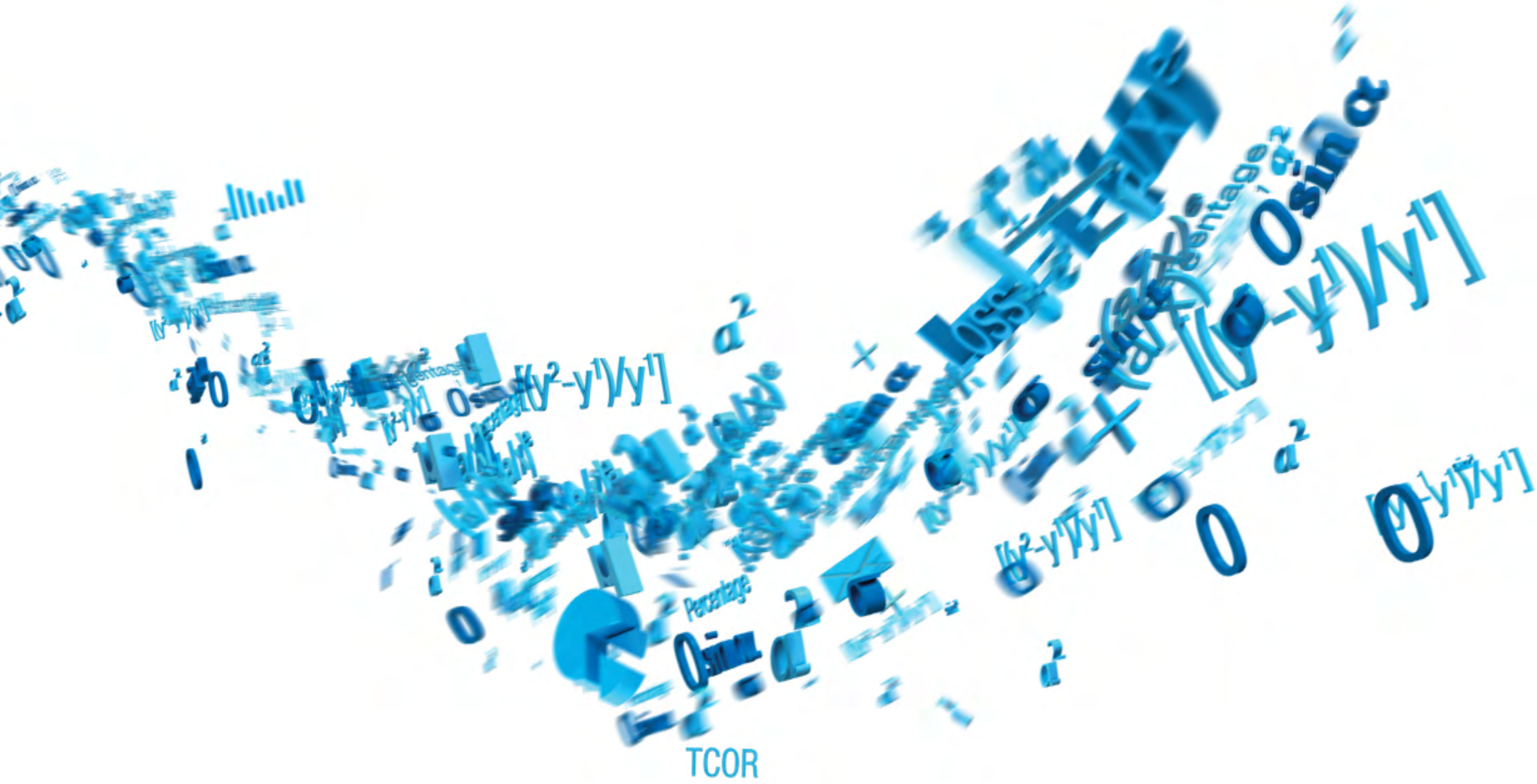

Actuarial Valuation As At December 31, 2014

Public Service Pension Plan

Regulatory Registration Number 0208769

June 18, 2015

Empower Results®

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Executive Summary

An actuarial valuation has been prepared for the *Public Service Pension Plan* (the "PSPP") as at December 31, 2014 for the purpose of monitoring the PSPP's funding position and providing an appropriate funding recommendation for the period until the next such actuarial valuation is performed. This section provides an overview of the important results and the key inputs to the valuation process. The next actuarial valuation for the purposes of developing funding requirements must be performed no later than as at December 31, 2017.

Summary of Main Results

	December 31, 2014		December 31, 2011	
	Going-Concern ($millions)	Solvency ($millions)	Going-Concern ($millions)	Solvency ($millions)
Assets	9,002	9,762	6,739	6,456
Liabilities	10,735	18,000	8,780	12,547
Surplus (Deficit)	**(1,733)**	**(8,238)**	**(2,041)**	**(6,091)**
Funded/Solvency Ratio	**84%**	**54%**	**77%**	**51%**

Contribution Rates

The contribution rates recommended in this report as applied to earnings up to and over the YMPE are consistent with those now in effect (as recommended in the valuation report at December 31, 2011). The aggregate contribution rate is 0.04% less than that established at December, 31, 2011; however, when applied to the current pensionable earnings base, the member and employer rates remain unchanged.

Combined Member & Employer Contribution Rates (% of Pay)

	December 31, 2014	December 31, 2011
Current Service Cost	17.61%	16.28%
Unfunded Liability	7.97%	9.34%
Total	**25.58%**	**25.62%**
Earnings up to YMPE	23.40%	23.40%
Earnings over YMPE	33.44%	33.44%

Executive Summary

Basic Membership Information

As at valuation date, the basic membership information is as follows:

	Active Members	CPS Suspended Members	Deferred Members	Hold-on-Deposit Members	Retired Members
Percentage of going-concern liabilities	46.6%	7.0%	5.5%	0.1%	40.8%
Percentage of solvency liabilities	51.5%	7.8%	5.5%	0.1%	35.1%
Number	41,561	3,860	8,872	3,711	23,799
Average age	44.0	47.5	47.7	49.4	72.5
Average 2014 earnings/annual pension	$68,697	$109,858	$6,243	N/A	$14,631

Key Assumptions

The principal assumptions to which the valuation results are most sensitive are outlined in the following table.

	December 31, 2014		December 31, 2011	
	Going-Concern	Solvency	Going-Concern	Solvency
Discount rate	6.05%	Annuity purchases: 0.75% Lump sums: 1.8% for 10 years, 2.5% thereafter	6.35%	Annuity purchases: 1.6% Lump sums: 1.8% for 10 years, 2.6% thereafter
Inflation rate	2.25%	Implicit in discount rates	2.50%	Implicit in discount rates
Pensionable Earnings increases	2.25% for 2014, 3.50% thereafter, plus merit & promotion based on 2015 experience study	n/a	3.00% for 2011, 2012 and 2013 3.75% thereafter, plus merit & promotion based on 2010 experience study	n/a
Mortality table	Males: CPM Private Table projected with scale CPM-B Females: 95% CPM Private Table projected with scale CPM-B	UP94 generational	93% of UP94 Generational	UP94 generational
Retirement rates	Rates varying by age and service – 2015 experience study	Immediate if over 55; otherwise at age 55	Rates varying by age and service – 2010 experience study	Immediate if over 55; otherwise at age 55

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by the Public Service Pension Board (hereafter referred to as the "Board") to conduct an actuarial valuation of the PSPP as at December 31, 2014 for the purposes of:

- determining the financial position of the PSPP as at December 31, 2014 on a going-concern basis;
- determining the going-concern current service cost as at December 31, 2014;
- determining the contribution rates that will be applicable to the PSPP under the *Public Sector Pension Plans Act* and regulations (the "*Act*") for years after 2014; and
- determining the financial position of the PSPP as at December 31, 2014 on a solvency basis.

