MEMO

OPSEU Pension Trust   Fiducie du régime de retraite du SEFPO

To: Sponsors' Technical Working Group

From: OPTrust Actuarial Services

Date: February 15, 2018

Re: OPTrust Select – Sustainability Analysis

The purpose of this memo is to provide the results of OPTrust's sustainability analysis on the OPTrust Select ("Select") schedule of benefits. In addition, the memo provides the estimated retirement income from Select and government benefits at various earnings levels and provides commentary on the advantages and disadvantages of the plan design.

Benefit Design

Select provides lifetime retirement income at age 65. It is a "no frills" schedule of benefits within the OPSEU Plan with no guaranteed ancillary benefits. The following table outlines the key provisions:

Provision	Description
Contribution Rate	3.0% employee and 3.0% employer (total 6%)
Benefit Formula	0.6% x pensionable service x upgraded career average earnings
Earnings Upgrades	100% conditional indexing, dependent on OPSEU Plan's funded status
Early Retirement Benefits	None
Bridge Benefits/CPP Integration	None
Normal Form of Pension	Life only with refund of contributions guarantee
Inflation Protection	100% conditional indexing, dependent on OPSEU Plan's funded status

Appendix A provides details of the key design features and a comparison to the OPSEU Plan main schedule of benefits.

Sustainability Analysis

The review of the sustainability of Select involves a projection of contributions and expected benefits for an assumed group of members and based on various assumptions. A description of the plan design is provided below.

Given that Select has not yet been approved by the Sponsors and does not have any members, for purposes of this analysis we have used the active membership data from the December 31, 2016 valuation of the OPSEU Plan assuming these members join Select on January 1, 2017. The 43,575 active members have an average age of 45.1 and an estimated 2017 average salary of $62,998. For further details regarding the membership data, please refer to the December 31, 2016 valuation report.

We have used the same assumptions and methods used for the December 31, 2016 actuarial valuation of the OPSEU Plan with the following exceptions:

- The nominal discount rate has been determined such that the present value of future contributions is equal to or slightly exceeds the present value of future benefits and related non-investment expenses where the benefits reflect earnings upgrades of 2.0% p.a. and post-retirement cost-of-living increases of 2.0% p.a.

- An annual non-investment expense provision of $2 million over the next 30 years was included in respect of incremental costs associated with the additional members

- The retirement assumption reflects only the regular early retirement rates (i.e. 90-point and 60/20 rates are not applicable)

Note that given the benefit design, many of the OPSEU Plan valuation assumptions are not applicable. A summary of the relevant assumptions is provided in Appendix B.

The present value of future benefits has been increased by 1% in order to approximate the impact of the Canadian Institute of Actuaries' new mortality improvement scale (MI-2017). The Board of Trustees approved adoption of MI-2017 for the upcoming December 31, 2017 valuation of the OPSEU Pension Plan.

The following table shows the results of our analysis. The results under the Intended Benefits Scenario reflect both earnings upgrades and cost-of-living increases of 2.0% each year. The Core Benefits Scenario reflect no earnings upgrades or cost-of-living increases.

$ Millions	**Core Benefits**	**Intended Benefits**
Assets		
Present Value of Future Contributions	1,775	1,775
Liabilities		
Present Value of Future Benefits	1,319	1,741
Present Value of Expected Expenses	29	29
Total Expected Liabilities	1,348	1,770
Funding Cushion	427	5
Probability of Contributions Sustaining the Benefits*	84%	57%

* *Based on Willis Towers Watson's investment model as of September 30, 2017 and reflecting the asset mix consistent with OPTrust's Long-Term Acceptable Risk portfolio (LTARP). Please refer to the December 31, 2016 valuation report for information regarding the asset mix for OPTrust's LTARP.*

The above table shows that the core benefit can be provided with a high degree of probability (84%) – using a 3.85% nominal discount rate, the present value of future contributions slightly exceeds the total expected liabilities. The intent is to provide indexation so long as the funded status permits. This design allows for risk sharing among active members, retired members and employers while at the same time guaranteeing a minimum benefit.

