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

The above guidance applies to valuations with effective dates on and after March 31, 2017, up to December 30, 2017, pending any further guidance or other evidence of change in annuity pricing.

## **CPI-Indexed Annuity Pricing**

### **Previous Guidance**

The most recent guidance from the PFFRC concluded that for valuations with effective dates on or after December 31, 2016 (but no later than December 30, 2017), an appropriate discount rate for estimating the cost of purchasing a group annuity where pensions are fully indexed to the rate of change in the Consumer Price Index (CPI) would be the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) reduced arithmetically by 60 bps, in conjunction with CPM2014Proj.

### **Analysis**

A subset of the contributing insurers also provided hypothetical quotes for the illustrative blocks on a CPI-indexed basis as of March 31, 2017; however, only two insurers indicated that they would definitively be willing to transact on their hypothetical quotes. The hypothetical quotations as at December 31, 2016 and March 31, 2017, for the medium-duration illustrative block where insurers indicated that they would be willing to transact on their hypothetical quotes may be summarized as follows:

<b>Average of the Most Competitive Hypothetical Quotes (Using CPM2014Proj Mortality Tables)</b>		
	<b>December 31, 2016</b>	<b>March 31, 2017</b>
<b>Number of hypothetical quotes in the average</b>	3	2
<b>Discount rate</b>	0.03%	0.05%
<b>Spread over CANSIM V39057</b>	- 48 bps	- 63 bps

Based on the average of the two (three for December 31, 2016) 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 increased during the quarter. The absolute value 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.

The PPFRC was not provided with any quantitative data either on actual fully- or partially-indexed annuity purchases or on bona fide quotations in cases where the transaction did not proceed during the first quarter of 2017.

#### **Guidance for Fully CPI-Indexed Pensions**

Considering the pricing received, as well as the lack of bona fide quotations during the first quarter, the PPFRC has concluded there is insufficient data to warrant a revision to the previous guidance, and that 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 would be determined using an interest rate equal to the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057), reduced arithmetically by 60 bps, in conjunction with CPM2014Proj.

The above guidance applies to valuations with effective dates on and after March 31, 2017, up to December 30, 2017, pending any further guidance or other evidence of change in annuity pricing.

#### **Example**

As at March 31, 2017, the unadjusted yield on Government of Canada real-return long-term bonds (CANSIM series V39057) was 0.68%. Therefore, an applicable underlying discount rate would be determined as  $0.68\% - 0.60\% = 0.08\%$ .

#### **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 for such

situations consistent with the guidance provided in the annual educational note dated March 1, 2017, modified to reflect the revised guidance contained in this memo.

### Validity of March 1, 2017 Educational Note

Except as noted above, actuaries would continue to reference the March 1, 2017 [educational note](#) for guidance with respect to the selection of assumptions for hypothetical wind-up and solvency valuations with effective dates between December 31, 2016 and December 30, 2017. In particular, the educational note continues to apply with respect to the following:

- Rounding of the interest rate resulting from following the guidance;
- Application to both immediate and deferred pensions and the overall size of the group annuity purchase;
- Mortality basis, which remains the 2014 Combined Canadian Pensioners' Mortality Table (CPM2014) in conjunction with the CPM Improvement Table B (CPM-B) with no mortality adjustments (CPM2014Proj); and
- Mortality adjustments, 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.

### Actual Annuity Pricing

The purpose of this educational note supplement 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 and the factors outlined in the section of the March 1, 2017 educational note titled Mortality Adjustments, some of the other factors that may affect pricing of a particular purchase include, but are not limited to, the following:

- 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.

### Retroactive Application

If an actuary has already prepared a funding valuation report with an effective date on or after March 31, 2017, before the publication of this guidance, the actuary would consider paragraphs 1820.30 through 1820.36 of the Standards of Practice to determine whether it is necessary to withdraw or amend the report.

### Additional Comments

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 March 31, 2017, up to December 30, 2017, pending any future guidance or other evidence of change in annuity pricing.

As part of this quarterly review, the PFFRC requested information from insurers as to whether an illustrative block of business that is half the size or five times the size, but keeping the same average pension and profile as the current illustrative block, would have a significant impact on price. Based on the information collected, the PFFRC does not currently believe that the guidance should be revised to reflect differing pricing for these modified blocks.

It may be noted that the spreads versus GoC long-term bonds for group annuity pricing have been volatile during the past three to four years. Actuaries may wish to be mindful of this volatility when communicating advice related to future hypothetical wind-up and solvency valuations.