As per our engagement, we have summarized the results of this actuarial valuation along with the ensuing opinions in this report to the Board. The results contained in this report may not be appropriate for accounting purposes, or any other purpose not listed above.

While we have been engaged by the Board to conduct this actuarial valuation, we note that the users of our work may well extend to parties external to the Board, notably the PSPP members. Out of respect for the Board's confidentiality, however, we shall not undertake to communicate the terms of our engagement or results of our work with such other users unless so directed by the Board.

Summary of Changes Since the Last Valuation

The last actuarial valuation for the PSPP in which a contribution rate recommendation was provided was performed as at December 31, 2011. Since the time of the last valuation, we note that the following have occurred:

- various going-concern assumptions have been changed to reflect changes in future expectations as well as to realign the margin contained in the assumptions such that the margin is predominantly reflected in the discount rate assumption.
- a mortality experience study was performed in 2014 resulting in a change to the mortality assumption;
- an experience study was performed in 2015 resulting in a change to the retirement, termination, merit and promotion and proportion of terminating members electing a lump sum settlement;
- solvency assumptions have been changed to reflect the assumptions applicable to December 31, 2014 valuation date.

Section 1: Introduction

Information and Inputs

In order to prepare our valuation, we have relied upon the following information:

- membership data compiled as at December 31, 2014 by the PSPP's administrator, Alberta Pensions Services Corporation ("APS");
- asset data taken from the PSPP's annual financial statements for 2014;
- a copy of the PSPP regulations with amendments up to December 31, 2014; and
- information concerning events occurring subsequent to December 31, 2014 and prior to the date of this report, as identified below.

Furthermore, our actuarial assumptions and methods have been chosen to reflect our understanding of the Board's desired funding objectives with due respect to accepted actuarial practice and regulatory constraints.

Subsequent Events

Subsequent to the valuation date, an experience study in relation to retirement, termination, merit and promotion increases and proportion of terminating members electing a lump sum settlement was performed and provided important information about the PSPP as it was at the valuation date. As a result, the relevant going-concern assumptions have been updated to reflect the findings of this experience study.

Apart from this event, we have not been made aware of any subsequent events which would have an effect on the results of this valuation. However, the following points should be noted in this regard:

- actual experience deviating from expected, since the valuation date to the date of this report, will result in gains or losses; and
- to the best of our knowledge, the results contained in this report are based on the regulatory and legal environment in effect at the date of this report and do not take into consideration any potential changes that are currently the subject of debate, review and/or court appeal.

Section 2: Going-Concern Results

Going-Concern Financial Position of the PSPP

A going-concern valuation provides an assessment of the PSPP's financial position at the valuation date on the premise that the PSPP continues indefinitely. On the basis of the PSPP provisions, membership data, going-concern assumptions and methods and asset information described in the Appendices, the going-concern financial position of the PSPP as at December 31, 2014 is shown in the following table. The results as at December 31, 2011 are also shown for comparison purposes.

	December 31, 2014 ($millions)	December 31, 2011 ($millions)
Assets		
Market Value	9,787	6,481
Asset Fluctuation Adjustment	(785)	258
Total Assets	**9,002**	**6,739**
Liabilities		
Active Members		
Retirement	3,991	3,617
Termination	878	699
Death	146	92
Total Actives	5,015	4,408
CPS Suspended Members	748	568
Deferred Members	586	522
Pending net AHS transfer to LAPP	-	8
Hold-on-Deposit Members	9	56
Retired Members and Beneficiaries	4,377	3,218
Total Liabilities	**10,735**	**8,780**
Surplus / (Unfunded Liability)	**(1,733)**	**(2,041)**
Funded Ratio	**84%**	**77%**

Section 2: Going-Concern Results

Change in Going-Concern Financial Position

During the period from December 31, 2011 to December 31, 2014, the going-concern financial position of the PSPP changed from an unfunded liability of $2,041 million to an unfunded liability of $1,733 million. The major components of this change are summarized in the following table:

Reconciliation of the Going-Concern Financial Position
For the Period from December 31, 2011 to December 31, 2014

	($millions)
Unfunded Liability as at December 31, 2011	**(2,041)**
▪ Special payments made in inter-valuation period	562
▪ Expected interest on unfunded liability and special payments	(360)
Expected unfunded liability as at December 31, 2014	**(1,839)**
▪ Gain from investment earnings higher than assumed	419
▪ Loss due to salary increases higher than assumed	(47)
▪ Gain due to COLA increases lower than assumed	49
▪ Gain due to interest credited on employee contributions lower than assumed	13
▪ Administration expenses less than assumed	2
▪ Gain due to retirement experience	133
▪ Gain due to pensioner mortality experience	24
▪ Loss due to termination experience	(56)
▪ Miscellaneous	(38)
Unfunded liability before assumption changes	**(1,340)**
▪ Change in liabilities due to changes in actuarial assumptions:	
o Mortality	(261)
o Discount rate	(354)
o Inflation rate and corresponding general wage increase rate	159
o Short-term salary increase rate	63
o Retirement rates	89
o Termination and proportion electing a lump sum settlement rates	(31)
o Seniority, merit and promotion	(14)
o Discount rate for terminated members electing a lump sum	(44)
Unfunded liability as at December 31, 2014	**(1,733)**

Section 2: Going-Concern Results

Additional information regarding the change in going-concern financial position follows.

Special Payments – Special payments were made during the inter-valuation period towards funding the unfunded liability.

Interest – Notional interest is applied at the previous valuation rate of 6.35% per annum.

Investment Return – The actuarial value of assets earned an average of 8.0% per annum during the inter-valuation period, higher than the assumed return of 6.35% per annum.

Salary Increases – Members' salary increases during the inter-valuation period were higher than the assumed increase rates.

COLA Increases – COLA increases were 0.96%, 0.72% and 1.56% for 2012, 2013 and 2014 respectively, which in aggregate, are lower than the assumed increase rate of 1.5% per annum.

Interest on employee contributions – Employee contributions were credited interest at 1.50% for 2012 and 1.45% for each of 2013 and 2014 which is lower than the assumed rate.

Expenses – Actual expenses incurred in the inter-valuation period were less than the contributions allocated for administrative expenses.

Retirement Experience – This item reflects a combination of members who commenced pension and received benefits that had a lower value than the going-concern liability previously attributed to them as well as members who deferred their retirement past the optimal age.

Pensioner Mortality – The number of pensioner deaths during the inter-valuation period was different than the expected number resulting in a loss.

Termination Experience – This item reflects members terminating and receiving a higher value than the going-concern liability previously attributed to them.

Assumption Changes – Details of assumptions and changes are shown in Appendix C.

Section 3: Solvency Results

Solvency Financial Position of the PSPP

The solvency valuation is required by the *Act* for the purpose of providing an assessment of the PSPP's financial position at the valuation date on the premise that the PSPP's obligations are settled on the valuation date for all members. The *Act* does not require funding based on the solvency valuation results.

The financial position of the PSPP on the solvency basis is measured by comparing the value of the assets, reduced by an allowance for estimated wind-up expenses, with the actuarial liability for benefits earned for service up to the valuation date determined on the assumption the PSPP is terminated on the valuation date, with immediate settlement of liabilities.

