

**ONTARIO PUBLIC SERVICE EMPLOYEES' UNION PENSION
PLAN**

Actuarial Valuation as at December 31, 2014

August 27, 2015

Registration Number 1012046

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TOWERS WATSON



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Introduction

Purpose

At the request of the Board of Trustees of the OPSEU Pension Trust ("OPTrust"), we have prepared this report, which presents the results of the actuarial valuation of the Ontario Public Service Employees' Union Pension Plan (the "Plan") as at December 31, 2014.

The principal purposes of the report are:

- to present information on the financial position of the plan on both going concern and solvency bases;
- to review the hypothetical windup status of the plan;
- to establish the statutory contribution requirements in each plan year until the next actuarial valuation; and
- to provide certain additional information required for the administration of the plan.

This report outlines the changes in the plan's financial situation since the previous actuarial valuation at December 31, 2013, provides the information and the actuarial opinion required by the *Pension Benefits Act (Ontario)* and Regulation thereto ("PBA") and provides the information required to maintain plan registration under the *Income Tax Act (Canada)* and Regulations thereto ("ITA").

The Ontario Public Service Employees' Union Pension Plan is a Jointly Sponsored Pension Plan ("JSPP"). The Plan's funding policy includes the use of Rate Stabilization Reserves ("RSRs") to help achieve contribution and benefit stability.

This report summarizes the results of the actuarial valuation and contains an actuarial opinion as an integral part of the report. Supporting detailed information on the significant terms of engagement, assets, actuarial basis, membership data and plan provisions is contained in the Appendices.

The information contained in this report was prepared for OPTrust, for its internal use and for filing with the Financial Services Commission of Ontario and the Canada Revenue Agency, in connection with the actuarial valuation of the plan prepared by Towers Watson Canada Inc. ("Towers Watson"). This report is not intended, nor necessarily suitable, for other parties or for other purposes. Further distribution of all or part of this report to other parties (except where such distribution is required by applicable legislation) or other use of this report is expressly prohibited without Towers Watson's prior written consent. Towers Watson is available to provide additional information with respect to this report to the above-mentioned intended users upon request.

Significant Events Since Previous Actuarial Valuation

Actuarial Basis

Since the last actuarial valuation, the following changes have been made to the going concern actuarial basis:

- the mortality assumption was updated to reflect an updated mortality improvement scale and recent mortality experience;
- the long-term inflation assumption was decreased from 2.25% to 2.00% per annum and the other inflation-linked assumptions were adjusted accordingly;
- the termination settlement discount rate was decreased from 2.50% to 2.00% per annum; and
- the valuation discount rate was further decreased from 6.15% to 5.85% per annum.

Since the previous actuarial valuation, the assumptions used in the solvency and hypothetical windup valuations have been updated to reflect market conditions at the actuarial valuation date.

A summary of the actuarial bases and further details appear in Appendices 3A and 3B.

Plan Provisions

This actuarial valuation reflects the plan provisions as at December 31, 2014 and does not make any provision for the possibility that a change or action (retroactive or otherwise) may be imposed by order of a regulatory body or a court as we were not aware of any definitive events that would require such change or action at the time this actuarial valuation was completed.

OPTrust has negotiated transfer agreements with HOOPP, OMERS and the Ontario Pension Board to facilitate transfers for certain members who have been involved in a divestment prior to January 1, 2014 ("Section 80.1 transfers"). Other transfer agreements are under consideration. Under the agreements, members have a one-time opportunity to elect to consolidate their separate pension benefits in their successor pension plan. These transfers are expected to have an immaterial impact on the financial position of the OPSEU Pension Plan.

There have been no changes to the plan provisions since the previous actuarial valuation that have a material financial effect on the results of the actuarial valuation.

Subsequent Events

We completed this actuarial valuation on August 27, 2015.

In June 2015, the Canadian Institute of Actuaries released a final communication indicating the Actuarial Standards Board has promulgated an updated mortality assumption for commuted value purposes (2014 Combined Mortality Table with CPM Improvement Scale B) to be effective October 1, 2015. This change will be reflected in OPTrust's next valuation.

The heightened uncertainty in the economic environment has continued with an overall lowering of investment return expectations over the last few months. As a result, the margin reflected in the December 31, 2014 going concern funding valuation discount rate is considerably less than it was when set based on September 30, 2014 expectations. We believe a 3.85% real (5.85% nominal) funding valuation discount rate continues to be acceptable for OPTrust's December 31, 2014 valuation.

To the best of our knowledge, and on the basis of our discussions with OPTrust management, we are not aware of any other events which occurred between the valuation date and the date of this report which would have a material impact on the results of the valuation.

Section 1: Going Concern Financial Position

1.1 Statement of Financial Position

\$ millions

	December 31, 2014	December 31, 2013
Assets		
Smoothed value of assets	16,296	15,141
Present value of future contributions		
• Employer	2,629	2,553
• Member	2,485	2,405
Total present value of future contributions	5,114	4,958
Total assets	21,410	20,099
Liabilities		
Present value of total projected benefits		
• Active members	11,630	10,942
• Special deferred vested members	366	400
• Deferred vested members	341	301
• Pensioners and beneficiaries	8,495	7,766
• Former members with unprocessed benefits	142	81
Total present value of total projected benefits	20,974	19,490
Allowance for future strengthening of mortality assumption	n/a	190
Provision for future expenses	322	312
Rate Stabilization Reserves		
• Employer	104	98
• Member	10	9
Total Rate Stabilization Reserves	114	107
Total liabilities	21,410	20,099
Going concern funding surplus / (deficit)	0	0

Comments:

- The smoothed value of assets is based on the market value of \$17,481 million at December 31, 2014 as provided by OPTrust management.
- The provision for future expenses is based on \$23 million per year for 30 years.
- Information regarding the Rate Stabilization Reserves was provided by OPTrust management.
- The currently scheduled employer and member contributions meet the minimum contribution test described in Appendix 3A.
- There is no excess surplus as at December 31, 2014, as defined under paragraph 147.2(2)(d) of the ITA.
- The most critical of the actuarial assumptions is the choice of discount rate. By way of illustration, the going concern deficit would be \$3,449 million as at December 31, 2014 if the liability discount rate was reduced by 1% (i.e., from 5.85% to 4.85%). For purposes of this calculation, no changes were made to any of the other actuarial assumptions or actuarial methods.

1.2 Reconciliation of Financial Position

\$ millions

Going concern surplus (deficit) as at December 31, 2013		0
Interest on surplus (deficit)		<u>0</u>
Expected going concern surplus (deficit) as at December 31, 2014		0
Economic experience:		
● Net investment gain (loss) recognized	521	
● Salary increase less (greater) than expected	44	
● YMPE increase (less) greater than expected	(8)	
● COLA less (greater) than expected	<u>46</u>	603
Demographic experience:		
● Retirement experience	(42)	
● Net termination experience	(52)	
● Active mortality experience	3	
● Pensioner experience (including mortality experience)	(18)	
● Gain (loss) from new entrants	<u>73</u>	(36)
Change in actuarial basis:		
● Mortality assumption	(303)	
● Inflation (and linked assumptions)	(69)	
● Termination settlement discount rate	(104)	
● Discount rate	<u>(148)</u>	(624)
Other experience including data changes		<u>57</u>
Going concern surplus (deficit) as at December 31, 2014		0

1.3 Minimum Contribution Test

\$ millions

As at December 31, 2014	Modified Aggregate	Projected Unit Credit
Assets		
Smoothed value of assets	16,296	16,296
Liabilities		
Present value of accrued projected benefits		
• Active members	6,516	6,791
• Special deferred vested members	366	366
• Deferred vested members	341	341
• Pensioners and beneficiaries	8,495	8,495
• Former members with unprocessed benefits	142	142
Total present value of accrued projected benefits	15,860	16,135
Provision for future expenses	322	322
Rate Stabilization Reserves		
• Employer	104	104
• Member	10	10
Total Rate Stabilization Reserves	114	114
Total liabilities	16,296	16,571
Funding surplus / (deficit)	0	(275)
Allocation of RSRs to fund deficit	0	114
Remaining funding deficit	0	(161)
2015 scheduled contributions / normal cost	530	458
Comparison of contributions		
Present value of scheduled contributions / normal cost	6,645	5,753
Remaining deficiency to be funded	0	161
Total 16 year funding	6,645	5,914

Comments:

- The liabilities for active members under the modified aggregate cost method are net of the present value of future contributions.
- The scheduled contributions to the Plan over the next 16 years exceed the minimum required based on the minimum contribution test using the projected unit credit cost method (as described in Appendix 3A). As a result, the minimum contribution test has no impact on the Plan's funding requirements.

