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Educational Note

Section 3500 of the Practice-Specific Standards for Pension Plans – Pension Commuted Values (other than Subsection 3570)

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Committee on Pension Plan Financial Reporting

August 2020

Document 220124

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The actuary should be familiar with relevant educational notes. They do not constitute standards of practice and are, therefore, not binding. They are, however, intended to illustrate the application of the Standards of Practice, so there should be no conflict between them. The actuary should note however 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. Responsibility for the manner of application of standards of practice in specific circumstances remains that of the members. As standards of practice evolve, an educational note may not reference the most current version of the Standards of Practice; and as such, the actuary should cross-reference with current Standards. To assist the actuary, the CIA website contains an up-to-date reference document of impending changes to update educational notes.

MEMORANDUM

To: All Pension Actuaries

From: Steven W. Easson, Chair
Actuarial Guidance Council

Jared Mickall, Chair
Committee on Pension Plan Financial Reporting

Date: August 13, 2020

Subject: **Educational Note – Section 3500 of the Practice-Specific Standards for Pension Plans – Pension Commuted Values (other than subsection 3570)**

Introduction

The purpose of this educational note is to provide guidance to actuaries for determining commuted values for pension plans that are not covered under subsection 3570. A separate educational note has been prepared for subsection 3570. This educational note was developed based on input from the Actuarial Standards Board through the designated group and based on questions submitted to the Committee on Pension Plan Financial Reporting (PPFRC) after the release of the revised Section 3500 of the Practice-Specific Standards for Pension Plans – Pension Commuted Values on January 24, 2020. This educational note also reflects the revised effective date of December 1, 2020 and the revision to paragraph 3520.06.2, announced by the Actuarial Standards Board in the July 20, 2020 memorandum.

The creation of this cover letter and educational note has followed the Actuarial Guidance Council's (AGC's) protocol for the adoption of educational notes. 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 PPFRC and has received final approval for distribution by the AGC on August 11, 2020.

The actuary should be familiar with relevant educational notes. They do not constitute standards of practice and are, therefore, not binding. They are, however, intended to illustrate the application of the Standards of Practice, so there should be no conflict between them. The actuary should note however 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. Responsibility for the manner of application of standards of practice in specific circumstances remains that of the members. As standards of practice evolve, an

educational note may not reference the most current version of the Standards of Practice; and as such, the actuary should cross-reference with current Standards. To assist the actuary, the CIA website contains an up-to-date reference document of impending changes to update educational notes.

Guidance to Members on Specific Situations

From time to time, Canadian Institute of Actuaries (CIA) members seek advice or guidance from PPFRC. Both the CIA and PPFRC strongly encourage such dialogue. CIA members would be assured that it is proper and appropriate for them to consult with the chair or vice-chair of PPFRC.

CIA members are reminded that responses provided by PPFRC are intended to assist them in interpreting the CIA Standards of Practice, educational notes, and Rules of Professional Conduct, in assessing the appropriateness of certain techniques or assumptions. A response from PPFRC does not constitute a formal opinion as to whether the work in question is in compliance with the CIA Standards of Practice. Guidance provided by PPFRC is not binding upon the members.

Recent Guidance

The revised standards (and the red-lined version) and the rationale for the amendments to Section 3500, as well as for the addition of the new Subsection 3570, are addressed in the January 24, 2020 memorandum: Final Standards – Amendments to Section 3500 of the Practice-Specific Standards for Pension Plans – Pension Commuted Values, as updated in the July 20, 2020 memorandum.

The contents of this educational note are as follows:

1. Assumed pension commencement age
    a) Application of Paragraphs 3530.06, 3530.06.1 and 3530.06.2
    b) Application of Paragraph 3530.06.3
    c) Members eligible to retire
    d) Other considerations for pension commencement age
    e) Small Benefit Commutation
    f) 50% Excess Cost Sharing Rule
2. Family composition
3. Alternative indexing formulas
    a) Application of Paragraph 3540.16
    b) Application of Paragraph 3540.16.1
4. Other considerations

Questions or comments regarding this educational note may be directed to Jared Mickall, Chair of the PPFRC, at Jared.Mickall@mercer.com.

SWE, JM

1. Assumed pension commencement age

1. a) Application of Paragraphs 3530.06, 3530.06.1 and 3530.06.2

Section 3500 outlines principles to value a pension for which a liquid market does not exist. The concepts outlined in Section 3500 provide the framework for valuing this promise. Within that framework an assumption for the pension commencement age is required. The revisions to Section 3500 now require a different assumption for the commencement age than was used prior to the revisions.

Under Section 3500 before December 1, 2020, the commuted value is based on an assumption that the pension commences as at an assumed retirement age that maximizes the value; the "Optimal Retirement Date" (ORD). This is required even if the commuted value of the immediate pension entitlement is less than the commuted value of the pension based on the ORD.

Under Section 3500 effective December 1, 2020, the commuted value is based on an assumption that requires (Paragraph 3530.06) the value be determined with 50% weight on value assuming the ORD and a 50% weight on the value assuming *"...that retirement will occur at the earliest age at which the plan member will be entitled to an unreduced lifetime pension."* (earliest unreduced retirement date (EURD)).