On the basis of the PSPP provisions, membership data, solvency assumptions and methods and asset information described in the Appendices, as well as the requirements of the *Act*, the solvency financial position of the PSPP as at December 31, 2014 is shown in the following table. The solvency financial position of the PSPP as at December 31, 2011 is shown for comparison purposes.

	December 31, 2014 ($millions)	December 31, 2011 ($millions)
Assets		
Market Value	**9,787**	**6,481**
Estimated Wind-up Expenses	(25)	(25)
Total Solvency Assets	**9,762**	**6,456**
Liabilities		
Active Members	9,276	6,481
CPS Suspended Members	1,398	849
Deferred Members	998	767
Hold-on-Deposit Members	9	8
Pending AHS Transfer to LAPP	-	56
Retired Members and Beneficiaries	6,319	4,386
Total Solvency Liabilities	**18,000**	**12,547**
Solvency Excess / (Deficit)	**(8,238)**	**(6,091)**
Solvency Ratio	**54%**	**51%**

Section 4: Contribution Rates

Contribution Rate In Respect of Current Service Costs

The annual going-concern cost of benefits in respect of service accruing after the valuation date is known as the current service cost. On the basis of the PSPP provisions, membership data, going-concern assumptions and methods and asset information described in the Appendices, the following table sets out:

- the current service cost expressed as a percentage of pensionable earnings;
- the provision for expenses included in the current service contribution rate; and
- the resulting total current service contribution rate.

Corresponding results from the previous valuation are also shown.

	December 31, 2014	December 31, 2011
Present value of:		
- Normal actuarial cost	$454,108,000	$364,252,000
- Next year's contributory earnings	$2,653,718,000	$2,309,081,000
Normal actuarial cost rate	17.11%	15.78%
Provision for PSPP expenses	0.50%	0.50%
Total current service contribution rate	17.61%	16.28%

Reconciliation of Current Service Rate

The table below identifies the main components of the change in the current service rate from the prior valuation to this valuation:

Reconciliation of Current Service Rate (% of Pensionable Earnings)

Current Service Rate at December 31, 2011	16.28%
Demographic experience including the impact of transitioning from a lower short-term salary increase assumption	0.66%
Effect of higher member contributions on cost of 50% Rule	0.14%
Actuarial assumption changes	0.53%
Current Service Rate at December 31, 2014	17.61%

Section 4: Contribution Rates

Contribution Rate in Respect of Unfunded Liability

Since the PSPP has a going-concern unfunded liability, additional contributions are required to fund this deficiency. In accordance with the *Act*, an unfunded liability must be amortized by a schedule of special contributions over a period not exceeding 15 years from the valuation date that it first arose. Once established, an amortization schedule remains in place until it can be eliminated either by actual contributions or net experience gains that are revealed in subsequent valuations. In the event that subsequent valuations reveal net experience losses, a new schedule is established to amortize the additional unfunded liability resulting from such losses.

In circumstances where a series of amortization schedules have been established and a valuation reveals a net experience gain, the *Act* permits a reduction in the established contribution rates or the amortization period, normally commencing with the amortization schedule that has been in existence the longest.

The following table summarizes the amortization schedules that have been established for the PSPP prior to the valuation date along with the present value at December 31, 2014 of the additional contributions for which each schedule is expected to account over its remaining lifetime.

Valuation Date at which Schedule Established	Commencement of Schedule	Contribution Rate (% pay)	End Date for Schedule	Present Value at 31-Dec-2014 ($millions)
31-Dec-2002	1-Sept-2003	2.76%	31-Dec-2017	220
31-Dec-2005	1-Jan-2007	0.16%	31-Dec-2020	25
31-Dec-2008	1-Jan-2010	3.76%	31-Dec-2023	838
31-Dec-2010	1-Jan-2012	0.26%	31-Dec-2025	69
31-Dec-2011	1-Jan-2013	2.40%	31-Dec-2026	690
	Total	9.34%		1,842

The total present value at December 31, 2014 of established contributions is $1,842 million compared to a total unfunded liability at December 31, 2014 of $1,733 million. Consequently, the established amortization schedules provide for too much deficit funding and will need to be reduced in some fashion. The following table illustrates the necessary updates to the existing schedules where the contribution rates for the oldest schedules are reduced first.

Valuation Date at which Schedule Established	Commencement of Schedule	Contribution Rate (% pay)	End Date for Schedule	Present Value at 31-Dec-2014 ($millions)
31-Dec-2002	1-Sept-2003	1.39%	31-Dec-2017	111
31-Dec-2005	1-Jan-2007	0.16%	31-Dec-2020	25
31-Dec-2008	1-Jan-2010	3.76%	31-Dec-2023	838
31-Dec-2010	1-Jan-2012	0.26%	31-Dec-2025	69
31-Dec-2011	1-Jan-2013	2.40%	31-Dec-2026	690
	Total	7.97%		1,733

Section 4: Contribution Rates

Excess Surplus

The *Income Tax Act* prescribes the maximum going-concern surplus that may be retained by the PSPP while full contributions continue. Since there is no going-concern surplus, contribution rates would not be affected by the prescribed maximum surplus limit.

Contribution Rate in Respect of Solvency Deficiency

The *Act* does not require additional contributions to fund the solvency deficiency.

Total Required Contribution Rate

The total contribution rates that are required commencing January 1, 2015 to provide for accruing service and amortization of the unfunded liability in accordance with established schedules as modified above are outlined in the following table. These rates have been established on the basis that total costs are shared equally between PSPP active members and their employers.

Total Contribution Rates
(% of Pensionable Earnings)

	Members	Employers	Total
Level Rate On All Earnings			
Current Service Rate	8.805%	8.805%	17.61%
Unfunded Liability Payments			
December 31, 2002	0.695%	0.695%	1.39%
December 31, 2005	0.080%	0.080%	0.16%
December 31, 2008	1.880%	1.880%	3.76%
December 31, 2010	0.130%	0.130%	0.26%
December 31, 2011	1.200%	1.200%	2.40%
Total Contribution Rate	12.790%	12.790%	25.58%
Split Rate Below/Above YMPE			
On Earnings Below YMPE	11.70%	11.70%	23.40%
On Earnings Above YMPE	16.72%	16.72%	33.44%

Section 5: Additional Disclosures

Effect – Going-Concern Valuation Interest Rate Reduced by 1%

The going-concern valuation liability shown in Section 2 and the current service cost shown in Section 4 are based on an interest rate assumption of 6.05% per year. The impact on these results of using an interest rate 1% lower is as follows:

	At 6.05% ($millions)	At 5.05% ($millions)	Effect	
			In $millions	In %
Total going-concern liability	$10,735	$12,436	+ $1,701	+ 15.8%
Total normal actuarial cost	$454	$545	+ $91	+ 20.1%

The current service cost under the reduced discount rate has been calculated assuming future employee contribution would not change.

Effect –Solvency Valuation Interest Rate Reduced by 1%

The solvency liability shown in Section 3 is based on:

- a discount rate before adjustments for indexing of 2.5% per annum for the first 10 years and 3.8% per annum thereafter for the calculations of transfer values; and
- a discount rate before adjustments for indexing of 2.82% per annum for the estimation of the cost of purchasing the pensions for retirees and beneficiaries.

The impact on the solvency results of using a discount rate that is 1% lower than these assumed rates is as follows.