Section 2: Solvency and Hypothetical Windup Financial Position

2.1 Statement of Solvency Financial Position

\$ millions

	December 31, 2014	December 31, 2013
Solvency value of assets		
• Market value of assets	17,481	15,952
• Solvency asset adjustment	422	376
• Provision for plan windup expenses	(50)	(50)
Total solvency value of assets	17,853	16,278
Solvency liability		
• Active members	8,051	6,959
• Special deferred vested members	477	467
• Deferred vested members	414	299
• Pensioners and beneficiaries	9,361	7,770
• Former members with unprocessed benefits	165	81
Total solvency liability	18,468	15,576
Solvency surplus / (deficit) prior to application of Regulation 1.3.1(3)	(615)	702
Solvency deficit specified under Regulation 1.3.1(3)	0	N/A
Solvency funded ratio (Regulation 14(2))	0.95	1.02

Comments:

- The financial position of the Plan on a solvency basis is determined by comparing the solvency value of assets to the solvency liability (the actuarial present value of benefits accrued in respect of credited service prior to the actuarial valuation date, calculated as if the Plan were wound up on that date, excluding the value of future COLAs). No allowance was made for subsequent benefit changes which may become effective after the actuarial valuation date.

- The solvency asset adjustment is determined as the present value of scheduled contributions during the six year period following the valuation date (\$3,145 million) plus the present value of remaining special payments that were established in prior valuations (nil) less the present value of projected normal costs during the six year period following the valuation date determined based on the projected unit credit cost method as used for the minimum contribution test (\$2,723 million).
- The Regulation to the PBA permits certain benefits to be excluded from the solvency liability. Pursuant to the directions from OPTrust, the value of future COLAs have been excluded from the solvency valuation. The full solvency liability, taking into account all of the benefits excluded under the Regulation, is \$27,870 million as at December 31, 2014.
- Regulation 1.3.1(3) of the PBA allows any solvency deficit to be specified to zero. The Board has elected to specify the solvency deficiency as at December 31, 2014 to be zero.
- The solvency funded ratio (determined as the market value of assets divided by the total solvency liabilities) exceeds 0.85. OPTrust is currently exempt from the annual filing test (absent this exemption, a solvency funded ratio of at least 0.85 is required to avoid an annual filing requirement). The next report required to be filed is as at December 31, 2017.
- The increase in the solvency liability as at December 31, 2014, that would result from a 1% decrease in the assumed liability discount rate, is \$2,740 million. For purposes of this calculation, no changes were made to any of the other actuarial assumptions or actuarial methods.

2.2 Hypothetical Windup Financial Position

The hypothetical windup valuation results presented in this report are determined under the same scenario used for the solvency valuation.

If the Plan were to be wound up on the actuarial valuation date, the hypothetical windup value of assets would be equal to the market value of assets (net of a provision for windup expenses). As permitted by the Regulation to the PBA, the OPTrust has elected to exclude certain benefits (the value of future escalated COLAs) from the solvency liability. The full hypothetical windup liability, taking into account all of the benefits excluded under the Regulation, is \$27,870 million as at December 31, 2014. Consequently, the hypothetical windup surplus (unfunded hypothetical windup liability) as at the actuarial valuation date is \$(10,439) million.

The transfer ratio (determined as market value of assets divided by hypothetical windup liabilities) is 0.63 at December 31, 2014 (0.66 at December 31, 2013). As it is less than 1.00, restrictions are imposed on the lump sum transfers which may be made from the Plan until the next valuation is filed. In accordance with Regulation 19 of the PBA, this ratio should be monitored periodically and should the ratio fall below 0.57 (i.e., 90% of 0.63) before the next valuation report is filed, approval should be sought from the Superintendent of Pensions to continue to pay commuted values.

2.3 Windup Incremental Cost

The windup incremental cost for a given year represents the present value, at the actuarial valuation date, of the expected aggregate change in the windup liability during the year, excluding the impact of expected benefit payments during the year. The windup incremental costs in respect of each year between December 31, 2014 and December 31, 2017, the next actuarial valuation date (unless another report is filed in the interim), are derived from the projection of the windup liability, as follows:

\$ millions

	2015	2016	2017
Projected windup liability as at beginning of year	27,870	27,781	27,679
Windup incremental cost for the year	777	802	810
Interest on projected windup liability, windup incremental cost and expected benefit payments (at -0.17% p.a.)	(47)	(47)	(47)
Expected benefit payments during year	<u>(819)</u>	<u>(857)</u>	<u>(898)</u>
Projected windup liability as at end of year	27,781	27,679	27,544

Comments:

- The assumptions for the hypothetical windup liability projections for purposes of calculating the windup incremental cost are the same assumptions as those used in the hypothetical windup valuation. The projected population, benefits and members' contributions valued in the hypothetical windup liability projection are based on the demographic and benefit projection assumptions used for the going concern valuation described in Appendix 3A. No new members have been allowed for in these projections.
- The windup incremental costs shown above are as at the beginning of the year. The windup incremental cost, adjusted with interest (at -0.17% per annum) as at December 31, 2014, is \$803 million for 2016 and \$812 million for 2017.

Section 3: Contribution Requirements

3.1 Current Contributions

Employers and members are currently contributing 9.4% of salary up to the YMPE and 11.0% of salary in excess of the YMPE. These contributions are currently sufficient to fund the Plan and meet the minimum contribution requirement test as shown in Section 1.3.

In accordance with the Sponsorship Agreement between OPSEU and the Government of Ontario, emerging actuarial gains and losses are to be shared equally between the employer and member sponsors. Each sponsor decides how its share of any surplus or deficit generated as a result of actuarial gains (losses) is to be used or settled. For this valuation, the net actuarial gains (losses) were nil.

The current contributions reflected in this valuation meet the funding framework for the Plan which was agreed to between OPSEU and the Government of Ontario. The funding framework prohibits any increase in employer contributions over the period from December 31, 2012 to December 31, 2017.

Based on the December 31, 2014 membership, the estimated contributions to the Plan for 2015 to 2017 are shown below. These contributions are estimates only and are based on the assumption that salaries will increase by 2.75% per year and include any contributions made in respect of disabled members.

\$ millions

	2015	2016	2017
Employer contributions	265	272	279
Member contributions	265	272	279
Total contributions	530	544	558

3.2 Other Statutory Contributions

Additional contributions may be required in respect of the transfer values for members who terminate employment or active plan membership. Where applicable, such additional contributions must be remitted before the related transfer value may be paid in full to the terminated member.

3.3 Future Contribution Levels

Future contribution and/or benefit levels may be required to change as a result of future changes in the actuarial methods and assumptions, the membership data, the plan provisions and the legislative rules, or as a result of future experience gains or losses, none of which has been anticipated at this time. Emerging experience, differing from the assumptions, will result in gains or losses that will be revealed in future actuarial valuations.