With respect to the determination of an unreduced lifetime pension for the purpose of Paragraph 3530.06, where the terms of the plan are such that the earliest age at which the plan member will be entitled to an unreduced lifetime pension is later than the date the member will effectively receive an unreduced lifetime pension from the plan when the lifetime and non-lifetime pensions are viewed together (the "effective unreduced date") then the EURD to determine a commuted value would be the effective unreduced date.

The methodology, outlined in Paragraph 3530.06, recognizes that a member who elects the commuted value has an unknown pension commencement date.

Examples below outline the application of Paragraphs 3530.06 and 3530.06.1–3530.06.2. It is possible that plan provisions exist such that the calculation concepts illustrated below result in a commuted value, for different service periods, that when added together exceed the commuted value at the ORD in aggregate. In these circumstances, as illustrated in the examples below, it would not be appropriate to limit the commuted value to the value at the ORD age.

The examples assume:

- 2014 Canadian Pensioners' Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B) (sex-distinct);
- Male who terminates plan membership in 2020; and
- Discount rate of 3.5% per year.

For illustration purposes, the examples were prepared using integer ages. In practice the calculations could be done using more granular ages (e.g., on a monthly basis). The examples are based on a set of economic and demographic assumptions to outline the application of Section 3500. A different set of economic and demographic assumptions could lead to different results; however, the application of Section 3500 would be the same.

Example 1

Example 1 outlines how the methodology in 3530.06 would be applied to the following member data and plan provisions:

- A member is age 50 with 12 years of service;
- The accrued pension payable at age 65 of $3,000 per month payable for the life of the member; and
- The early retirement reduction, for early commencement, the member is entitled to is 4% per year for each year prior to age 62.

The commuted value would reflect a 50% weighting at the ORD and a 50% weighting at the EURD (50%/50%) as illustrated in the table below:

Age	Monthly Accrued Pension (A)	Plan Early Retirement Reduction (B)	Reduced Monthly Pension (A) x (B) = (C)	Monthly Income Tax Act Limit	Income Tax Act Early Retirement Reduction (E)	Reduced Income Tax Act Limit (D) x (E) = (F)	Monthly Limited Pension Min. of (C, F) = (G)	Present Value Factor (H)	Value (G) x 12 x (H) = (I)
55	$ 3,000	0.72	$ 2,160	$ 3,092	0.88	$ 2,721	$ 2,160	15.8050	$ 409,700
56	$ 3,000	0.76	$ 2,280	$ 3,092	0.91	$ 2,814	$ 2,280	15.0289	$ 411,200
57	$ 3,000	0.80	$ 2,400	$ 3,092	0.94	$ 2,906	$ 2,400	14.2829	$ 411,300
58	$ 3,000	0.84	$ 2,520	$ 3,092	0.97	$ 2,999	$ 2,520	13.5657	$ 410,200
59	$ 3,000	0.88	$ 2,640	$ 3,092	1.00	$ 3,092	$ 2,640	12.8760	$ 407,900
60	$ 3,000	0.92	$ 2,760	$ 3,092	1.00	$ 3,092	$ 2,760	12.2121	$ 404,500
61	$ 3,000	0.96	$ 2,880	$ 3,092	1.00	$ 3,092	$ 2,880	11.5727	$ 400,000
62	$ 3,000	1.00	$ 3,000	$ 3,092	1.00	$ 3,092	$ 3,000	10.9562	$ 394,400
63	$ 3,000	1.00	$ 3,000	$ 3,092	1.00	$ 3,092	$ 3,000	10.3615	$ 373,000
64	$ 3,000	1.00	$ 3,000	$ 3,092	1.00	$ 3,092	$ 3,000	9.7880	$ 352,400
65	$ 3,000	1.00	$ 3,000	$ 3,092	1.00	$ 3,092	$ 3,000	9.2351	$ 332,500
								Value ORD:	$ 411,300
								Value EURD:	$ 394,400
								Commuted Value determined as 50% X Value ORD + 50% X Value EURD:	**$ 402,850**

Example 2

Many plans have different provisions for different periods of service. Paragraph 3530.06.1 requires that the retirement age used to determine the highest value of the pension (ORD) is a single age while the value of the pension at the first unreduced age is determined at the unreduced age for each period of service. The value of the pension at the EURD for each period of service would be determined and added together.

Example 2 outlines how the methodology would be applied to the following member data and plan provisions:

- A member is age 50 with 12 years of total service distributed as:

  - Eight years of period 1 service, and
  - Four years of period 2 service;
- The accrued pension payable at age 65 of $3,000 per month payable for the life of the member; and
- The early retirement reduction, for early commencement, the member is entitled to is:
  - For period 1 service: 4% per year for each year prior to age 62, and
  - For period 2 service: 4% per year for each year prior to age 65.