The results presented in this letter have been developed using a particular set of actuarial assumptions. The actual sustainability of Select will depend on plan demographics and investment return which are not known at this time.

Benefit Design Advantages and Disadvantages

The advantages of this design are as follows:

1. A high degree of risk sharing between members and employers
   - Career Average Plan with earnings upgrades that are intended to be paid, but dependent on the OPSEU Plan's funded position
2. Some degree of risk sharing with retirees

- Cost of living increases intended to be paid, but dependent on the OPSEU Plan's funded position

3. More predictable benefit and in turn costs
   - Not based on unknown earnings near retirement
   - Higher level of equity among groups of members
   - Early retirement windows can be negotiated
4. Reasonable income replacement ratio for most members when combined with government benefits

The disadvantages of this design are as follows:

1. May limit human resource management flexibility
   - Relatively lower income replacement ratio for higher earners compared to higher earners in the existing OPSEU Plan schedule of benefits (no CPP integration)
   - Early retirement windows can be expensive if pension plan is used to downsize workforce – no pre-funding of unreduced early retirement prior to age 65

Retirement Income Replacement Analysis

1. Government Retirement Benefits
   The CPP and other social security benefits are designed to ensure a secure post retirement income for low earners. The following chart approximates how much CPP and OAS is provided annually (based on January 1, 2018 levels) given various pre-retirement incomes:

Final Salary	$40,000	$50,000	$60,000	$70,000
Approximate Basic CPP Income	$9,739	$12,174	$13,610	$13,610
Approximate Enhanced CPP Income	3,246	4,057	5,868	7,077
Maximum OAS Income	7,040	7,040	7,040	7,040
Retirement Income CPP & OAS	$20,025	$23,271	$26,518	$27,727
Social Security Income Replacement Ratio at 65	50%	47%	44%	40%

The table shows that the lower the income, the higher the replacement ratio. Members with higher pre-retirement incomes will require more savings and higher pensions to maintain their pre-retirement standard of living.

2. Government plus OPTrust Select Benefits
   The following chart outlines the annual retirement income including CPP, OAS and the proposed OPTrust Select benefits. For this illustration, earnings are assumed to increase by 2.5% each year and the OPT Select benefit reflects earnings upgrades of 2.0% each year. The member is assumed to contribute to the CPP for their full career at a level consistent with final salary. The CPP figures have been calculated based on the enhanced benefits that will be phased in beginning in 2019.

Final Salary	$40,000	$50,000	$60,000	$70,000
Retirement Income CPP & OAS	$20,025	$23,271	$26,518	$27,727
OPT Select (25 years of service credit)	5,662	7,077	8,492	9,908
Total Retirement Income	$25,687	$30,348	$35,010	$37,635
Income Replacement Ratio at 65	64%	61%	58%	54%

The replacement ratios for the target group of members is more than 50% of their pre-retirement earnings. This is a significant income replacement amount, although some members may still require additional savings.

Actuarial Opinion

In our opinion, for the purpose of the analysis:

- The membership data on which the calculations are based are sufficient and reliable;
- The assumptions are appropriate and have been determined in accordance with OPTrust's funding objectives; and
- The methods employed are appropriate and have been determined in accordance with OPTrust's funding objectives.

This letter has been prepared, and our opinion has been given, in accordance with accepted actuarial practice in Canada.

With the exception of the Board of Trustees adoption of the new mortality improvement scale, we are not aware of any other events which occurred subsequent to the calculation date that would materially change the results presented in this memo on or after the calculation date.

Limitation of Work

The information contained in this memo was prepared by the OPTrust Actuarial Services Department for the exclusive use of the OPSEU Plan Sponsors as part of its review of the OPTrust Select proposal. This memo should not be used for purposes other than those listed above, distributed to persons other than the intended users or relied upon by any other person without prior written consent of OPTrust.