Section 4: Actuarial Certification and Opinion

4.1 Actuarial Certification

Based on the results of these actuarial valuations, we hereby certify that, in our opinion, as at December 31, 2014:

- The Plan is fully funded on a going concern basis.
- The employer and member contributions for 2015 to 2017 are set out in Section 3.
- The solvency surplus (deficit), determined by comparing the solvency liability, as defined in the Regulation to the *Pension Benefits Act (Ontario)*, to the solvency value of assets, is \$(615) million.
- The hypothetical windup surplus (unfunded hypothetical windup liability), determined by comparing the hypothetical windup liability, the measure of the obligations of the Plan on a hypothetical windup basis including the value of any potential obligations that may have been excluded for purposes of the solvency valuation, to the hypothetical windup value of assets, is \$(10,439) million.
- The excess actuarial surplus, pursuant to section 147.2(2) of the *Income Tax Act (Canada)*, is \$0.
- The transfer ratio, as defined in the Regulation to the *Pension Benefits Act (Ontario)*, is 0.63. This transfer ratio takes precedence over any previously estimated transfer ratio as at December 31, 2014 filed with the Financial Services Commission of Ontario in accordance with Regulations 19(4) or 19(5).
- The solvency ratio, defined as the ratio of the solvency value of assets prior to deduction of the provision for plan windup expenses to the solvency liabilities, is 0.95.
- The prior year credit balance is \$0.
- There is no Guarantee Fund Assessment required under Section 37 of the Regulation to the *Pension Benefits Act (Ontario)*.
- In accordance with the Regulation to the *Pension Benefits Act (Ontario)*, the next actuarial valuation should be performed with an effective date not later than December 31, 2017. The basis for contributions presented in this report is effective until the next actuarial opinion is filed.
- The limitation imposed under Section 8504(6) of the Regulations to the Income Tax Act (Canada) has been applied in the determination of the benefits and liabilities set out in this report.

4.2 Actuarial Opinion

In our opinion:

- the membership data on which the actuarial valuations are based are sufficient and reliable for the purposes of the going concern, solvency and hypothetical windup valuations;
- the assumptions are appropriate for the purposes of the going concern, solvency and hypothetical windup valuations and have been determined in accordance with OPTrust's funding objectives;
- the methods employed in the actuarial valuations are appropriate for the purposes of the going concern, solvency and hypothetical windup valuations and have been determined in accordance with OPTrust's funding objectives; and
- the rates of contribution presented in this report, together with the Plan's assets and future investment earnings thereon, should be adequate to provide the benefits accruing under the Plan.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada. The actuarial valuations have been conducted in accordance with our understanding of the funding and solvency standards prescribed by the *Pension Benefits Act (Ontario)* and Regulation thereto, and in accordance with our understanding of the requirements of the *Income Tax Act (Canada)* and Regulations thereto. This actuarial opinion forms an integral part of the report.

The results presented in this report have been developed using a particular set of actuarial assumptions. Other results could have been developed by selecting different actuarial assumptions. The results presented in this report are reasonable actuarial results based on actuarial assumptions reflecting our expectation of future events.

Towers Watson Canada Inc.



Ian Markham
Fellow of the Canadian Institute of Actuaries



Laura Newman
Fellow of the Canadian Institute of Actuaries

Toronto, Ontario
August 27, 2015

Appendix 1: Assets

The December 31, 2014 market value and reconciliation of assets during the period from January 1, 2014 to December 31, 2014 are based on the OPTrust audited financial statements. We relied on this information in preparing this valuation.

Evolution of Assets

During the period from January 1, 2013 to December 31, 2014, the assets have evolved as follows:

\$ millions

	2014	2013
Market value at January 1	15,952	14,705
Contributions:		
• Employer	254	254
• Member	261	261
• Transfers in	14	24
Total contributions	529	539
Benefit payments:		
• Pension payments	(646)	(614)
• Lump sum payments	(66)	(106)
• Transfers out	(86)	(164)
Total benefit payments	(798)	(884)
Income:		
• Net investment income	1,818	1,615
• Operating expenses	(20)	(23)
Total earnings	1,798	1,592
Market value at December 31	17,481	15,952

Smoothed Asset Value

The following table shows the calculation of the smoothed asset value:

\$ millions					
Year	Actual Market Value	Expected Market Value	(Gain)/Loss	Percentage (gain)/loss deferred	Deferred (gain)/Loss
2014	17,481	16,635	(846)	80%	(676)
2013	15,952	15,245	(707)	60%	(423)
2012	14,705	14,351	(354)	40%	(142)
2011	13,703	13,984	281	20%	56
Smoothing adjustment					(1,185)

\$ millions	
Market value at December 31, 2014	17,481
Smoothing adjustment	(1,185)
Smoothed value of assets	16,296

The difference between the market value of assets and smoothed value of assets will be recognized in the smoothed value of assets in future valuations as follows:

\$ millions	
Year	Gains/(Losses) Recognized
2015	325
2016	381
2017	310
2018	169
	1,185

Rate of Return on Assets

The rates of return achieved on the OPTrust fund during the years 2010 through 2014 were as follows:

	2014	2013	2012	2011	2010
Market value of assets (net of investment expenses) *	11.50%	11.12%	9.11%	4.37%	12.90%
Smoothed asset value (net of investment expenses) *	9.63%	9.52%	6.70%	6.06%	7.00%

* Determined by prior actuary for 2012 and earlier years.

Note that the rates of return shown above may differ slightly from rates published in OPTrust's Annual Report. Different methods are used to calculate rates of return for performance measurement purposes (as shown in the Annual Report) versus those calculated for the purpose of determining actuarial gains or losses (as shown above).

Asset Distribution

Details of OPTrust's assets by major asset category can be found in OPTrust's consolidated financial statements.

Appendix 2: Rate Stabilization Reserves

Information regarding the Rate Stabilization Reserves ("RSRs") was provided by OPTrust management. We relied on this information in preparing this valuation.

During the period from December 31, 2013 to December 31, 2014, the Rate Stabilization Reserves have evolved as follows:

\$ millions

	Total	Employer	Member
Balance at December 31, 2013	107	98*	9*
Less payments to fund deficit	0	0	0
Plus interest	<u>7</u>	<u>6</u>	<u>1</u>
	7	6	1
Balance at December 31, 2014	114	104*	10*

**rounded*

The RSRs have accumulated with interest from December 31, 2013 to December 31, 2014 at 6.15% (the valuation discount rate used for the December 31, 2013 funding valuation).

Appendix 3A: Actuarial Basis – Going Concern

Pension plans are long term financial commitments and the cost of these commitments (or liabilities) must be estimated in order to determine the amount of funds to be set aside to meet them.

To estimate the cost of the future commitments, assumptions must be made about future events and conditions that will affect the cost. These assumptions may be categorized as either economic or demographic assumptions. Economic assumptions pertain to factors such as the rate of inflation and the rate of investment return. Demographic assumptions pertain to events affecting the Plan members, such as terminations, mortality, retirement and other assumptions which pertain to conditions that are more plan specific, such as marital status and the percent of Plan members selecting survivors' benefits.

The actuarial basis of calculation for this valuation is set out below. The actuarial basis includes the economic and demographic assumptions used to value the liabilities. It also includes the actuarial methods used to determine the smoothed value of assets and the determination of the funded position of the plan and contribution requirements.

Future events will show the actual cost to be higher or lower than the actuarial estimate since any difference between the Plan's actual experience and the actuarial assumptions will emerge as experience gains or losses in future valuations; and will thus be reflected in the level of future contributions and/or benefits. In the long run, the cost of the Plan will ultimately be determined by the benefits provided and by the Plan's actual experience, not by the actuarial basis chosen from time to time by actuaries to estimate this cost.

We have considered the appropriateness of the actuarial assumptions and the methods in the context of a long term horizon and taking into consideration OPTrust's funding objectives. The following changes were made to the actuarial assumptions for this valuation:

- The mortality assumption was updated to reflect the mortality improvement scale CPM Improvement Scale B from the Canadian Institute of Actuaries' Canadian pensioner mortality study. In addition, the base table was updated to the 2014 Private Sector Mortality Table with a multiplier of 108% to align to the Plan's experience.
- The inflation assumption was decreased from 2.25% to 2.00% per annum in order to reflect generally lower inflation expectations. In addition, all the inflation-linked assumptions have decreased by 25 bps.
- The discount rate used for settling the benefits that are expected to be paid as a commuted value has been reduced from 2.50% to 2.00%. Although this is a long-term assumption, decreasing this assumption recognizes that current commuted value rates are at historically low levels and are expected to remain low for some time.