	Valuation basis at December 31, 2014 ($millions)	Based on Interest Rate Lower by 1% ($millions)	Effect	
			In $millions	In %
Total liability - solvency	$18,000	$21,555	+ $3,555	+ 19.75%

Section 5: Additional Disclosures

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at December 31, 2014 of the expected aggregate change in the solvency liability between December 31, 2014 and the next calculation date, adjusted upwards for expected benefit payments between those dates. Appendix D provides further detail on the calculation methodology and related assumptions.

Based on the methodology and assumptions described in Appendix D, the incremental cost on a solvency basis, for the period from December 31, 2014 to December 31, 2015, is $732 million.

Margin for Adverse Deviation

A margin for conservatism or provision for adverse deviation has been built into the going-concern assumptions as described in Appendix C. This margin is aimed at reducing the potential adverse effect of the uncertainty inherent in the going-concern assumptions. If the future unfolds in accordance with what are considered to be best estimate assumptions (that is, assumptions without margin), then the margin built into the going-concern assumptions will be released into surplus.

The amount of margin to include in the going-concern assumptions is guided by the PSPP’s Statement of Funding Policy. This Statement contemplates that all margin will be built into the discount rate assumption such that:

- the going-concern liabilities calculated using the long-term rate of return assumption net of margin (i.e. the discount rate assumption)

will exceed

- the going-concern liabilities calculated using the long-term rate of return assumption before any reduction for margin

by at least 5%, with a target of 10%.

For this valuation, the amount of margin incorporated into the discount rate assumption is 0.55% per annum. In other words, the discount rate is 0.55% lower than the best estimate long-term rate of return assumption. This margin has been discussed with the Board, and the Board has expressed their comfort with the margin level.

The following table illustrates the magnitude of the 0.55% discount rate margin expressed in terms of a percentage of the going-concern liabilities and current service cost determined using best estimate assumptions.

	Going-Concern Value	**Best Estimate Value**	**Margin**	**Margin (as a % of Best Estimate Value)**
Liabilities	$10,735m	$10,025m	$710m	7.1%
Current service cost	17.61%	15.66%	1.95%	12.5%

Section 5: Additional Disclosures

The amount of margin included in the going-concern assumption basis is a matter of judgement and is influenced by a number of factors, including:

- the desire to maintain stable and affordable contribution rates;
- the level of the asset fluctuation adjustment and the resulting proximity of the actuarial asset value to market value; and
- the conviction that the margin can be managed to its target level over the long-term.

Section 6: Actuarial Certificate

Actuarial Opinion and Certification for the *Public Service Pension Plan*

CRA Registration: 0208769

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the PSPP as at December 31, 2014. We confirm that we have prepared an actuarial valuation of the PSPP as at December 31, 2014 for the purposes outlined in the Introduction section to this report and consequently:

We hereby recommend that:

1. Commencing January 1, 2015 and continuing until the next actuarial valuation is certified, the recommended combined total member and employer contribution rate payable is 25.58% of aggregate member contributory earnings. The allocation of the 25.58% total contribution rate to member earnings up to and over the YMPE in a manner consistent with prior years' results in the following contribution rates in respect of each member and his/her employer:

- contribution rate on earnings up to YMPE:	11.70% member and 11.70% employer
- contribution rate on earnings over YMPE:	16.72% member and 16.72% employer

2. The next actuarial valuation for the purpose of developing a contribution recommendation be performed no later than as at December 31, 2017.

We hereby certify that, in our opinion:

1. With respect to the purposes of determining the PSPP's financial position on a going-concern basis:

a) The PSPP has a going-concern unfunded liability (excess of liabilities over assets) of $1,733 million as at December 31, 2014, based on total assets of $9,002 million and total liabilities of $10,735 million.

b) There is no excess surplus as defined by Section 147.2(2) of the *Income Tax Act* at December 31, 2014.

2. With respect to the purpose of determining the PSPP's financial position on a solvency basis:

a) The PSPP has a solvency deficit of $8,238 million as at December 31, 2014, determined as solvency assets of $9,762 million less solvency liabilities of $18,000 million.

b) The solvency ratio is 54% as at December 31, 2014.

c) The liabilities of the PSPP would exceed the PSPP's assets by $8,238 million if the PSPP was terminated and wound-up as at December 31, 2014.

3. With respect to the purpose of determining the contribution rates that are applicable to the PSPP for years after 2014:

a) The PSPP's going-concern current service cost is estimated to be 17.61% of aggregate member contributory earnings. Of this cost, 17.11% is attributed to the cost of benefits accruing in the year following the valuation date and 0.50% is attributed to administrative expenses that are paid from the fund.

Section 6: Actuarial Certificate

b) The additional contributions required to fund the going-concern unfunded liability in accordance with the *Act* are as summarized in the following table.

Unfunded Liability Identified as at	Contribution Rate (% pay)	Amortization Ending Date
December 31, 2002	1.39%	December 31, 2017
December 31, 2005	0.16%	December 31, 2020
December 31, 2008	3.76%	December 31, 2023
December 31, 2010	0.26%	December 31, 2025
December 31, 2011	2.40%	December 31, 2026
Total	7.97%	

4. For the purposes of the valuation:
- The data on which this valuation is based are sufficient and reliable;
- The assumptions used are appropriate; and
- The actuarial cost methods and the asset valuation methods used are appropriate.

5. This report and its associated work have been prepared, and our opinion given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *Income Tax Act.*

6. Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses that will be revealed in subsequent valuations.

Original signed by

Donald Ireland
Fellow, Canadian Institute of Actuaries

Original signed by

Colleen Blanchette
Fellow, Canadian Institute of Actuaries

June 18, 2015

Appendix A: Assets

PSPP assets are held in trust and are managed by Alberta Investment Management Corporation. This type of arrangement governs only the investment of the assets deposited into the trust fund and in no way guarantees the benefits provided under the PSPP or the costs of providing such benefits. Any excess income or, in fact, any other profit caused by the actual PSPP experience varying from the actuarial assumptions will accrue to the fund. It is conversely true that any losses due to variations of actual experience from the actuarial assumptions will emerge as a liability of the PSPP, which will either cause a reduction in the surplus generated from other sources or require an increase in contributions to maintain the same benefit level.

The asset data required for the valuation in respect of the PSPP's trust fund was taken from the PSPP's audited financial statements at December 31, 2014. The valuation included an examination of the asset data to test for general reasonableness, internal consistency, consistency with asset data provided in prior years, a comparison of the contributions and disbursements reported with those expected to be made, as well as a reconciliation with the previous valuation's asset data. These tests demonstrated that the asset data is sufficient and reliable for the purposes of the valuation.

Asset Allocation

The following is a summary of the composition of the PSPP's trust fund assets by asset type as reported in the financial statements as at December 31, 2014. For comparison, the reported allocation at December 31, 2011 is also shown.

Asset Class	Proportion at 31-Dec-2014	Proportion at 31-Dec-2011
Money market	0.5%	0.8%
Liability matching assets	15.2%	20.4%
Other fixed income	16.6%	13.8%
Equities	49.6%	52.3%
Alternatives	17.4%	12.7%
Strategic opportunities	0.7%	0.0%
Total Invested Assets	100.0%	100.0%

Appendix A: Assets

Reconciliation of Invested Assets

A reconciliation of the invested assets since January 1, 2012 is summarized below. The following table reconciles the fund's market value (adjusted for in-transit items).