Yours sincerely,

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Appendix A – Comparison of OPTrust Select and OPSEU Plan Provisions

Plan Features	OPTrust Select	OPSEU Plan
Eligibility for Enrolment	Mandatory enrolment for employees who earn more than half the YMPE. Optional enrolment for employees who earn less than half the YMPE in the previous 2 calendar years.	Mandatory enrolment for permanent employees and optional enrolment for fixed-term and casual employees.
Pension formula	0.6% of upgraded career average earnings for each year of pension service.	1.345% of best five-year average salary up to the average YMPE and 2% above the average YMPE for each year of pension service.
Average salary	Upgraded career average earnings based on full time salary rate, excluding overtime and bonuses. Upgraded earnings is not guaranteed and will be determined by the Board annually on an ad hoc basis. Upgrades can range from 0-100% of the increase in Average Industrial Wage (AIW).	Highest consecutive five-year (60 month) average, based on full time salary rate, excluding overtime and bonuses.
Average YMPE	Not applicable.	Five-year average.
Bridge benefit (payable to age 65)	Not applicable.	0.655% of average salary up to the average YMPE for each year of credited service (max 35 years).
Normal retirement date	Age 65.	Age 65.
Earliest retirement date	Age 55.	Age 55 (may be earlier if member has attained the 90 factor).
Earliest unreduced retirement date	Age 65.	90 factor (age plus qualifying service equals 90) or 60/20 factor (age 60 with 20 years of qualifying service).
Early retirement reduction factor	Actuarial reduction	A 5% reduction is applied for each year prior to normal retirement age of 65. Partial years are prorated accordingly. No reduction if 90 or 60/20 factor is reached.
Inflation protection	Inflation protection is not guaranteed and will be determined by the Board annually on an ad hoc basis. Inflation protection can range from 0-100% of the previous year's Consumer Price Index (CPI).	Inflation protection is guaranteed. Pensions and deferred pensions are increased every January at 100% of CPI, averaged over 24 months. Inflation protection applies to all service and is capped at 8% per year with a carry forward provision.

Plan Features	OPTrust Select	OPSEU Plan
Normal form of pension	Lifetime pension with refund of contributions guarantee.	Lifetime pension with refund of contributions guarantee.
Survivor benefits	A survivor pension equal to 60% of the member's lifetime pension is available to an eligible spouse but member's pension must be actuarially reduced to provide this.	Eligible spouse at retirement receives a survivor pension equal to 60% of the member's lifetime pension, payable for the spouse's lifetime with no reduction to the member's pension. If no eligible spouse, a survivor pension may be payable to an eligible child.
Optional form(s) of pension	A spousal survivor pension may be increased to 65%, 70% or 75% of the member's lifetime pension but member's pension is subject to an additional actuarial reduction.	A spousal survivor pension may be increased to 65%, 70% or 75% of the member's lifetime pension but member's pension is subject to an actuarial reduction.
Postponed retirement after normal retirement date	Unreduced lifetime pension is payable starting at age 65 but members can continue to accrue service until the end of the year in which they turn 71 if they continue working past age 65.	Unreduced lifetime pension is payable starting at age 65 but members can continue to accrue service until the end of the year in which they turn 71 if they continue working past age 65.
Disability benefits	Not applicable.	A member with 10 or more years of credit or continuous membership who is totally and permanent disabled can receive a disability pension. The disability benefit is the member's accrued pension at termination, with no early reduction factor applied.
Pre-retirement death Benefits	Eligible spouse or beneficiary is entitled to receive the lump sum value of the member's pension. A surviving spouse may elect to receive this as a lump sum or in the form of an immediate or deferred pension.	Eligible spouse or beneficiary is entitled to receive the lump sum value of the member's pension for post-1986 service. A surviving spouse may elect to receive this as a lump sum or in the form of an immediate or deferred pension. For pre-1987 service survivors receive either a pension or refund of contributions.
Post-retirement death benefits	A surviving eligible spouse is entitled to a lifetime pension equal to 60%, 65%, 70% or 75% of the member's pension, depending on the form of pension the member chose at retirement. Upon the death of the surviving spouse, or if the member had no spouse, a residual balance equal to the total contributions with interest up to date of retirement minus the total pension payments received by the member and their survivors is payable in a	A surviving eligible spouse is entitled to a lifetime pension equal to 60%, 65%, 70% or 75% of the member's pension, depending on the form of pension the member chose at retirement. Upon the death of the surviving spouse, or if the member had no spouse, a residual balance equal to the total contributions with interest up to date of retirement minus the total pension payments received by the member and their survivors is payable in a