- The valuation discount rate was decreased from 6.15% to 5.85% per annum. This reflects the 25 bps reduction in the inflation assumption, changes to market conditions (up to the time the discount rate was established, based on our September 30, 2014 Canadian Investment Model) and our expected return for the Plan, as well as a small increase in the margin reflecting the Plan's sustainability focus.

In future valuations, changes in the actuarial basis can be expected in response to changing circumstances and experience, as well as the underlying objectives adopted by OPTrust for the funding of benefits.

Summary of Going Concern Actuarial Basis

The following actuarial assumptions and methods were used in performing the going concern valuation.

	December 31, 2014	December 31, 2013
Economic Assumptions		
Price inflation (CPI)	2.00% per annum	2.25% per annum
Valuation discount rate (net of assumed investment expenses)	5.85% per annum	6.15% per annum
Allowance for non-investment expenses	A provision of \$23 million per year, over the next 30 years, was included in respect of future administrative costs	A provision of \$23 million per year, over the next 30 years, was included in respect of future administrative costs
Average national wage and Income Tax Act maximum benefit limit increases	2.50% per annum	2.75% per annum
Average members' earnings increases	2.75% per annum plus promotional scale (Table 1)	1.00% for 2014 and 3.00% per annum thereafter plus promotional scale (Table 1)
Interest on members' required contributions	3.00% per annum	3.25% per annum

	December 31, 2014	December 31, 2013
Demographic Assumptions		
Mortality	108% of 2014 Canadian Pensioner's Mortality Private Sector Table (CPM2014Priv), with generational projection using Scale B (CPM-B)	1994 Uninsured Pensioner Mortality Table, with generational projection using scale AA ("UP94-generational"); in addition, an allowance of \$190 million for a future strengthening of the mortality assumption was included
Retirement		
• regular early retirement	Age-related rates (Table 2)	Age-related rates (Table 2)
• 90-Point retirement	40% prior to age 60	40% prior to age 60
• 60/20	30% at age 60 with 20 years of service and 20% thereafter	30% at age 60 with 20 years of service and 20% thereafter
• deferred vested	Age 59 (immediately if older)	Age 59 (immediately if older)
Disability	No provision (membership continues)	No provision (membership continues)
Termination		
• rates	Service-related rates (Table 3)	Service-related rates (Table 3)
• benefits	70% elect commuted value (determined based on a discount rate of 2.00% and UP94-generational mortality) and 30% elect deferred annuity	70% elect commuted value (determined based on a discount rate of 2.50% and UP94-generational mortality) and 30% elect deferred annuity
• involuntary terminations	10% involuntary and eligible for grow-in benefits	10% involuntary and eligible for grow-in benefits
Marital status		
• female members	60% have spouse	60% have spouse
• male members	85% have spouse	85% have spouse
Member / spouse age difference		
• female members	Spouse 2 years older	Spouse 2 years older
• male members	Spouse 3 years younger	Spouse 3 years younger
Actuarial Methods		
Asset valuation method	Market-related value	Market-related value
Actuarial cost method	Modified Aggregate	Modified Aggregate

Going Concern Actuarial Assumptions

Price Inflation Assumption (CPI)

The inflation assumption, which is the expected future average annual increase in the Consumer Price Index (CPI), is used directly in the determination of the Plan's projected benefits since pensions and deferred pensions are inflation protected. The inflation assumption is also a key component of the other economic assumptions. We developed the long-term inflation assumption from the following sources of information:

- The 2015 Canadian Investment Perspectives Survey undertaken by Towers Watson forecasts a median long-term inflation rate of 2.0% per annum (25th and 75th percentiles are also 2.0% per annum).
- The Bank of Canada's target inflation range is 1% to 3% per annum. This has not changed for some time.
- The Canada Pension Plan's ("CPP") 26th Actuarial Report (as at December 31, 2012) assumes 2.0% inflation for the years 2014 to 2019, 2.1% in 2020 and then 2.2% per annum in 2021 and thereafter.

Based on the above, we believe that a long-term inflation rate of 2.00% (2.25% at previous valuation) is an appropriate long-term best estimate assumption for the December 31, 2014 valuation.

Average National Wage Increases

We use an assumption for future increases in the Average National Wage to project the Year's Maximum Pensionable Earnings ("YMPE") and the defined benefit limits of the Income Tax Act. Generally, an average wage increase assumption is determined as inflation plus an allowance for general productivity increases.

We believe that a general productivity increase of 0.50% per annum above CPI, to reflect productivity improvements, is a reasonable best estimate assumption. While average Canadian weekly earnings have been increasing at rates similar to CPI for the past 30 years (i.e., no general productivity increases), labour productivity in Canada has been growing at 1.3% during those 30 years. Our research suggests that average earnings have not kept up to productivity increases due to a combination of factors including general changes in the labour markets and higher costs of fringe benefits. We expect this situation to change as we go into a protracted period of general labour shortages once the economy recovers following the current economic uncertainty, and that general wage increases will be more aligned with labour productivity increases.

Thus, for the December 31, 2014 valuation, we assumed that average national wages increase at 2.50% per annum (2.75% at previous valuation), which is based on the assumed inflation rate described above plus general productivity increases of 0.50% per annum.

OPSEU Pension Plan Members' Earnings Increases

We assumed that general wages for Plan members will increase over the long-term at 2.75% per annum (3.00% at previous valuation). This assumption reflects the long-term inflation rate plus general Plan member earnings increases of 0.75% per annum.

In addition, we applied the following salary promotional scale. Based on discussions with OPTrust management, we understand that this produces reasonable earnings increases over the long-term.

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%

This assumption was based on an experience study completed by the prior actuary in 2010.

Valuation Discount Rate

For purposes of this valuation, we have used a real discount rate of 3.85% per annum (5.85% per annum nominal).

In order to determine an appropriate valuation discount rate, we have used the September 30, 2014 Canadian Investment Model developed by Towers Watson (the "Model") to generate a probability distribution of future investment returns. The probability distribution is derived by applying stochastic modeling techniques to the modelled portfolio, based on OPTrust's long-term reference asset mix and a set of asset return assumptions for each class.

OPTrust's long-term reference asset mix is as follows:

Fixed Income	
• Canadian cash	2.5%
• Canadian mid-term bonds	20.0%
• Canadian real-return bonds	<u>2.5%</u>
Total fixed income	25.0%
Real Assets	
• Canadian real estate	15.0%
• Infrastructure	15.0%
• Commodities (energy)	<u>5.0%</u>
Total real assets	35.0%
Equities	
• Canadian equities	8.0%
• Developed equities	14.0%
• Emerging equities	8.0%
• Private equities	<u>10.0%</u>
Total equities	40.0%
Total	100.0%

The Model reflects Towers Watson's views of the expected market average index returns that an institutional investor could expect to achieve through a passive investment management approach. This Model does not capture the unique characteristics of the OPTrust investment process.

OPTrust's investment costs are assumed to be covered by additional returns from active management. Based on data provided by OPTrust management, we believe this is a reasonable assumption.

Based on the Model for a portfolio with the above asset mix, the 50th percentile (i.e., median) long term real rate of return was 4.25% per annum. After an allowance of a provision for adverse deviations of 0.40% (reflecting OPTrust's funding objectives), we established a 3.85% real (5.85% nominal) valuation discount rate assumption for OPTrust. The valuation discount rate used for the previous valuation was 3.90% real (6.15% nominal).