	Year Ending December 31		
	2014 ($ million)	2013 ($ million)	2012 ($million)
Opening Market Value	$ 8,559	$ 7,300	$ 6,481
Contributions:			
Employees	325	314	256
Employer	325	315	256
Prior Service	5	5	5
Transfers from Other Plans	11	15	13
Benefits:			
Pension Benefits	(320)	(292)	(269)
Disability Benefits	(2)	(2)	(2)
Termination Benefits	(107)	(92)	(75)
Death Benefits	(21)	(28)	(24)
Transfers to Other Plans	(22)	(31)	(78)
Investment Earnings	1,094	1,109	780
Expenses:			
Investment Expenses	(48)	(43)	(32)
Administrative Expenses	(12)	(11)	(11)
Closing Market Value	$ 9,787	$ 8,559	$ 7,300
Approximate Rate of Return (net of investment expenses)	12.1%	14.4%	11.5%

Appendix A: Assets

Target Asset Mix

The target asset mix strategy for the PSPP at December 31, 2014 is as follows:

Money Market	0.5%
Long Bonds	15.0
Universe Bonds	2.0
Real Return Bonds	5.0
Mortgages	5.0
Canadian Equities	12.0
Global Equities	26.0
Emerging Market Equities	5.0
Private Equities	4.5
Canadian Real Estate	12.5
Foreign Real Estate	2.5
Private Income and Debt	10.0
	100.0%

Rates of Return

The PSPP's assets achieved the following rate of return during the inter-valuation period, before administration expenses but after investment expenses:

	2014	**2013**	**2012**
Market Value	12.1%	14.4%	11.5%
Actuarial Asset Value	10.3%	10.7%	3.2%

Appendix A: Assets

Development of Asset Fluctuation Adjustment

The development of the asset fluctuation adjustment is shown in the following tables. Please refer to Appendix C for a description of the asset valuation methodology.

	2009	2010	2011	2012	2013
Accum / Market Value Dec. 31, 2010	$6,167				
Net Cash Flow 2011	104				
Assumed Income @ 6.50%	404				
Accum / Market Value Dec. 31, 2011	$6,675	$6,481			
Net Cash Flow 2012	71	71			
Assumed Income @ 7.08%	474	460			
Accum / Market Value Dec. 31, 2012	$7,220	$7,012	$7,300		
Net Cash Flow 2013	194	194	194		
Assumed Income @ 7.06%	518	502	522		
Accum / Market Value Dec. 31, 2013	$7,932	$7,708	$8,016	$8,559	
Net Cash Flow 2014	182	182	182	182	
Assumed Income @ 7.00%	562	546	567	605	
Accum / Market Value Dec. 31, 2014	$8,676	$8,436	$8,765	$9,346	$9,787

Summary	
Average of Final Values	$9,002
90% of 2014 Market Value	$8,808
Greater of these two values	$9,002
Less 2014 Market Value	(9,787)
Asset Fluctuation Adjustment	$ (785)

Appendix B: Membership Data

Source of Data

This actuarial valuation is based on membership data compiled as at the valuation date and obtained from APS.

Various tests on the membership data were conducted to ensure its validity. Tests performed included the following:

- Membership reconciliation with prior valuation data, which is presented hereunder.
- Comparison of changes in salaries, years of membership and credited service.
- Comparison of pensions paid to retirees and lump sum benefits paid following termination of employment or death to amounts contained in the asset data.
- Validation with APS of all deviations observed in information compared to data provided for the previous actuarial valuation and adjustments made where necessary.

The results of the tests performed demonstrated that the membership data was complete, except that 2014 pensionable earnings data were missing for 1375 active/CPS members. To estimate this missing data, these members were assigned 2014 pensionable earnings equal to the average 2014 pensionable earnings for the quinquennial age and service group to which they belong.

In our opinion, the impact of these data estimates does not materially affect the results of the valuation. The adjusted data is sufficient and reliable for the purposes of this valuation.

Appendix B: Membership Data

Membership Reconciliation

The reconciliation of all members by calendar year since the last actuarial valuation is as follows:

	Active	CPS Suspended	Deferred	Hold-on-Deposit	Retired/ Beneficiaries	Total
As at December 31, 2011	**40,260**	**2,936**	**8,497**	**3,703**	**21,181**	**76,577**
New members	4,818	2	-	23	-	4,843
Return to Active	223	(22)	(163)	(38)	-	-
New CPS	(399)	404	(5)	-	-	-
Terminations - Deferred	(1,197)	(50)	1,026	221	-	-
ATB Transfers	(132)	-	-	-	-	(132)
Paid out/Transfers	(1,999)	(28)	(463)	(141)	-	(2,631)
Retirements	(800)	(79)	(259)	-	1,138	-
Deaths	(64)	(3)	-	(3)	(446)	(516)
Data adjustments	-	1	9	(1)	5	14
As at December 31, 2012	**40,710**	**3,161**	**8,642**	**3,764**	**21,878**	**78,155**

	Active	CPS Suspended	Deferred	Hold-on-Deposit	Retired/ Beneficiaries	Total
As at December 31, 2012	**40,710**	**3,161**	**8,642**	**3,764**	**21,878**	**78,155**
New members	4,410	3	2	16	170	4,601
Return to Active	209	(35)	(140)	(33)	(1)	-
New CPS	(274)	274	-	-	-	-
Terminations - Deferred	(1,029)	(71)	995	105	-	-
ATB Transfers	(159)	-	-	-	-	(159)
Paid out/Transfers	(2,026)	(28)	(446)	(130)	-	(2,630)
Retirements	(993)	(102)	(262)	(1)	1,358	-
Deaths	(76)	(1)	(2)	(2)	(642)	(723)
Expiry of Guarantee	-	-	-	-	(9)	(9)
Data adjustments	(514)[1]	(510)[1]	(18)	18	10	6
As at December 31, 2013	**40,258**	**3,711**	**8,771**	**3,737**	**22,764**	**79,241**

[1] Historically, former PSPP members who transferred to the UAPP were reported as active members in the data. For the December 31, 2013 valuation, 512 such members have been identified and allocated to the CPS membership.

Appendix B: Membership Data

	Active	CPS Suspended	Deferred	Hold-on-Deposit	Retired/ Beneficiaries	Total
As at December 31, 2013	**40,258**	**3,711**	**8,771**	**3,737**	**22,764**	**79,241**
New members	5,587	3	1	38	23	5,652
Return to Active	261	(56)	(166)	(39)	-	-
New CPS	(431)	442	(11)	-	-	-
Terminations - Deferred	(924)	(78)	918	84	-	-
ATB Transfers	(175)	-	-	-	-	(175)
Paid out/Transfers	(1,897)	(36)	(378)	(91)	-	(2,402)
Retirements	(1,060)	(132)	(256)	(3)	1,451	-
Deaths	(41)	(4)	(5)	(1)	(434)	(485)
Expiry of Guarantee	-	-	-	-	(8)	(8)
Data adjustments	(17)	10	(2)	(14)	3	(20)
As at December 31, 2014	**41,561**	**3,860**	**8,872**	**3,711**	**23,799**	**81,803**

Membership Summary

Active Members

		December 31, 2014	December 31, 2011
Number			
	Male	13,440	12,803
	Female	28,121	27,457
	Total	**41,561**	**40,260**
Average Age			
	Male	43.5	44.1
	Female	44.2	44.1
	Total	**44.0**	**44.1**
Average PSPP Service			
	Male	9.7	10.6
	Female	9.7	10.1
	Total	**9.7**	**10.2**
Average Annualized Earnings			
	Male	$ 76,304	$ 69,097
	Female	65,061	57,900
	Total	**$ 68,697**	**$ 61,461**