The commuted value would reflect the 50% weighting at the ORD and 50% weighting at the EURD for each period of service as illustrated in the table below:

Age	Monthly Accrued Pension (Period 1 / Period 2)	Plan Early Retirement Reduction	Reduced Monthly Pension	Monthly Income Tax Act Limit	Income Tax Act Early Retirement Reduction	Reduced Income Tax Act Limit	Monthly Limited Pension	Present Value Factor	Value
	(A)	(B)	(A) x (B) = (C)	(D)	(E)	(D) x (E) = (F)	Min. of (C , F) = (G)	(H)	(G) x 12 x (H) = (I)
55	$ 2,000	0.72	$ 1,440	$ 2,061	0.88	$ 1,814	$ 1,440	15.8050	$ 273,100
	1,000	0.60	600	1,031	0.88	907	600	15.8050	113,800
	$ 3,000		$ 2,040	$ 3,092		$ 2,721	$ 2,040		$ 386,900
56	$ 2,000	0.76	$ 1,520	$ 2,061	0.91	$ 1,876	$ 1,520	15.0289	$ 274,100
	1,000	0.64	640	1,031	0.91	938	640	15.0289	115,400
	$ 3,000		$ 2,160	$ 3,092		$ 2,814	$ 2,160		$ 389,500
57	$ 2,000	0.80	$ 1,600	$ 2,061	0.94	$ 1,938	$ 1,600	14.2829	$ 274,200
	1,000	0.68	680	1,031	0.94	969	680	14.2829	116,600
	$ 3,000		$ 2,280	$ 3,092		$ 2,906	$ 2,280		$ 390,800
58	$ 2,000	0.84	$ 1,680	$ 2,061	0.97	$ 1,999	$ 1,680	13.5657	$ 273,500
	1,000	0.72	720	1,031	0.97	1,000	720	13.5657	117,200
	$ 3,000		$ 2,400	$ 3,092		$ 2,999	$ [illegible]		$ 390,700
59	$ 2,000	0.88	$ 1,760	$ 2,061	1.00	$ 2,061	$ 1,760	12.8760	$ 271,900
	1,000	0.76	760	1,031	1.00	1,031	760	12.8760	117,400
	$ 3,000		$ 2,520	$ 3,092		$ 3,092	$ [illegible]		$ 389,300
60	$ 2,000	0.92	$ 1,840	$ 2,061	1.00	$ [illegible]	$ [illegible]	12.2121	$ 269,600
	1,000	0.80	800	1,031	1.00	[illegible]	800	12.2121	117,200
	$ 3,000		$ 2,640	$ 3,092		$ [illegible]	$ 2,640		$ 386,800
61	$ 2,000	0.96	$ 1,920	$ 2,061	1.00	$ [illegible]	1,920	11.5727	$ 266,600
	1,000	0.84	840	1,031	[illegible]	[illegible]	840	11.5727	116,700
	$ 3,000		$ 2,760	$ 3,092		3,092	$ 2,760		$ 383,300
62	$ 2,000	1.00	$ 2,000	$ 2,061	[illegible]	$ [illegible]	$ 2,000	10.9562	$ 262,900
	1,000	0.88	880	1,031	1.0[illegible]	1,031	880	10.9562	115,700
	$ 3,000		$ 2,880	$ 3,092		3,092	$ 2,880		$ 378,600
63	$ 2,000	1.00	$ 2,000	$ 2,061	[illegible]	$ 2,061	$ 2,000	10.3615	$ 248,700
	1,000	0.92	920	1,031	1.00	1,031	920	10.3615	114,400
	$ 3,000		$ 2,920	$ 3,092		$ 3,092	$ 2,920		$ 363,100
64	$ 2,000	1.00	$ 2,000	$ 2,061	1.00	$ 2,061	$ 2,000	9.7880	$ 234,900
	1,000	0.96	960	1,031	1.00	1,031	960	9.7880	112,800
	$ 3,000		$ [illegible]	$ 3,092		$ 3,092	$ 2,960		$ 347,700
65	$ 2,000	1.00	$ 2,0[illegible]	$ [illegible]	1.00	$ 2,061	$ 2,000	9.2351	$ 221,600
	1,000	1.00	1,0[illegible]	1,031	1.00	1,031	1,000	9.2351	110,800
	$ 3,000		$ [illegible],000	$ 3,092		$ 3,092	$ 3,000		$ 332,400
							Value ORD:	Period 1	$ 274,200
								Period 2	116,600
								Total	$ 390,800
							Value EURD:	Period 1	$ 262,900
								Period 2	$ 110,800
							Commuted Value determined as 50% X Value ORD Total + 50% X (Value EURD Period 1 + Value EURD Period 2):	**Total**	**$ 382,250**

Examples 3 and 4 outline how the methodology in Paragraph 3530.06.1 would be applied in combination with Paragraph 3530.06.2.

Example 3 (the same as Example 1 but limited to the Income Tax Act maximum pension)

The earliest unreduced age of the plan for a high income earner may be affected by the application of the Income Tax Act maximum pension limits in which case the EURD may be different in respect of a registered pension plan benefit.