The Plan's assets are invested in a diversified portfolio, which includes certain asset classes subject to risk that provide potential for higher returns. The investment return assumption used in this valuation to discount future projected benefit payments includes an estimated risk premium for investment of fund assets in instruments subject to risk. Based on historical experience, assets invested in instruments subject to risk are expected to yield higher returns in the long-run than assets invested in risk-free investments (such as government bonds), but these returns may fluctuate significantly from year to year and not necessarily in line with changes in the plan's liabilities over long periods of time. As a result, investing in investments subject to risk increases the potential for future asset-liability mismatch, which could lead to greater volatility in the plan's financial position and minimum contribution requirements.

Non-Investment Expenses

In determining this allowance, OPTrust reviewed the Plan's experience and considered expected future expense levels (including the expectation of future efficiencies offsetting future inflationary increases). The expense provision was determined as the present value of future administrative expenses of \$23 million per annum for 30 years.

Interest on Members' Required Contributions

It is assumed that members' contributions will be updated with interest at the rate of 3.00% per annum (3.25% at previous valuation). This assumption is a reasonable best estimate assumption based on OPTrust's administrative practice of crediting interest (CANSIM minimum crediting rate).

Mortality Assumption

In the fall of 2014, we completed a pensioner mortality study based on the Plan's pensioner experience over the period from 2009 to 2013. Based on the results of that study, the mortality assumption has been updated to reflect actual benefit-weighted pensioner experience. The Plan's experience has been aligned to the 2014 Private Sector Mortality Table (CPM2014Priv) with a multiplier of 108%.

In addition, the mortality improvement scale assumption reflects the mortality improvement scale included in the CIA report (the CPM Improvement Scale B or "CPM-B").

Based on the results of the Plan's mortality study, we believe that 108% of CPM2014Priv with CPM-B is a reasonable best estimate mortality assumption.

Retirement Assumption

The following retirement rates were used:

Table 2
(All rates per 1,000 members)

Attained Age	Regular early	90-point	60/20
55	46	400	0
56	20	400	0
57	23	400	0
58	26	400	0
59	29	400	0
60	58	0	300
61	59	0	200
62	61	0	200
63	62	0	200
64	115	0	200
65 and over	1,000	1,000	1,000

These rates are based on a study of Plan members' retirement experience over the period from 2007 to 2011. We believe that these rates are a reasonable best estimate assumption.

Retirement Assumption – Deferred Vested Members

Deferred vested members are assumed to retire at age 59 (immediately if older). We believe that this adequately reflects the Plan's benefit provisions and should be considered a reasonable best estimate assumption.

Disability Assumption

No allowance has been made for disability incidence/recovery on the basis that the impact of including such an assumption would not have a material effect on the valuation results (contributions are made and benefits accrue during periods of disability).

Termination Assumption

A sample of the service-related termination rates is as follows:

Table 3	
Age	Termination Rates (per 1,000 members)
20	77
25	63
30	51
35	41
40	33
45	27
50	22
55 and over	0

The rates are based on a study of Plan members' termination experience over the period from 2007 to 2011. We believe that these rates are a reasonable best estimate assumption.

Member Choices at Termination and Commuted Value Basis

We assumed 70% of terminating members elect a commuted value and 30% elect a deferred pension. Based on a review of recent Plan experience, the percentage of terminating members that elected the commuted value option was close to 70%. At this point, we see no reason to change this assumption.

For those terminating members who are assumed to elect a commuted value option on termination of employment, their termination benefits were valued assuming a net discount rate of 2.00% per year (2.50% at previous valuation). While this is a long term rate assumed for valuation purposes, the rate used to determine actual commuted values on termination is based on real and nominal return bond rates in effect at the termination date.

The deferred pension option is valued in the same way as for a deferred vested member (i.e., based on going concern assumptions with pension commencing at age 59 or immediately if older).

Proportion of Active Members Married

The following table shows the assumed percentage of members with spouses and the assumed spouse's ages:

	Percentage	Assumed Age of Spouse
Females	60%	2 years older
Males	85%	3 years younger

It has been assumed that the spouse of a male member is three years younger than the member and the spouse of a female member is two years older than the member. We have no evidence to suggest that these assumptions are not appropriate.

Going Concern Actuarial Methods

Asset Smoothing Method

A smoothing technique is applied to the market value of assets in determining the smoothed asset value for the purpose of the valuation. As the market value tends to be volatile over short time periods, the use of this approach reduces the influence of such short term movements and is consequently appropriate for the valuation of long term financial commitments and is consistent with the Board's Funding Policy.

The smoothed asset value was calculated by taking the difference between the actual return on the fund (net of investment expenses) and the expected return on the fund (based on the valuation discount rate in effect at the prior valuation date) and recognizing these differences gradually over the current and following four years.

Actuarial Cost Method

The going concern valuation was conducted using the modified aggregate actuarial cost method. Under this method, the Plan's financial position is determined as the total assets less the total liabilities.

The total assets are determined as the sum of:

- the smoothed value of the Plan's assets; and
- the actuarial present value of future member and employer contributions expected to be paid, in respect of current membership, based on assumed salary increases and expected decrements.

The total liabilities are determined as the sum of:

- the present value of all total projected benefits (both already accrued and those expected to accrue in the future), based on assumed salary increases and total service expected to be earned by Plan members;
- the present value of future Plan expenses expected to be paid following the valuation date; and
- the Member and Employer Rate Stabilization Reserves, which are the respective sponsors' share of the accumulated actuarial gains that have not been used for benefit improvements or contribution reductions and have been allocated to the respective Rate Stabilization Reserve.

This funding valuation method will produce a stable contribution requirement to fund future benefit accruals provided the average entry age of new members does not fluctuate significantly. The actual Employer and Member contribution rates to fund future benefit accruals are fixed by the terms of the Plan. To the extent that these contributions are greater or less than the contribution requirement for new entrants, future gains or losses will result. Any actuarial gains or losses are to be shared equally between the Government of Ontario and Plan members in accordance with the terms of the Sponsorship Agreement.

Cost Method for Minimum Contribution Test

For the purpose of this test, as required under the Pension Benefits Act (Ontario), the present value of future member and employer contributions expected to be paid over the following sixteen years is compared to the present value of the amounts that would be required over the sixteen year period based on the projected unit credit method.

Under the projected unit credit method, the actuarial liability is determined by calculating the present value of benefits earned in respect of service prior to the valuation date where such benefits are based on earnings projected for assumed future increases. The difference between the smoothed asset value and the actuarial liability represents the funding excess or the unfunded actuarial liability. Any new unfunded actuarial liability may be funded over a period of up to sixteen years.

The actuarial current service cost is determined by calculating the actuarial present value of benefits earned in respect of service for the year following the valuation date where such benefit is based on earnings projected for assumed future increases.

For the purpose of this test, the projected unit credit actuarial liability and actuarial current service cost were determined based on the same assumptions used for the going concern valuation.

The projected unit credit contribution is equal to the actuarial current service cost plus any amounts required to amortize any new unfunded actuarial liability.

In comparing the present value of future contributions expected to be made to the Plan over the sixteen-year period, the present values were calculated as follows:

- The future payroll was assumed to increase each year by the assumed general salary increase assumption of 2.75%.
- The contributions were discounted back to the valuation date at the going concern valuation discount rate.

Benefits Valued

The benefits valued were those in effect at the valuation date and those which come into effect during the year following the valuation date.

Appendix 3B: Actuarial Basis – Solvency and Hypothetical Windup

As required by the *Pension Benefits Act (Ontario)* (the “PBA”), a solvency valuation and a hypothetical wind-up valuation were performed on the Plan as at December 31, 2014 in accordance with the standards prescribed by the PBA. The purpose of a solvency valuation is to establish the minimum funding requirements for the Plan (if applicable). The purpose of a hypothetical windup valuation is to estimate the funded position of the Plan, if it had wound up on the valuation date.

Summary of Actuarial Bases

Solvency Valuation Basis

The following actuarial assumptions and methods were used in performing the solvency valuation.