Appendix B: Membership Data

CPS Suspended Members

	December 31, 2014	December 31, 2011
Number		
Male	1,745	1,409
Female	2,115	1,527
Total	**3,860**	**2,936**
Average Age		
Male	47.8	48.2
Female	47.1	47.3
Total	**47.5**	**47.7**
Average PSPP Service		
Male	9.3	10.3
Female	9.4	10.5
Total	**9.4**	**10.4**
Average CPS		
Male	6.6	17.3
Female	5.5	16.5
Total	**6.0**	**16.9**
Average Annualized Earnings		
Male	$114,791	$103,563
Female	105,788	96,952
Total	**$109,858**	**$100,125**

Deferred Members

	December 31, 2014	December 31, 2011[2]
Number		
Male	2,890	4,029
Female	5,982	8,171
Total	**8,872**	**12,200**
Average Age		
Male	48.8	48.5
Female	47.2	46.8
Total	**47.7**	**47.3**
Average Deferred Pension[3]		
Male	$ 7,290	$ 7,429
Female	5,737	5,601
Total	**$ 6,243**	**$ 6,212**

[2] Includes Hold-on-Deposit members – a breakdown between deferred and Hold-on-Deposit members is not available at December 31, 2011

[3] Includes cost of living adjustments to the January 1 following the valuation date

Appendix B: Membership Data

Hold-on-Deposit Members

	December 31, 2014	December 31, 2013
Number		
Male	1,192	**N/A**
Female	2,519	
Total	**3,711**	
Average Age		
Male	50.7	**N/A**
Female	48.8	
Total	**49.4**	
Average Contributions with Interest		
Male	$ 2,540	**N/A**
Female	2,497	
Total	**$ 2,511**	

Retired Members and Survivors/Beneficiaries

	December 31, 2014	December 31, 2013
Number		
Male	10,669	8,436
Female	13,30	12,745
Total	**23,799**	**21,181**
Average Age		
Male	73.9	72.1
Female	71.4	72.1
Total	**72.5**	**72.1**
Average Current Pension (including any coordination)*		
Male	$ 16,755	$ 15,379
Female	12,905	10,979
Total	**$ 14,631**	**$ 12,732**

* Including indexation as at January 1, 2015

Active Membership Distribution

The following tables provides a break-down of the active membership at December 31, 2014 by years of credited service and by age group, showing the number of members, the average earnings and the average accumulated member contributions with interest in each age/service group.

Appendix B: Membership Data

All Active
COMPLETED YEARS OF PENSIONABLE SERVICE

Age	Under 5	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and Over	Total
Under 25	1,360	5							1,365
	51,802	53,951							51,810
	5,837	25,821							5,912
25-29	4,124	528							4,652
	59,674	65,340							60,317
	11,435	35,483							14,186
30-34	3,617	1,939	165	1					5,722
	64,167	72,065	74,094	52,779					67,127
	14,007	42,801	59,806	51,137					25,140
35-39	2,369	1,900	769	103	1				5,142
	65,731	75,153	78,978	75,951	129,263				71,411
	15,176	47,632	69,603	77,219	133,567				36,637
40-44	1,806	1,581	973	479	74	7			4,920
	64,111	74,181	78,273	78,554	70,512	63,397			71,649
	14,497	48,547	71,817	86,685	89,929	89,867			45,088
45-49	1,456	1,369	801	597	427	243	14		4,907
	65,477	71,662	77,278	76,015	75,001	71,833	71,044		71,570
	15,046	47,229	71,999	85,261	101,313	106,484	118,865		54,243
50-54	1,197	1,203	856	681	581	715	567	50	5,850
	66,260	69,557	72,219	75,767	73,306	76,215	71,501	69,463	71,368
	15,617	45,898	67,937	86,616	102,277	119,842	122,978	121,416	70,523
55-59	787	948	715	630	507	629	600	315	5,131
	64,306	69,347	70,797	71,449	72,918	73,417	73,922	71,254	70,538
	15,854	46,458	67,270	82,144	104,279	118,264	135,488	118,261	78,405
60-64	325	531	411	410	308	365	406	345	3,101
	63,731	68,853	69,361	70,070	68,032	69,147	72,110	73,035	69,389
	17,378	45,924	66,529	81,376	98,062	114,292	138,474	122,392	84,201
65 and Over	72	132	106	111	63	88	84	115	771
	66,385	66,650	68,700	70,306	68,572	68,861	73,944	77,498	70,256
	15,588	44,583	66,095	81,540	96,393	113,673	136,198	123,591	84,039
Total	17,113	10,136	4,796	3,012	1,961	2,047	1,671	825	41,561
	62,577	71,770	74,906	74,378	72,517	73,215	72,637	72,761	68,697
	13,318	45,708	69,129	84,190	101,284	116,414	131,865	120,923	49,033

Each cell shows:
- Number of Members
- Average annual pensionable earnings
- Average contributions with interest

Appendix B: Membership Data

Male Active

COMPLETED YEARS OF PENSIONABLE SERVICE

Age	Under 5	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and Over	Total
Under 25	478	1							479
	55,707	51,548							55,698
	6,206	23,156							6,242
25-29	1,371	151							1,522
	62,558	72,335							63,528
	12,108	41,418							15,045
30-34	1,231	621	55						1,907
	68,454	76,138	79,618						71,278
	14,826	47,459	65,589						26,968
35-39	872	636	236	41	1				1,786
	72,256	80,137	85,088	83,669	129,263				77,052
	17,410	53,625	78,200	87,517	133,567				40,103
40-44	611	562	347	183	17	1			1,721
	71,763	82,000	84,745	86,565	77,625	81,333			79,361
	17,137	56,405	80,643	98,116	101,434	106,645			52,281
45-49	436	436	238	207	143	73	6		1,539
	75,912	80,713	88,132	85,754	80,207	77,956	70,084		80,959
	17,219	55,771	86,436	100,438	111,719	118,792	112,490		64,100
50-54	318	356	229	206	170	272	127	8	1,686
	80,885	81,263	85,975	88,227	82,657	82,555	81,075	72,184	82,974
	19,145	56,606	85,893	106,707	119,957	132,250	142,959	155,744	85,442
55-59	237	282	176	176	147	217	209	93	1,537
	77,009	79,664	85,662	82,615	83,131	81,378	83,407	81,566	81,477
	19,119	56,383	86,860	98,516	124,706	134,317	158,834	147,838	95,954
60-64	98	164	115	119	73	107	179	142	997
	75,508	80,949	80,026	83,215	83,267	80,673	79,594	83,406	80,825
	20,426	55,667	80,612	99,882	127,136	139,484	156,673	147,289	105,770
65 and Over	27	45	28	28	16	27	32	63	266
	73,115	78,901	79,110	82,069	75,594	85,856	85,677	86,065	81,688
	15,552	55,782	80,012	98,087	114,097	150,748	169,315	143,028	106,171
Total	5,679	3,254	1,424	960	567	697	553	306	13,440
	68,667	79,508	84,989	85,353	81,972	81,544	81,624	83,101	76,304
	14,804	53,338	82,222	100,299	119,338	133,274	154,592	146,800	56,845

Each cell shows:

Number of Members
Average annual pensionable earnings
Average contributions with interest