Example 3a – Income Tax Act maximum at the date the member terminates from the plan

Example 3a uses the following member data and plan provisions:

- A member is age 50 with 12 years of service;
- The accrued pension payable at age 65 of $3,300 per month payable for the life of the member;
- The early retirement reduction, for early commencement, the member is entitled to is 4% per year for each year prior to age 62; and
- Income Tax Act maximum of $3,092 per year of service, at the date the member terminates from the plan. This maximum is reduced by 3% per year prior to the attainment of the earliest of age 60, 30 years of service or the sum of age and service equal to 80.

Example 3a illustrates that the relevant age, based on Paragraph 3530.06.2, is the first age at which the unreduced Income Tax Act maximum first limits the pension under the plan. This age is determined by the later of the following ages:

- the age the Income Tax Act maximum is first unreduced (age 59 when the member is expected to attain age plus service equal to 80); and
- the first age the pension is limited by the unreduced Income Tax Act maximum.

Example 3a outlines how this methodology would be applied as illustrated in the table below:

Age	Monthly Accrued Pension (A)	Plan Early Retirement Reduction (B)	Reduced Monthly Pension (C) = (A) x (B)	Monthly Income Tax Act Limit (D)	Income Tax Act Early Retirement Reduction (E)	Reduced Income Tax Act Limit (F) = (D) x (E)	Monthly Limited Pension (G) = Min. of (C, F)	Present Value Factor (H)	Value (I) = (G) x 12 x (H)
55	$ 3,300	0.72	$ 2,376	$ 3,092	0.88	$ 2,721	$ 2,376	15.8050	$ 450,600
56	$ 3,300	0.76	$ 2,508	$ 3,092	0.91	$ 2,814	$ 2,508	15.0289	$ 452,300
57	$ 3,300	0.80	$ 2,640	$ 3,092	0.94	$ 2,906	$ 2,640	14.2829	$ 452,500
58	$ 3,300	0.84	$ 2,772	$ 3,092	0.97	$ 2,999	$ 2,772	13.5657	$ 451,200
59	$ 3,300	0.88	$ 2,904	$ 3,092	1.00	$ 3,092	$ 2,904	12.8760	$ 448,700
60	$ 3,300	0.92	$ 3,036	$ 3,092	1.00	$ 3,092	$ 3,036	12.2121	$ 444,900
61	$ 3,300	0.96	$ 3,168	$ 3,092	1.00	$ 3,092	$ 3,092	11.5727	$ 429,400
62	$ 3,300	1.00	$ 3,300	$ 3,092	1.00	$ 3,092	$ 3,092	10.9562	$ 406,500
63	$ 3,300	1.00	$ 3,300	$ 3,092	1.00	$ 3,092	$ 3,092	10.3615	$ 384,500
64	$ 3,300	1.00	$ 3,300	$ 3,092	1.00	$ 3,092	$ 3,092	9.7880	$ 363,200
65	$ 3,300	1.00	$ 3,300	$ 3,092	1.00	$ 3,092	$ 3,092	9.2351	$ 342,700
								Value ORD:	$ 452,500
								Value EURD:	$ 429,400
								Commuted Value determined as 50% X Value ORD + 50% X Value EURD:	**$ 440,950**

As outlined in Example 3a, the age at which the pension is unreduced has changed from age 62 in Example 1 to age 61; the age at which the Income Tax Act maximum is not reduced for early commencement and is first limiting the pension.

Example 3b – Income Tax Act maximum at the date the member commences their pension from the plan

Example 3b uses the same member data and plan provisions as Example 3a with the exception that the Income Tax Act maximum is determined at the date the member commences their pension from the plan and for purposes of this example the Income Tax Act maximum in the year of termination was $2,455 per year of service. This maximum is reduced by 3% per year prior to the attainment of the earliest of age 60, 30 years of service or the sum of age and service equal to 80.

The example assumes that inflation is 1% per year and therefore the assumed increase applied to the Income Tax Act maximum is 2% per year producing a projected Income Tax Act maximum at age 55 of $2,711.

Example 3b illustrates that the relevant age, based on Paragraph 3530.06.2, is the first age at which the unreduced Income Tax Act maximum first limits the pension under the plan. This age is determined by the later of the following ages:

- the age the Income Tax Act maximum is first unreduced (age 59 when the member is expected to attain age plus service equal to 80), and
- the first age the pension is limited by the unreduced Income Tax Act maximum.

Example 3b outlines how this methodology would be applied as illustrated in the table below:

Age	Monthly Accrued Pension	Plan Early Retirement Reduction	Reduced Monthly Pension	Projected Monthly Income Tax Act Limit	Income Tax Act Early Retirement Reduction	Reduced Income Tax Act Limit	Monthly Limited Pension	Present Value Factor	Value
	(A)	(B)	(A) x (B) = (C)	(D)	(E)	(D) x (E) = (F)	Min. of (C , F) = (G)	(H)	(G) x 12 x (H) = (I)
55	$ 3,300	0.72	$ 2,376	$ 2,711	0.88	$ 2,385	$ 2,376	15.8050	$ 450,600
56	$ 3,300	0.76	$ 2,508	$ 2,765	0.91	$ 2,516	$ 2,508	15.0289	$ 452,300
57	$ 3,300	0.80	$ 2,640	$ 2,820	0.94	$ 2,651	$ 2,640	14.2829	$ 452,500
58	$ 3,300	0.84	$ 2,772	$ 2,876	0.97	$ 2,790	$ 2,772	13.5657	$ 451,200
59	$ 3,300	0.88	$ 2,904	$ 2,934	1.00	$ 2,934	$ 2,904	12.8760	$ 448,700
60	$ 3,300	0.92	$ 3,036	$ 2,993	1.00	$ 2,993	$ 2,993	12.2121	$ 438,600
61	$ 3,300	0.96	$ 3,168	$ 3,052	1.00	$ 3,052	$ 3,052	11.5727	$ 423,900
62	$ 3,300	1.00	$ 3,300	$ 3,114	1.00	$ 3,114	$ 3,114	10.9562	$ 409,300
63	$ 3,300	1.00	$ 3,300	$ 3,176	1.00	$ 3,176	$ 3,176	10.3615	$ 394,900
64	$ 3,300	1.00	$ 3,300	$ 3,239	1.00	$ 3,239	$ 3,239	9.7880	$ 380,500
65	$ 3,300	1.00	$ 3,300	$ 3,304	1.00	$ 3,304	$ 3,300	9.2351	$ 365,700
								Value ORD:	$ 452,500
								Value EURD:	$ 438,600
								Commuted Value determined as 50% X Value ORD + 50% X Value EURD:	**$ 445,550**

As outlined in Example 3b, the age at which the pension is unreduced has changed from age 62 in Example 1 to age 60; the age at which the Income Tax Act maximum is not reduced for early commencement and is first limiting the pension.

Example 4 (the same as Example 2 but limited to the Income Tax Act maximum pension)

Example 4a (Income Tax Act maximum applied in aggregate)

Example 4a outlines how the application of Paragraph 3530.06.2 would be applied when there are different periods of service with different early retirement reductions. Example 4a uses the following member data and plan provisions:

- A member is age 50 with 12 years of total service distributed as:
  - 8 years of period 1 service, and
  - 4 years of period 2 service;
- The accrued pension payable at age 65 of $3,300 per month payable for the life of the member;
- The early retirement reduction, for early commencement the member is entitled to is:
  - For period 1 service: 4% per year for each year prior to age 62, and
  - For period 2 service: 4% per year for each year prior to age 65;
- Income Tax Act maximum of $3,092 per year of service, at the date the member terminates from the plan. This maximum is reduced by 3% per year prior to the attainment of the earliest of age 60, 30 years of service or the sum of age and service equal to 80; and
- The Income Tax Act maximum according to the plan provisions applies to period 1 and period 2 service in aggregate.

In this example the Income Tax Act maximum is applied in aggregate (based on the plan provisions) and the age at which the pension is unreduced is age 62. For the purpose of determining the commuted value, the unreduced age for each respective period of service has effectively been replaced with a single unreduced age by the application of the Income Tax Act maximum (age 62 in this example). This is illustrated in the table below:

Age	Monthly Accrued Pension (Period 1 / Period 2) (A)	Plan Early Retirement Reduction (B)	Reduced Monthly Pension (A) x (B) = (C)	Monthly Income Tax Act Limit (D)	Income Tax Act Early Retirement Reduction (E)	Reduced Income Tax Act Limit (D) x (E) = (F)	Monthly Limited Pension Min. of (C Period 1 + C period 2 , F) = (G)	Present Value Factor (H)	Value (G) x 12 x (H) = (I)
55	$ 2,200 1,100 $ 3,300	0.72 0.60	$ 1,584 660 $ 2,244	$ 3,092	0.88	$ 2,721	$ 2,244	15.8050	$ 425,600
56	$ 2,200 1,100 $ 3,300	0.76 0.64	$ 1,672 704 $ 2,376	$ 3,092	0.91	$ 2,814	$ 2,376	15.0289	$ 428,500
57	$ 2,200 1,100 $ 3,300	0.80 0.68	$ 1,760 748 $ 2,508	$ 3,092	0.94	$ 2,906	$ 2,508	14.2829	$ 429,900
58	$ 2,200 1,100 $ 3,300	0.84 0.72	$ 1,848 792 $ 2,640	$ 3,092	0.97	$ 2,999	$ [illegible]	13.5657	$ 429,800
59	$ 2,200 1,100 $ 3,300	0.88 0.76	$ 1,936 836 $ 2,772	$ 3,092	1.00	$ 3,092	$ 2,772	12.8760	$ 428,300
60	$ 2,200 1,100 $ 3,300	0.92 0.80	$ 2,024 880 $ 2,904	$ 3,092	1.00	$ 3,092	$ 2,904	12.2121	$ 425,600
61	$ 2,200 1,100 $ 3,300	0.96 0.84	$ 2,112 924 $ 3,036	$ 3,092	1.00	$ 3,092	$ 3,036	11.5727	$ 421,600
62	$ 2,200 1,100 $ 3,300	1.00 0.88	$ 2,200 968 $ 3,168	$ 3,092	1.00	$ 3,092	$ 3,092	10.9562	$ 406,500
63	$ 2,200 1,100 $ 3,300	1.00 0.92	$ 2,200 1,012 $ 3,212	$ 3,092	1.00	$ 3,092	$ 3,092	10.3615	$ 384,500
64	$ 2,200 1,100 $ 3,300	1.00 0.96	$ 2,200 [illegible] $ 3,2[illegible]	$ 3,092	1.00	$ 3,092	$ 3,092	9.7880	$ 363,200
65	$ 2,200 1,100 $ 3,300	1.00 1.00	$ 2,2[illegible] [illegible]100 $ [illegible]300	$ 3,092	1.00	$ 3,092	$ 3,092	9.2351	$ 342,700
							Value ORD: Value EURD:		$ 429,900 $ 406,500
							Commuted Value determined as 50% X Value ORD Total + 50% X Value EURD:	**Total**	**$ 418,200**