	December 31, 2014	December 31, 2013
Economic Assumptions		
Discount rates		
• commuted value transfers	2.5% per annum for 10 years; 3.8% per annum thereafter	3.0% per annum for 10 years; 4.6% per annum thereafter
• annuity purchases	2.6% per annum	3.9% per annum
Demographic Assumptions		
Form of settlement		
• pensioners and deferred vested members	Assumed to elect annuity purchase	Assumed to elect annuity purchase
• actives over age 55	Assumed to elect annuity purchase	Assumed to elect annuity purchase
• actives under age 55	Assumed to elect commuted value	Assumed to elect commuted value
Mortality		
• commuted value transfers	1994 Uninsured Pensioner Mortality Table, with generational projection using scale AA	1994 Uninsured Pensioner Mortality Table, with generational projection using scale AA
• annuity purchases	1994 Uninsured Pensioner Mortality Table, with generational projection using scale AA	1994 Uninsured Pensioner Mortality Table, with generational projection using scale AA
Retirement age	Most valuable	Most valuable

	December 31, 2014	December 31, 2013
Marital status		
• female members	60% have spouse	60% have spouse
• male members	85% have spouse	85% have spouse
Member / spouse age difference		
• female members	Spouse 2 years older	Spouse 2 years older
• male members	Spouse 3 years younger	Spouse 3 years younger

Hypothetical Wind-up Valuation Basis

The hypothetical wind-up valuation uses the same assumptions as the solvency valuation except that an allowance is included for future COLAs.

Following is a summary of the assumptions for the hypothetical wind-up valuation that differ from those used in the solvency valuation.

	December 31, 2014	December 31, 2013
Economic Assumptions		
Discount rates		
• commuted value transfers	1.3% per annum for 10 years; 1.6% per annum thereafter	1.7% per annum for 10 years; 2.3% per annum thereafter
• annuity purchases	-0.6% per annum	0.15% per annum

Solvency Valuation Liability Scenario

The solvency valuation is based on a wind-up scenario where active and deferred vested members would be offered a choice of a commuted value transfer and pensioners and beneficiaries would have annuities purchased on their behalf. Benefits would be based on members' accrued pensions and associated rights, based on applicable statutory wind-up requirements, plan provisions, credited service, historical salaries and accumulated contributions up to the valuation date.

As allowed by legislation and directed by OPTrust, the value of future escalated COLAs were excluded from the solvency liabilities.

Hypothetical Wind-up Liability Scenario

The hypothetical wind-up valuation scenario is the same as the solvency valuation's scenario except that future escalated COLAs are included in the wind-up liabilities.

Commuted Values

It was assumed that all active members under the age of 55 at the valuation date would elect to transfer out the commuted value of their entitlements, in lieu of a deferred pension.

Commuted value transfers have been determined based on the Canadian Institute of Actuaries' Standards of Practice for Pension Commuted Values (Section 3500) as applicable to terminations occurring in December 2014, resulting in discount rates of 2.5% per annum for 10 years, then 3.8% per annum for the solvency valuation (1.3% per annum for 10 years, then 1.6% per annum for the hypothetical windup valuation) and mortality rates from the 1994 Uninsured Pensioner Mortality Table with generational projection using scale AA.

Annuity Purchases

In our opinion, it would not be possible to find life insurance companies in Canada that would be able to take on the necessary annuities (particularly considering the size of the Plan and the fact that the group annuities would be indexed annuities for an actual windup valuation). In the event of an actual Plan termination, it is likely that the Plan would be continued in "run off" mode for some time to come.

Nevertheless, for the purpose of the solvency and hypothetical windup valuations, where commuted values were not assumed to be transferred, we have applied the Canadian Institute of Actuaries' ("CIA") guidance for the cost of annuities at December 31, 2014 (Educational Note Supplement issued January 23, 2015) for the purchase of annuities as a reasonable proxy for the purposes of the valuation. The cost of any such annuities was estimated based on economic conditions in effect at the valuation date. In particular, an interest rate of 2.6% per annum for the solvency valuation (-0.6% per annum for the hypothetical windup valuation) and mortality rates from the 1994 Uninsured Pensioner Mortality Table with generational projection using scale AA were used to estimate the cost of these annuities. The duration of the liabilities assumed to be settled through the purchase of non-indexed annuities is 11.7.

Wind-up Expenses

An allowance for expenses related to a wind-up of the Plan under the scenario indicated must be included. An expense allowance of \$50 million was used for this valuation (unchanged from the prior valuation).

Solvency and Hypothetical Wind-up Actuarial Methods

Assets

Assets deemed to be available for purposes of the hypothetical wind-up valuation are equal to the market value of the Plan assets, reduced for assumed wind-up expenses.

Assets deemed to be available for purposes of the solvency valuation are equal to the sum of:

- i. the market value of the Plan assets, reduced for assumed wind-up expenses; and
- ii. the difference in the present value of scheduled contributions and the actuarial current service cost determined using the projected unit credit method over the next six years.

Benefits Valued**Retired Members and Beneficiaries**

For retirees and beneficiaries, we valued the pensions in payment.

Non-Retired Members Eligible to Retire

For non-retired members who are eligible to retire, we valued accrued pensions commencing payment at the age that produces the greatest value.

Non-Retired Members Not Eligible to Retire

Non-retired members, who are not eligible to retire, were assumed to retire at the age giving rise to the greatest liability. The benefit valued was the accrued retirement benefit for which the member would be eligible upon retiring at such age.

Deferred Vested Members

All other members were assumed to retire at age 59, with an unreduced pension equal to the benefit accrued at the valuation date.

Pre-Retirement Death Benefits

We made allowance for the pre-retirement death benefit related to the basic lifetime pension by assuming no discount for mortality prior to retirement when determining the commuted values of these benefits.

Future COLAs

For the solvency valuation, future COLAs were excluded as permitted by legislation and directed by OPTrust.

Appendix 4: Summary of Plan Provisions

The following is an outline of the principal features of the plan which are of financial significance to valuing the plan benefits. This summary is based on the most recently restated plan document dated September 2013, and does not make any provisions for the possibility that a change or action (retroactive or otherwise) could be imposed by order of a regulatory body or a court. It is not a complete description of the plan terms and should not be relied upon for administration or interpretation of benefits. For a detailed description of the benefits, please refer to the plan document.

Definitions

Continuous Service

The period of uninterrupted employment without regard to certain periods of temporary suspension or lay-off.

Credited Service

Continuous Service during which contributions are made. Proportionate Credited Service is provided to part-time members. Credited Service includes periods of service purchased by a member and periods of service under a predecessor plan provided any required funds have been transferred to the plan.

Highest Average Salary

The average of the best 60 consecutive months of salary.

Salary

Member's base salary rate and does not include overtime pay or any payment to the member in lieu of a benefit provided by the employer or any payment determined by the Board not to be part of a member's salary.

YMPE

Year's Maximum Pensionable Earnings as defined in the Canada Pension Plan.

YMPE Average

5-year average of the YMPE including the year of the event and the 4 preceding years.

Plan Participation

Mandatory membership for public servants, crown employees and employees of any agency, board, commission, foundation or other organization under an Act of Ontario legislature who are in a bargaining unit represented by OPSEU.

Elective membership for unclassified employees in any organization who are in bargaining units represented by OPSEU which have elected to be covered by the Plan.

Member Contributions

Effective January 1, 2012, member contribution formula is 9.4% of salary up to the YMPE and 11.0% of salary in excess of the YMPE. In addition, any payments required to liquidate unfunded liabilities, solvency deficiencies and actuarial losses will be made in accordance with the terms of the Sponsorship Agreement.

Employer Contributions

Matching contributions are made by the Employer. In addition, any payments required to liquidate unfunded liabilities, solvency deficiencies and actuarial losses will be made in accordance with the terms of the Sponsorship Agreement.

Normal Retirement

Eligibility

Age 65.