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## Appendix A – Summary and Links for Historical Guidance

The following is a summary of the historical guidance issued by the PFRRC. 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 <sup>1</sup>	Non-indexed Immediate and Deferred <i>Duration: Spread relative to unadjusted CANSIM V39062</i>			Fully CPI-Indexed <i>Spread relative to unadjusted CANSIM V39057</i>
		Low duration	Medium duration	High duration	All durations
Mar 31, 2017	CPM2014Proj	8.5: + 70 bps	11.0: + 100 bps	13.5: + 110 bps	- 60 bps
<a href="#">Dec 31, 2016</a>	CPM2014Proj	8.5: + 70 bps	11.0: + 90 bps	13.5: + 100 bps	- 60 bps
<a href="#">Sep 30, 2016</a>	CPM2014Proj	8.7: + 80 bps	11.4: + 110 bps	14.0: + 120 bps	- 70 bps
<a href="#">Jun 30, 2016</a>	CPM2014Proj	8.6: + 90 bps	11.3: + 120 bps	13.8: + 130 bps	- 70 bps
<a href="#">Mar 31, 2016</a>	CPM2014Proj	8.5: + 90 bps	11.1: + 120 bps	13.6: + 130 bps	- 70 bps
<a href="#">Dec 31, 2015</a>	CPM2014Proj	8.5: + 60 bps	11.1: + 100 bps	13.6: + 110 bps	- 70 bps
<a href="#">Sep 30, 2015</a>	CPM2014Proj	8.4: + 80 bps	11.0: + 110 bps	13.4: + 120 bps	- 70 bps
<a href="#">Jun 30, 2015</a>	UP94Proj	8.3: - 20 bps	10.9: + 30 bps	13.6: + 60 bps	- 120 bps
<a href="#">Mar 31, 2015</a>	UP94Proj	8.5: + 0 bps	11.3: + 30 bps	14.0: + 60 bps	- 120 bps
<a href="#">Dec 31, 2014</a>	UP94Proj	8.2: + 0 bps	10.9: + 30 bps	13.5: + 60 bps	- 120 bps
<a href="#">Sep 30, 2014</a>	UP94Proj	8.1: + 0 bps	10.6: + 30 bps	13.2: + 50 bps	- 120 bps
<a href="#">Jun 30, 2014</a>	UP94Proj	8.0: + 0 bps	10.5: + 40 bps	12.9: + 60 bps	- 110 bps
<a href="#">Mar 31, 2014</a>	UP94Proj	7.7: + 50 bps	10.1: + 80 bps	12.3: + 100 bps	- 100 bps
<a href="#">Dec 31, 2013</a>	UP94Proj	7.6: + 50 bps	9.5: + 70 bps	12.1: + 80 bps	- 110 bps
<a href="#">Sep 30, 2013</a>	UP94Proj	7.6: + 50 bps	9.9: + 80 bps	12.2: + 90 bps	- 100 bps
<a href="#">Jun 30, 2013</a>	UP94Proj	7.7: + 40 bps	10.2: + 60 bps	12.5: + 70 bps	- 120 bps

Ed. Note / Supplement	Mortality table	Non-indexed <i>Spread relative to unadjusted CANSIM V39062</i>		Fully CPI-Indexed <i>Spread relative to unadjusted CANSIM V39057</i>
		Immediate	Deferred	All purchase sizes
<a href="#">Mar 31, 2013</a>	UP94Proj		+ 70 bps	+ 0 bps
<a href="#">Dec 31, 2012</a>	UP94Proj		+ 70 bps	+ 0 bps
<a href="#">Sep 30, 2012</a>	UP94Proj		+ 70 bps	+ 0 bps
<a href="#">Jun 30, 2012</a>	UP94Proj		+ 80 bps	+ 0 bps
<a href="#">Mar 31, 2012</a>	UP94Proj		+ 90 bps	+ 0 bps
<a href="#">Dec 31, 2011</a>	UP94Proj		+ 90 bps	+ 0 bps
<a href="#">Sep 30, 2011</a>	UP94Proj		+ 90 bps	+ 0 bps
<a href="#">Jun 30, 2011</a>	UP94Proj		+ 70 bps	+ 0 bps
<a href="#">Mar 31, 2011</a>	UP94Proj		+ 70 bps	+ 0 bps
<a href="#">Dec 31, 2010</a>	UP94@2020		+ 100 bps	+ 0 bps
<a href="#">Sep 30, 2010</a>	UP94@2020		+ 110 bps	+ 0 bps

<sup>1</sup> "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.

<a href="#">Jun 30, 2010</a>	UP94@2020	+ 70 bps		+ 0 bps
<a href="#">Mar 31, 2010</a>	UP94@2020	+ 40 bps		+ 0 bps
<a href="#">Dec 31, 2009</a>	UP94@2020	+ 40 bps		+ 0 bps
<a href="#">Jul 31, 2009</a>	UP94@2015	+ 10 bps to + 50 bps <sup>2</sup>		- 40 bps to + 0 bps <sup>2</sup>
<a href="#">Oct 31, 2008</a>	UP94@2015	+ 100 bps to + 140 bps <sup>2</sup>	+ 100 bps	- 40 bps to + 0 bps <sup>2</sup>
<a href="#">Feb 29, 2008</a>	UP94@2015	+ 70 bps to + 110 bps <sup>2</sup>	+ 70 bps	- 40 bps to + 0 bps <sup>2</sup>

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<sup>2</sup> 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.