Example 4b (the same as Example 4a but with the Income Tax Act maximum applied to each period of service separately)

The plan provisions may outline an application of the Income Tax Act maximum by period of service instead of in aggregate as illustrated in Example 4. In Example 4b below, the Income Tax Act maximum is applied by each period of service. In this case the EURD for each period of service becomes the earlier of the age the plan formula is unreduced or the age the plan is limited by the Income Tax Act maximum with no reduction applied.

In this example the Income Tax Act maximum is applied by separate period of service (based on the plan provisions). For period 1 service the age the unreduced Income Tax Act maximum first applies is age 61 and for period 2 service the age the unreduced Income Tax Act maximum first applies is age 64. The value of the pension at the EURD would be the sum of the value of the pension at the EURD for period 1 service added to the value of the pension at the EURD for period 2 service. This is illustrated in the table below:

Age	Monthly Accrued Pension (Period 1 / Period 2) (A)	Plan Early Retirement Reduction (B)	Reduced Monthly Pension (A) x (B) = (C)	Monthly Income Tax Act Limit (D)	Income Tax Act Early Retirement Reduction (E)	Reduced Income Tax Act Limit (D) x (E) = (F)	Monthly Limited Pension Min. of (C, F) = (G)	Present Value Factor (H)	Value (G) x 12 x (H) = (I)
55	$ 2,200	0.72	$ 1,584	$ 2,061	0.88	$ 1,814	$ [illegible]	15.8050	$ 300,400
	1,100	0.60	660	1,031	0.88	907	660	15.8050	125,200
	$ 3,300		$ 2,244	$ 3,092		$ 2,721	$ 2,244		$ 425,600
56	$ 2,200	0.76	$ 1,672	$ 2,061	0.91	$ 1,876	$ 1,672	15.0289	$ 301,500
	1,100	0.64	704	1,031	0.91	[illegible]	[illegible]	15.0289	127,000
	$ 3,300		$ 2,376	$ 3,092		$ [illegible]14	2,376		$ 428,500
57	$ 2,200	0.80	$ 1,760	$ 2,061	0.94	$ 1,9[illegible]	$ [illegible]760	14.2829	$ 301,700
	1,100	0.68	748	1,031	0.94	969	748	14.2829	128,200
	$ 3,300		$ 2,508	$ 3,092		$ [illegible]906	$ 2,508		$ 429,900
58	$ 2,200	0.84	$ 1,848	$ 2,061	0.97	$ 1,[illegible]99	$ 1,848	13.5657	$ 300,800
	1,100	0.72	792	1,031	0.97	[illegible]0	792	13.5657	128,900
	$ 3,300		$ 2,640	$ 3,092		$ 2,999	$ 2,640		$ 429,700
59	$ 2,200	0.88	$ 1,936	$ 2,061	1.00	$ 2,061	$ 1,936	12.8760	$ 299,100
	1,100	0.76	836	1,[illegible]1	[illegible]0	1,031	836	12.8760	129,200
	$ 3,300		$ 2,772	$ 3,092		$ 3,092	$ 2,772		$ 428,300
60	$ 2,200	0.92	$ 2,024	$ 2,061	1.00	$ 2,061	$ 2,024	12.2121	$ 296,600
	1,100	0.80	880	1,031	1.00	1,031	880	12.2121	129,000
	$ 3,300		$ 2,904	$ 3,092		$ 3,092	$ 2,904		$ 425,600
61	$ 2,200	0.96	$ [illegible]12	2,061	1.00	$ 2,061	$ 2,061	11.5727	$ 286,300
	1,100	0.84	9[illegible]	[illegible]031	1.00	1,031	924	11.5727	128,300
	$ 3,300		$ 3[illegible]	$ 3,092		$ 3,092	$ 2,985		$ 414,600
62	$ 2,200	1.00	$ 2,200	$ 2,061	1.00	$ 2,061	$ 2,061	10.9562	$ 271,000
	1,100	0.88	[illegible]968	1,031	1.00	1,031	968	10.9562	127,300
	$ 3,300		$ 3,[illegible]68	$ 3,092		$ 3,092	$ 3,029		$ 398,300
63	$ 2,200	1.00	$ 2,200	$ 2,061	1.00	$ 2,061	$ 2,061	10.3615	$ 256,300
	1,100	[illegible]92	1,012	1,031	1.00	1,031	1,012	10.3615	125,800
	$ 3,300		$ 3,212	$ 3,092		$ 3,092	$ 3,073		$ 382,100
64	$ 2,200	1.00	$ 2,200	$ 2,061	1.00	$ 2,061	$ 2,061	9.7880	$ 242,100
	1,100	0.96	1,056	1,031	1.00	1,031	1,031	9.7880	121,100
	$ 3,300		$ 3,256	$ 3,092		$ 3,092	$ 3,092		$ 363,200
65	$ 2,200	1.00	$ 2,200	$ 2,061	1.00	$ 2,061	$ 2,061	9.2351	$ 228,400
	1,100	1.00	1,100	1,031	1.00	1,031	1,031	9.2351	114,200
	$ 3,300		$ 3,300	$ 3,092		$ 3,092	$ 3,092		$ 342,600