Basic Annual Pension

2% of the member's Highest Average Salary for each year of Credited Service

less

0.655% of the member's Highest Average Salary not exceeding the YMPE Average for each year of Credited Service to a maximum of 35 years.

Unreduced Early Retirement

Eligibility

- i. Age 60 with at least 20 years of Credited Service, or
- ii. Age plus years of Credited Service equal at least 90

Lifetime Retirement Income

Basic Annual Pension.

Supplementary Bridge Benefit

0.655% of the member's Highest Average Salary not exceeding the YMPE Average for each year of Credited Service to a maximum of 35 years. This benefit is payable until the members reaches age 65.

Early Retirement

Eligibility

Age 55.

Lifetime Retirement Income

Basic Annual Pension reduced by 5/12% of 1% for each month pension commencement precedes Normal Retirement.

Supplementary Bridge Benefit

0.655% of the member's Highest Average Salary not exceeding the YMPE Average for each year of Credited Service to a maximum of 35 years, reduced by 5/12% of 1% for each month pension commencement precedes Normal Retirement. This benefit is payable until the members reaches age 65.

Postponed Retirement

Members who work past their normal retirement date continue to participate in the plan. However, members must start to receive their pension no later than the end of the year in which the member attains 71 years of age.

Maximum Pension

The benefits in respect of Credited Service after 1991 are limited to the maximum allowable under the Income Tax Act.

Disability Benefits

Pension accruals continue at the same rate as when disability occurred. For the purpose of calculating the annual accrual, Salary is assumed to increase annually with increases in inflation.

The Employer makes contributions on behalf of the member.

Indexation of Benefits

Pensions will be indexed each January 1st after retirement, termination, death or divestment at the rate of 100% of the increase in the Consumer Price Index, subject to an 8% cap (with a carry forward).

Normal Form

A member with an eligible spouse receives a monthly pension payable for life, with a continuation of 60% to the eligible spouse on the Member's death. A member without an eligible spouse receives a monthly pension payable for life. A survivor's pension is payable to the Member's children under certain circumstances. The balance of the member's contributions plus interest up to the retirement date less any benefits already paid is refunded to the member's designated beneficiary or estate.

Death Benefit Before Retirement

In respect of Credited Service before January 1, 1987, the surviving spouse is entitled to an immediate pension of 60% of the pension to which the member would have been entitled had the member retired on the date of death. If there is no surviving spouse, the dependent children are entitled to a pension of 60% of the pension to which the member would have been entitled had the member retired on the date of death, payable to age 18. If there is no surviving spouse or dependent children, the member's estate is entitled to a benefit equal to the member's contributions with interest.

In respect of Credited Service after December 31, 1986, the member's surviving spouse or, if none, the member's designated beneficiary or estate is entitled to the commuted value of the member's deferred pension.

Termination of Employment

A terminated member is entitled to a deferred pension equal to the Basic Annual Pension commencing at Normal Retirement. Early commencement of the accrued pension (including the Supplemental Bridge Benefit) is permitted on or after age 55, reduced by 5/12% of 1% for each month pension commencement precedes Normal Retirement. In lieu of a deferred pension, if the terminated member has not attained age 55, the member may elect to commute the value of the entitlement.

If the member's termination of employment is involuntary and without cause, and the member has at least 55 points (age plus Continuous Service) at termination of employment, then the member is permitted to commence his or her accrued pension early based on the early commencement reduction that would have applied had the member continued in employment until such early commencement date.

Benefits Payable to Divested Members

Plan members (referred to as the "special deferred vested members") whose membership terminated as a result of a divestment are entitled to a deferred pension equal to the Basic Annual Pension commencing at Normal Retirement. Early commencement of the accrued pension (including the Supplemental Bridge Benefit) is permitted. If early commencement is on or after the member's Unreduced Early Retirement date, there is no reduction, otherwise the accrued pension is reduced by 5/12% of 1% for each month pension commencement precedes Normal Retirement. For the purposes of determining the member's eligibility for Unreduced Early Retirement, the period of membership with the Employer following the divestment is included as Credited Service.

50% Rule Refund

On retirement, death or termination of employment of a member, if the total of the member's required contributions made after December 31, 1986, plus interest, exceed 50% of the commuted value of the member's pension benefit earned for Credited Service after December 31, 1986, the excess is refunded in cash.

Appendix 5: Summary of Membership Data

Data Adjustments and Assumptions

For the actuarial valuation as at December 31, 2014 we have relied on membership and known membership movements as supplied by OPTrust staff. Plan membership was determined as of October 18, 2014 and adjusted by OPTrust to provide the December 31, 2014 membership. An assumption for new entrants from September to December was made based on the rate of new entrants in the first 8 months of 2014. A document titled "Actuarial Valuation Extract (AVE) for December 31, 2014 valuation" provided by OPTrust details the methodology used to determine the December 31, 2014 plan membership data for purposes of this valuation.

Towers Watson made the following additional adjustments with respect to the membership data:

- Actual inflationary increases to pensions in payment and deferred pension payments of 1.7%, effective January 1, 2015.
- In cases where there is misalignment between the pensioner's form of pension and the spouse's data, we made the following adjustments to the form of pension:
 - o A life-only form of pension was assumed for single members; and
 - o A joint and survivor 60% form of pension was assumed for married members whose spouse date of death is blank.
- In cases where a pensioner's spouse's date of birth is not available, we assumed that the spouse of a male member would be three years younger and the spouse of a female member would be two years older.
- In cases where a pensioner's spouse's gender is not available, we assumed the opposite gender than that of the pensioner.

Data Review

Both OPTrust and Towers Watson carried out extensive reviews of the membership data to test for reasonableness and consistency with the data provided in the previous valuation. The main tests of sufficiency and reliability which Towers Watson conducted on the membership data were as follows:

- a review of the reconciliation of plan member statuses from the prior valuation to the current valuation prepared by OPTrust;
- a review of consistency of individual data items and statistical summaries between the current and prior valuations (i.e., dates of birth, hire, entry, pension amounts, etc.);
- a review of reasonableness of individual data items, statistical summaries and changes in such information since the prior valuation; and

- a comparison of membership data (i.e., the aggregate member contributions, pension payments, etc.) and OPTrust's financial statements for accuracy.

All our tests had satisfactory results. We are satisfied that the data are sufficient and reliable for the purposes of our actuarial valuations. However, the tests conducted may not have captured certain deficiencies in the data. We have also relied on the certification of OPTrust as to the quality of the data.

Summary of Data

Following is a summary of key data items with comparative figures from the December 31, 2013 valuation.

	December 31, 2014	December 31, 2013
Active and Disabled Members		
Number	44,008	43,827
Average age	46.3 years	46.5 years
Average Credited Service	12.5 years	12.7 years
Total estimated pay rate ¹	\$2,827,140,465	\$2,761,632,313
Average estimated pay rate ¹	\$64,242	\$63,012
Pensioners and Beneficiaries		
Number	31,946	30,426
Average age	69.8 years	69.3 years
Total annual pension ²		
- Lifetime	\$600,919,407	\$559,834,115
- Bridge	\$64,432,039	\$64,939,041
Average annual lifetime pension	\$18,810	\$18,400
Deferred Vested Members		
Number ³	4,968	4,650
Average age	48.7 years	48.5 years
Total annual pension ²		
- Lifetime	\$31,338,362	\$29,355,774
- Bridge	\$11,535,434	\$10,798,349
Average annual lifetime pension	\$6,308	\$6,313
Special Deferred Vested Members		
Number	3,556	4,094
Average age	52.4 years	52.0 years
Total annual pension ²		
- Lifetime	\$25,038,261	\$28,769,102
- Bridge	\$9,708,946	\$11,042,824
Average annual lifetime pension	\$7,041	\$7,027

	December 31, 2014	December 31, 2013
Former Members with Unprocessed Benefits		
Number	1,735	1,471
Average age	45.8 years	44.2 years
Total annual pension ²		
- Lifetime	\$10,313,548	\$6,445,439
- Bridge	\$2,821,265	\$1,949,923
Average annual lifetime pension	\$5,944	\$4,382

1. The earnings are the salary rate as at January 1 following the valuation date.
2. The pensions shown above include the COLA granted January 1 following the valuation date. The December 31, 2013 pension amounts include a COLA of 0.9% and the December 31, 2014 pension amounts include a COLA of 1.7%.
3. Includes 59 members at December 31, 2014 entitled to grow-in benefits.