Appendix B: Membership Data

Female Active

COMPLETED YEARS OF PENSIONABLE SERVICE

Age	Under 5	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 and Over	Total
Under	882	4							886
25	49,686	54,551							49,708
	5,637	26,487							5,733
25-29	2,753	377							3,130
	58,238	62,538							58,756
	11,101	33,106							13,770
30-34	2,386	1,318	110	1					3,815
	61,955	70,146	71,332	52,779					65,053
	13,584	40,606	56,915	51,137					24,226
35-39	1,497	1,264	533	62					3,356
	61,930	72,646	76,272	70,847					68,409
	13,878	44,617	65,796	70,409					34,795
40-44	1,195	1,019	626	296	57	6			3,199
	60,199	69,869	74,686	73,602	68,390	60,407			67,501
	13,143	44,213	66,925	79,618	86,497	87,071			41,213
45-49	1,020	933	563	390	284	170	8		3,368
	61,016	67,432	72,690	70,846	72,380	69,203	71,764		67,280
	14,120	43,238	65,896	77,205	96,074	101,198	123,646		49,744
50-54	879	847	627	475	411	443	440	42	4,164
	60,969	64,637	67,194	70,363	69,438	72,322	68,737	68,945	66,669
	14,357	41,397	61,379	77,902	94,964	112,224	117,210	114,877	64,497
55-59	550	666	539	454	360	412	391	222	3,594
	58,832	64,979	65,943	67,120	68,748	69,225	68,853	66,935	65,860
	14,442	42,255	60,874	75,798	95,938	109,810	123,009	105,870	70,896
60-64	227	367	296	291	235	258	227	203	2,104
	58,646	63,448	65,218	64,695	63,299	64,367	66,208	65,780	63,970
	16,062	41,570	61,057	73,809	89,031	103,844	124,123	104,976	73,980
65	45	87	78	83	47	61	52	52	505
and Over	62,347	60,313	64,963	66,337	66,182	61,338	66,724	67,119	64,234
	15,610	38,791	61,099	75,958	90,366	97,262	115,819	100,043	72,381
Total	11,434	6,882	3,372	2,052	1,394	1,350	1,118	519	28,121
	59,553	68,111	70,647	69,244	68,672	68,915	68,192	66,664	65,061
	12,580	42,100	63,600	76,653	93,940	107,709	120,623	105,666	45,303

Each cell shows:

Number of Members
Average annual pensionable earnings
Average contributions with interest

Appendix B: Membership Data

Pensioner/Beneficiary Membership Distribution

The following table provides a break-down of the retired membership at December 31, 2014 by age and years since retirement, showing the number of members and the average annual pension in each age/service group.

Pensioners

YEARS SINCE RETIREMENT

Age	Under 5	5 - 14	15 - 24	25 - 34	35 and Over	Total
Under 60	1,391 22,264	87 9,493	45 9,076	8 7,388		1,531 21,073
60-64	1,932 22,591	1,472 18,713	49 8,581	17 6,176	4 4,665	3,474 20,649
65-69	1,981 19,409	3,178 15,839	58 10,324	32 6,371	9 4,654	5,258 17,047
70-74	366 18,254	2,442 15,086	1,471 10,274	40 9,671	12 4,710	4,331 13,641
75-79	26 13,590	1,089 13,003	2,279 10,406	60 9,804	21 6,789	3,475 11,211
80-84		76 9,377	1,888 10,251	742 9,356	23 5,783	2,729 9,946
85-89			809 10,238	960 9,937	34 7,179	1,803 10,020
90 and Over			50 9,442	903 9,599	245 8,924	1,198 9,454
Total	5,696 21,085	8,344 15,631	6,649 10,282	2,762 9,592	348 8,112	23,799 14,631

Each cell shows:
Number of Members
Average annual pension

Appendix C: Going-Concern Assumptions and Methods

A member's entitlements under a pension plan are generally funded during the period over which service is accrued by the member. In other words, the costs of each member's benefits are allocated in some fashion over each member's service. An actuarial valuation provides an assessment of the extent to which allocations relating to periods prior to a valuation date (often referred to as the actuarial liabilities) are covered by the plan's assets.

The going-concern valuation provides an assessment of a pension plan on the premise that the plan continues on into the future indefinitely. In order to prepare a going-concern valuation, two important elements need to be established:

- going-concern assumptions in respect of future events upon which a plan's benefits are contingent; and;
- going-concern methods which effectively determine the way in which a plan's costs will be allocated over the members' service.

Together, the going-concern assumptions and methods provide a basis from which a plan's cost can be estimated and also help establish an orderly program for meeting the ultimate cost of a plan. The true cost of a plan, however, will emerge only as experience develops, investment earnings are received, and benefit payments are made.

This appendix summarizes the going-concern assumptions and methods that have been adopted for the going-concern valuation of the PSPP at the valuation date. It is important to note that these assumptions and methods should be reviewed periodically to ensure that they adequately reflect the experience of the PSPP and continue to satisfy the PSPP's funding objectives. For purposes of this valuation, the going-concern methods and assumptions were reviewed and changes as indicated below were made.

Margins

Margins for conservatism or provisions for adverse deviation have been built into the going-concern assumptions where appropriate. These margins are aimed at reducing the potential adverse effect of the uncertainty inherent in the going-concern assumptions. If the future unfolds in accordance with what are considered to be best estimate assumptions (that is, assumptions with no such margins), then the margins built into the going-concern assumptions will be released into surplus.

Appendix C: Going-Concern Assumptions and Methods

Going-Concern Assumptions

	December 31, 2014	December 31, 2011
Demographic		
Mortality	Males: CPM Private Table projected with Scale CPM-B Females: 95% of CPM Private Table projected with Scale CPM-B	93% of UP94 Generational
Retirement	Actives: age and service-based, gender distinct table based on 2015 experience study Deferred: age 55	Actives: age and service-based, gender distinct table based on 2010 experience study Deferred: age 55
Termination	5-year select, gender distinct, age-based table based on 2015 experience study	5-year select, gender distinct, age-based table based on 2010 experience study
Proportion of vested terminated members electing a lump sum	80% if service less than 5 years, 50% if service between 5 and 15 60% if service between 15 and 20 70% if service between 20 and 25 75% if service greater than 25	80% if service less than 5 years, 50% if service more than 5 years
Proportion of members with spouses and spousal age differential	100% married; Male spouse 3 years older	Same
Future PSPP membership for funding the unfunded liability	PSPP active membership will remain stable and the aggregate pensionable earnings base will increase at the rate of increase for general earnings	PSPP active membership will remain stable and the aggregate pensionable earnings base will increase at the rate of increase for general earnings
Economic		
Inflation rate	2.25%	2.50%
Long-term rate of return	6.60%	7.08%
Discount rate	6.05%	6.35%
Discount rate for terminated members electing a lump sum	3.50%	4.10%
Inflation rate for terminated members electing a lump sum	2.00%	2.46%

Appendix C: Going-Concern Assumptions and Methods

Increases in pensionable earnings:		
i) General earnings increase rates	2.25% for 2014 3.50% thereafter	3.0% for 2011, 2012 and 2013 3.75% thereafter
ii) Merit and promotion increase rates	Age based rates based on the 2015 experience study	Age based rates based on the 2010 experience study
YMPE and Max Pension Limit	3.50%	3.75%
Cost-of-living adjustments	1.35%	1.50%
Interest on member contributions	4.25%	4.50%
Increase on advance pensioners	10%	Same
Expenses	0.5% of pensionable earnings	Same

Further detail concerning these assumptions is summarized below.

Demographic Assumptions

Mortality

Benefits paid from the PSPP in respect of a particular member are contingent to a very large degree on the survival of the member and/or the member's spouse. For example:

- if an active member dies prior to retirement, pre-retirement death benefits are triggered;
- a pension is paid to a pensioner only while the pensioner is alive; and
- where a pensioner has elected a joint and survivor form of benefit, a pension is paid to the pensioner's spouse in the event the pensioner predeceases his/her spouse

Consequently, an assumption has been made regarding the survival of members and, where applicable, spouses to each age into the future.