Plan Features	OPTrust Select	OPSEU Plan
	lump sum to the member's beneficiary or estate.	lump sum to the member's beneficiary or estate.
Return to work after retirement at a participating employer	If a pensioner rejoins the plan, their pension is suspended. At subsequent retirement, their pension is recalculated to include the re-employment period.	Re-employed pensioners who do not rejoin the plan, are subject to maximum re-employment earnings each calendar quarter. If they exceed the maximum, their pension income in subsequent quarters is reduced. If they rejoin the plan, their pension is suspended. At subsequent retirement, their pension is recalculated to include the re-employment period.
Termination options	Options include: 1. Deferred Pension. 2. Transfer commuted value to a locked in retirement account or another pension plan (up to age 55 only). 3. Immediate Pension if age 55 or older (with a reduction). No reduction if member is 65.	Options include: 1. Deferred Pension. 2. Transfer commuted value to a locked in retirement account or another pension plan (up to age 55 only). 3. Immediate Pension if age 55 or older (usually with a reduction). No reduction if member has attained 90 or 60/20 factors or is 65.
Reciprocal transfer agreements	Not applicable.	Yes. Members may transfer the value of their benefits in or out of the Plan under the terms of a number of reciprocal transfer agreements.
Grow-in provisions	Not applicable.	Yes. Grow-in rights enable members who are involuntarily terminated without cause on or after July 1, 2012 to start receiving an early unreduced pension on their factor date, if they qualify for an early unreduced pension before age 65 *and* you have 55 points (age + credit, membership or continuous service) on the date of termination, as if their employment had continued to that date.
Post-retirement insured benefits	Not applicable.	Members who meet the eligibility criteria are eligible for post-retirement insured benefits.

Appendix B – Assumptions

The following actuarial assumptions were used in performing the analysis.

Economic Assumptions	
Price inflation (CPI)	2.00% p.a.
Discount rate	5.60% p.a.
Allowance for non-investment expenses	$2 million p.a. over next 30 years
Average members' salary increases	2.75% p.a. plus promotional scale (Table 1)
Interest on members' required contributions	3.00% p.a.
Demographic Assumptions	
Mortality	108% of CPM2014Priv, with mortality improvement scale CPM-B
Retirement	Age-related rates (Table 2)
Disability	No provision (membership continues)
Termination	
• rates	Age-related rates (Table 3)
• benefits	30% elect deferred annuity 70% elect commuted value (determined based on a discount rate of 2.00% and CPM2014, with mortality improvement scale CPM-B)

Table 1	
Years Of Service	**Promotional Scale**
1	4.00%
2	3.60%
3	3.20%
4	2.60%
5	2.10%
6	1.80%
7	1.60%
8	1.40%
9	1.20%
10	1.00%
11	0.80%
12	0.60%
13	0.60%
14	0.50%
15	0.50%
16	0.50%
17	0.50%
18	0.30%
19	0.30%
20	0.30%
21 and over	0.00%

Table 2	
Age	**Retirement Rates**
55	4.60%
56	1.97%
57	2.28%
58	2.59%
59	2.90%
60	5.82%
61	5.95%
62	6.07%
63	6.20%
64	11.46%
65	100.00%

Table 3	
Age	**Sample Termination Rates**
20	7.7%
25	6.3%
30	5.1%
35	4.1%
40	3.3%
45	2.7%
50	2.2%
55 and over	0%