Membership Distributions

Active and Disabled Members

The following table shows the number of members and the average estimated pay rate as at January 1, 2015, distributed by age (nearest birthday) and completed years of Credited Service.

Age	Credited Service								Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
Up to 25	591	-	-	-	-	-	-	-	591
	46,233	-	-	-	-	-	-	-	46,233
25 - 29	2,277	323	1	-	-	-	-	-	2,601
	54,940	64,317	*	-	-	-	-	-	*
30 - 34	2,163	1,858	295	1	-	-	-	-	4,317
	58,904	67,031	65,366	*	-	-	-	-	*
35 - 39	2,401	1,910	1,559	140	-	-	-	-	6,010
	57,781	68,036	70,148	70,997	-	-	-	-	64,556
40 - 44	1,088	1,521	1,668	643	79	1	-	-	5,000
	60,225	68,745	70,213	71,603	68,322	*	-	-	*
45 - 49	1,041	1,310	1,413	864	862	401	6	-	5,897
	58,692	66,580	67,570	69,732	69,597	65,603	65,031	-	66,260
50 - 54	929	1,175	1,473	858	1,309	1,719	480	12	7,955
	58,166	64,513	64,909	67,014	68,189	67,990	64,788	63,867	65,487
55 - 59	595	873	1,167	748	1,026	1,412	927	172	6,920
	56,788	61,006	63,363	63,824	66,271	67,504	67,955	62,521	64,420
60 - 64	324	508	680	508	526	578	290	215	3,629
	56,427	60,383	62,547	64,167	65,880	66,656	66,940	61,989	63,380
65 & up	100	213	240	123	130	138	69	75	1,088
	54,713	60,558	62,495	62,840	64,551	68,042	69,429	62,806	62,850
Total	11,509	9,691	8,496	3,885	3,932	4,249	1,772	474	44,008
	57,065	66,008	*	*	67,571	*	66,978	62,359	64,242

* Results for two or fewer members not shown due to confidentiality.

Pensioners and Beneficiaries

The following table shows the number of pensioners and beneficiaries and their annual pension amounts as at January 1, 2015, distributed by age (nearest birthday).

Age	Number	Total Annual Lifetime Pension	Total Annual Bridge Benefit
35 - 39	1	*	*
40 - 44	4	12,821	-
45 - 49	22	201,967	12,984
50 - 54	143	1,875,578	480,358
55 - 59	1,798	41,272,093	14,159,192
60 - 64	5,894	129,653,666	44,223,505
65 - 69	8,900	173,733,673	5,523,012
70 - 74	6,854	124,302,945	15,141
75 - 79	4,824	80,244,327	17,848
80 - 84	2,765	40,654,908	-
over 85	741	8,963,373	-
Total	31,946	600,919,407	64,432,039

* Results for two or fewer members not shown due to confidentiality.

Deferred Vested Members

The following table shows the number of deferred vested members and their annual pension amounts as at January 1, 2015, distributed by age (nearest birthday).

Age	Number	Total Annual Lifetime Pension	Total Annual Bridge Benefit
under 25	38	7,594	3,686
25 - 29	122	122,143	52,044
30 - 34	247	579,532	227,295
35 - 39	464	1,567,102	581,183
40 - 44	648	2,780,505	998,792
45 - 49	867	4,912,051	1,852,535
50 - 54	1,112	8,987,786	3,399,027
55 - 59	909	8,094,224	2,960,476
60 - 64	474	3,753,483	1,379,043
over 65	87	533,942	81,353
Total	4,968	31,338,362	11,535,434

Special Deferred Vested Members

The following table shows the number of special deferred vested members and their annual pension amounts as at January 1, 2015, distributed by age (nearest birthday).

Age	Number	Total Annual Lifetime Pension	Total Annual Bridge Benefit
under 25	-	-	-
25 - 29	1	*	*
30 - 34	14	31,341	12,795
35 - 39	104	204,413	86,390
40 - 44	348	656,425	272,776
45 - 49	669	3,397,459	1,357,467
50 - 54	991	7,798,356	3,042,522
55 - 59	915	8,538,143	3,322,086
60 - 64	448	3,898,532	1,508,397
over 65	66	509,758	104,790
Total	3,556	25,038,261	9,708,946

* Results for two or fewer members not shown due to confidentiality.

Former Members with Unprocessed Benefits

The following table shows the number of former members with unprocessed benefits and their annual pension amounts as at January 1, 2015, distributed by age (nearest birthday).

Age	Number	Total Annual Lifetime Pension	Total Annual Bridge Benefit
under 25	65	10,137	4,586
25 - 29	142	94,824	41,373
30 - 34	209	270,369	105,106
35 - 39	205	460,736	163,850
40 - 44	200	617,197	198,269
45 - 49	186	747,094	236,748
50 - 54	214	1,060,991	374,663
55 - 59	220	2,816,217	864,337
60 - 64	158	2,472,217	793,551
65 - 69	90	1,224,602	38,782
over 70	46	539,164	-
Total	1,735	10,313,548	2,821,265

Reconciliation of Data

We performed the following reconciliation of membership data over the period December 31, 2013 to December 31, 2014.

	Active and Disabled Members Actives	Pensioners and Beneficiaries	Deferred Vested Members	Special Deferred Vested Members	Former Members with Unprocessed Benefits	Total
Members at December 31, 2013	43,827	30,426	4,650	4,094	1,471	84,468
New entrants (Actual)	3,408					3,408
Split due to marriage breakdown		10				10
Return to active	96		(46)	(2)	(48)	-
Retirement	(1,326)	1,761	(77)	(249)	(109)	-
Death - survivor pension payable	(20)	(256)	(1)	(2)	(5)	(284)
Death - fully settled or other pension stoppages		(282)				(282)
New beneficiaries		284				284
Terminations electing deferred pensions	(306)		600	(150)	(144)	-
Paid out	(430)		(124)	(98)	(156)	(808)
Transfer out	(481)		(19)	(4)	(90)	(594)
Members with unprocessed benefits	(760)			(53)	813	-
Data corrections and adjustments		3	(15)	20	3	11
Members at December 31, 2014	44,008	31,946	4,968	3,556	1,735	86,213

Appendix 6: Certification of the Plan Administrator

I hereby certify that, to the best of my knowledge and belief, for the purposes of the valuation:

- (i) the 2014 OPTrust asset information provided to Towers Watson Canada Inc. and summarized in Appendix 1 of this report is complete and accurate;
- (ii) the details related to the Rate Stabilization Reserves summarized in Appendix 2 of this report are complete and accurate;
- (iii) the assumptions and methods summarized in Appendices 3A and 3B of this report, which were developed in consultation with Towers Watson Canada Inc., have been adopted by OPTrust as the December 31, 2014 valuation assumptions;
- (iv) the Summary of Main Plan Provisions contained in Appendix 4 of this report is an accurate and complete summary of the material terms of the OPSEU Pension Plan in effect at the valuation date;
- (v) the membership data provided to Towers Watson Canada Inc. as at December 31, 2014, together with the process and related data projections as summarized in Appendix 5 of this report, are management's best estimates of all persons who are members of the OPSEU Pension Plan (including beneficiaries who are in receipt of a pension); and
- (vi) all events that may have an impact on the results of the valuation, including any events which may have occurred subsequent to the valuation date, have been communicated to Towers Watson Canada Inc.

August 12/2015
Date

R. Swamy
Reg Swamy, Chief Pension Officer