Value ORD:	Period 1	$ 301,700
	Period 2	$ 128,200
	Total	$ 429,900
Value EURD:	Period 1	$ 286,300
	Period 2	$ 121,100

Commuted Value determined as 50% X Value ORD Total + 50% X (Value EURD Period 1 + Value EURD Period 2):	**Total**	**$ 418,650**

1. b) Application of Paragraph 3530.06.3

Paragraph 3530.06.3 provides that:

> *"However, where a right described in paragraph 3520.09 or 3530.06 is contingent upon an action that is within the member's control and where it is not reasonable to assume the retirement assumption determined in accordance with paragraph 3530.06 or where it is not reasonable to assume that the member will always act to maximize the value of the benefit under paragraph 3520.09, an appropriate assumption would be made for the likelihood and timing of such action. For example, where a member is continuing in employment and is entitled to an unreduced pension that commences upon termination of employment, it may not be reasonable to assume that the member will immediately terminate employment in order to become eligible for an immediate benefit. In determining the likelihood and timing of such action, group data may be used."*

When invoking Paragraph 3530.06.3 to deviate from what is otherwise provided in Section 3500, the rationale would be rooted in expected pension plan membership behaviour. In addition to the example included in Paragraph 3530.06.3, other situations which could be considered are where:

- specific research conducted with group data, such as a retirement experience study of deferred vested members, yields credible results that are inconsistent with the retirement assumption in Paragraph 3530.06;
- assigning a 50% probability that retirement will occur at the earliest age at which the plan member will be entitled to an unreduced lifetime pension from the registered plan may not be reasonable, for example, when a supplemental plan exists and provides a seamless extension of the registered pension plan for the member. In such a circumstance a member may not act to maximize their options under the registered pension plan when such action reduces the value of the overall pension entitlement payable with reference to the supplemental and registered plans in combination; or
- the form of pension payable from the registered pension plan is adjusted by plan provisions if the member's pension is affected by limits imposed by the Income Tax Act.

Inappropriate applications of Paragraph 3530.06.3, in the absence of the aforementioned justifications, would include:

- the use of a single pension commencement age where the pension plan has EURD provisions that differ by service period and the pension plan does not permit the member to commence the service period pensions at different dates. This is an example which, if applied, would alter the purpose of Section 3500; or
- the benefit and/or payment terms of a supplemental pension arrangement are such that assuming a pension commencement age based on both arrangements combined could result in a lower total value payable to the member.

1. c) Members eligible to retire

If the member is entitled to an immediate pension and, where the plan provisions permit, the member may elect a commuted value, then the same principles, outlined above, would be applied to determine the commuted value (i.e., reflecting the 50% weight at the ORD and 50% weight at the EURD).

Where applicable legislation or plan provisions require that the commuted value cannot be less than the present value of an immediate pension, the value calculated would be determined based on the applicable legislation or plan provisions and it would be in compliance with Section 3500.

1. d) Other considerations for pension commencement age

Determining the commuted value based on an assumption that the pension commences as at an assumed retirement age that maximizes the value could result in plan values being higher or lower than those determined under the standard. Determining a commuted value in this manner would be done only if directed by the terms of the plan or as required by applicable legislation. Further, the disclosure required under Paragraph 3550.04 would need to be adhered to.

When determining the value in accordance with Section 3500, the actuary would be aware of any regulatory constraints, legal terms of the plan and/or interaction of the Income Tax Act that may not permit the determination of a plan value that is different than the commuted value determined under the standard.

1. e) Small Benefit Commutation

As per paragraphs 3510.01–.02, the standards in Section 3500 apply to advice on the computation of commuted values, regardless of whether or not commutation is at the member's election or as well as whether or not the commuted value is locked-in. For small benefit commutations, the requirements of Section 3500 apply, including the pension commencement age assumption of 50% ORD and 50% EURD.

1. f) 50% Excess Cost Sharing Rule

For the purpose of determining excess contributions payable on retirement for a member who elects an immediate pension the actual retirement age would be used to calculate the commuted value.

When calculating the commuted value for a member who is eligible for an immediate pension, but has not yet made such an election and is considering a commuted value or deferred pension option, then for the purposes of the calculating the commuted value and determining any excess contributions payable associated with the commuted value or deferred pension, a pension commencement assumption under Paragraphs 3530.06, 3530.06.1 and 3530.06.2 would continue to be used as described earlier in this educational note.

For additional clarity, if a member is provided with both immediate pension payment options as well as commuted value and/or deferred pension options, the excess

contributions payable under the immediate pension option may differ from the excess contributions payable under the commuted value and deferred pension options.

Where the determination of the commuted value for 50% excess cost sharing for a member, as defined in the applicable legislation, differs from the calculation as per Section 3500, actuaries would follow the applicable legislation.

2. Family Composition Assumption

Paragraph 3530.05 provides that:

> *"Where the plan provides a contingent benefit to a plan member's spouse and a change in the member's marital status after the valuation date is relevant to the determination of the commuted value, an appropriate assumption should be made concerning the likelihood of there being an eligible spouse, and the age of that spouse, at the time of death."*

Reading Paragraphs 3530.05 and 3530.06, in combination, the commuted value could be determined by making an appropriate assumption regarding family composition separately at both the earliest unreduced retirement age and at the optimal age. Such appropriate family composition may be to reflect the same assumption at a future date taking into account the marital status at the calculation date. Other approaches may also be reasonable. For example, for determining the commuted value for a member that can choose to start their pension immediately and who is currently married it may be reasonable to assume the person will be married to the same spouse at a future age.

3. Pension escalation rate formulas

3. a) Application of Paragraph 3540.16

Paragraph 3540.16 provides that:

> *Where pension escalation rates are either modified by applying a maximum or minimum annual increase, with or without carry forward of excesses or deficiencies to later years, or modified by prohibiting a decrease in a year where the application of the formula would otherwise cause a decrease in pension, the pension escalation rates otherwise applicable would be adjusted, based on the likelihood of the modification causing a material change in the pension payable in any year. In determining such likelihood, the current economic environment as well as future expectations would be considered. Either a stochastic or deterministic analysis may be used to determine the pension escalation rates.*

In situations where pensions are partially indexed, contain a deferred component, or subject to further modification, the actuary would make appropriate provisions consistent with the guidance provided in this educational note. In estimating the impact of the pension escalation formula on future benefit payments, the actuary would normally consider both the implied rates of increase in the Consumer Price Index (CPI) determined in accordance with Paragraph 3540.09, as well as the expected volatility in future CPI.

Types of Partial Indexation Provisions

Since there are significant variations in the types of partial indexation provisions, 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 three scenarios:

i. *Percentage of CPI*: Where the indexation is a percentage of CPI without any offsets, caps, or floors, the rates of pension escalation would be determined by applying the partial indexing formula of the plan to those rates of increase in the CPI, determined in accordance with Paragraph 3540.09.

ii. *CPI, subject to a fixed cap*: If the cap is significantly greater than the implied rates of increase in CPI, determined in accordance with Paragraph 3540.09, the pension escalation rates would approach those of a fully indexed pension.

If the cap is relatively low compared to the implied rates of increase in CPI, the assumed pension escalation rates 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 implied rates of increase in CPI, an appropriate estimate of the impact of the cap on pension escalation rates would be determined. It would be appropriate to assume the cap has an impact on future escalation rates, where analysis suggests that the impact is material.

iii. *CPI, less an offset*:

If the offset is significantly greater than the implied rates of increase in CPI, determined in accordance with Paragraph 3540.09, it may be appropriate to assume the plan indexation provisions have no impact on future pension benefit payments.

In all other cases, it would be reasonable to assume that the plan indexation provisions would have an impact on future pension payments as there may be a likelihood that the inflation rate would exceed the offset in a number of future years. A comparison of just the implied rate of increase in CPI against the offset on the date of calculation could incorrectly assign no value to the indexation feature.

If the implied rates of increase in CPI are moderately below the offset, it would be unreasonable to assume no impact on future pension benefit payments. For example, if the implied rate of increase in CPI is 1.4% and a plan provides indexation based on the CPI increase less 1.5%, with a floor of 0%, it may be inappropriate to assign no value to the indexation feature.

Similarly, if the implied rates of increase in CPI are moderately above the offset, it would be reasonable to assume future pension benefit payments would increase by more than the difference between the implied rates of increase in CPI and the offset. For example, if the implied rate of increase in CPI is 1.6% and

a plan provides indexation based on the CPI increase less 1.5%, with a floor of 0%, it may be inappropriate to assign 0.1% per year to the indexation feature.

3. b) Application of Paragraph 3540.16.1

When determining the projected funded status in future years for the purposes of Paragraph 3540.16.1, the interest rates determined in accordance with Paragraph 3540.07 would be used as proxies for the rates of return on the pension fund. When projecting the funded status in future years under multiple scenarios, actuaries would ensure that the assumptions used in each projection are internally consistent, and consideration would be given to modelling of future employee and employer contributions.

4. Other considerations

When determining the value in accordance with Section 3500 the actuary would be aware of any regulatory constraints, legal terms of the plan and/or interaction of the Income Tax Act that may override the requirements of Section 3500 and subsection 1210 would apply.