For this valuation, the gender-distinct mortality rates have been assumed to be in accordance with:

- for males, 100% of the Canadian Pensioner Mortality (CPM) 2014 – Private Sector Males mortality table without adjustment for pension size with future improvements in mortality in accordance with the CPM Scale B; and
- for females, 95% of the Canadian Pensioner Mortality (CPM) 2014 – Private Sector Females mortality table without adjustment for pension size with future improvements in mortality in accordance with the CPM Scale B.

This assumption is based on the analysis and conclusions of the PSPP’s 2014 Mortality Experience Study and is considered best estimate.

Appendix C: Going-Concern Assumptions and Methods

The previous valuation used gender-distinct mortality rates in accordance with 93% of the Uninsured Pensioner 1994 mortality table with mortality improvements projected generationally using Scale AA.

Retirement

A member's benefit entitlement under the PSPP is dependent on when the member decides to commence, or is deemed to commence, to receive a pension from the PSPP (referred to as retirement from the PSPP). Accordingly, an assumption with respect to when a member is expected to retire from the PSPP has been made.

The retirement rates used for active/CPS members in the valuation are shown in the following tables. These rates are based on the results of a study performed in 2015 on the PSPP’s retirement experience and are considered best estimate. The retirement rates used in the December 31, 2011 valuation for active/CPS members were based on a retirement experience study performed in 2010. For comparison, the previous valuation’s retirement rates are also shown.

For both this and the previous valuation, deferred vested members are assumed to retire at age 55, which is the age that maximizes the pension value for such members.

Appendix C: Going-Concern Assumptions and Methods

Male Retirement Rates – Active / CPS Members – 2015 Experience Study

	Age															
Service	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
2	2.5%	3.0%	3.0%	3.5%	4.5%	6.5%	5.0%	6.5%	7.0%	14.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
3	2.5%	3.0%	3.0%	3.5%	4.5%	6.5%	5.0%	6.5%	7.0%	15.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
4	2.5%	3.0%	3.0%	3.5%	5.0%	6.5%	5.0%	6.5%	7.0%	15.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
5	2.5%	3.0%	3.0%	3.5%	5.0%	6.5%	5.0%	6.5%	7.0%	15.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
6	2.5%	3.0%	3.0%	4.0%	5.0%	6.5%	5.0%	6.5%	7.0%	15.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
7	2.5%	3.0%	3.0%	4.0%	5.0%	7.0%	5.0%	7.0%	7.0%	15.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
8	2.5%	3.0%	3.0%	4.0%	5.0%	7.0%	5.0%	7.0%	7.0%	16.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
9	2.5%	3.0%	3.0%	4.0%	5.0%	7.0%	5.0%	7.0%	7.0%	16.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
10	2.5%	3.0%	3.0%	4.0%	5.0%	7.0%	5.0%	8.0%	7.0%	16.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
11	3.5%	3.5%	3.0%	4.0%	5.5%	7.0%	5.0%	8.0%	7.0%	16.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
12	3.5%	3.5%	3.0%	4.0%	5.5%	7.5%	5.0%	8.0%	7.0%	17.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
13	3.5%	3.5%	3.0%	4.0%	5.5%	7.5%	5.0%	8.0%	7.0%	17.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
14	3.5%	3.5%	3.0%	4.5%	5.5%	7.5%	7.0%	8.0%	7.0%	17.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
15	3.5%	3.5%	3.0%	4.5%	5.5%	7.5%	7.0%	8.0%	7.0%	17.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
16	3.5%	3.5%	3.0%	4.5%	5.5%	7.5%	7.0%	8.0%	7.0%	17.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
17	3.5%	3.5%	3.0%	4.5%	6.0%	7.5%	7.0%	8.0%	7.0%	18.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
18	3.5%	3.5%	3.0%	4.5%	6.0%	7.5%	7.0%	8.0%	7.0%	18.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
19	3.5%	3.5%	3.0%	4.5%	6.0%	7.5%	7.0%	8.0%	7.0%	18.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
20	4.5%	3.5%	3.0%	4.5%	6.0%	7.5%	7.5%	8.0%	7.0%	18.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
21	4.5%	3.5%	3.0%	4.5%	6.0%	7.5%	7.5%	8.0%	15.0%	20.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
22	4.5%	3.5%	3.0%	4.5%	6.0%	12.0%	7.5%	8.0%	10.0%	27.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
23	4.5%	3.5%	3.0%	5.0%	6.0%	12.0%	7.5%	20.0%	15.0%	28.0%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
24	4.5%	3.5%	3.0%	5.0%	6.5%	12.0%	15.0%	20.0%	15.0%	28.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
25	4.5%	5.0%	5.0%	5.0%	10.0%	20.0%	7.0%	20.0%	10.0%	28.5%	35.0%	25.0%	25.0%	50.0%	50.0%	100.0%
26	4.5%	5.0%	5.0%	10.0%	10.0%	8.0%	8.0%	10.0%	10.0%	29.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
27	4.5%	5.0%	15.0%	10.0%	7.5%	8.0%	9.5%	10.0%	10.0%	29.5%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
28	4.5%	15.0%	15.0%	7.5%	7.5%	8.0%	8.5%	10.0%	10.0%	29.5%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
29	5.0%	15.0%	10.0%	7.5%	7.5%	8.0%	9.0%	10.0%	10.0%	30.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
30	15.0%	10.0%	10.0%	7.5%	7.5%	11.0%	12.0%	10.0%	10.0%	30.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
31	15.0%	10.0%	10.0%	7.5%	7.5%	11.0%	12.0%	10.0%	10.0%	30.5%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
32	15.0%	10.0%	10.0%	7.5%	15.0%	11.0%	12.0%	10.0%	10.0%	31.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
33	15.0%	10.0%	15.0%	7.5%	15.0%	13.5%	13.0%	15.0%	20.0%	31.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
34	15.0%	10.0%	15.0%	15.0%	15.0%	16.0%	15.5%	15.0%	20.0%	31.5%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
35	30.0%	25.0%	15.0%	20.0%	15.0%	20.0%	22.5%	20.0%	20.0%	32.0%	45.0%	25.0%	25.0%	50.0%	50.0%	100.0%
36	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Rates are set at 100% for ages 70 and over and for service over 35 years.
Green shading indicates the earliest age / service combination at which unreduced retirement is available.

Appendix C: Going-Concern Assumptions and Methods

Female Retirement Rates – Active / CPS Members – 2015 Experience Study

	Age															
Service	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	20.0%	30.0%	50.0%	50.0%	100.0%
1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	20.0%	30.0%	50.0%	50.0%	100.0%
2	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	10.0%	10.0%	20.0%	30.0%	50.0%	50.0%	100.0%
3	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	15.0%	10.0%	20.0%	30.0%	50.0%	50.0%	100.0%
4	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	15.0%	10.0%	20.0%	30.0%	50.0%	50.0%	100.0%
5	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	15.0%	20.0%	20.0%	30.0%	50.0%	50.0%	100.0%
6	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	15.0%	20.0%	20.0%	30.0%	50.0%	50.0%	100.0%
7	2.0%	2.0%	3.0%	3.5%	5.5%	7.5%	5.0%	6.5%	6.5%	15.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
8	2.0%	2.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	15.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
9	3.5%	3.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	15.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
10	3.5%	3.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	15.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
11	3.5%	3.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	25.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
12	3.5%	3.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	25.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
13	3.5%	3.0%	3.5%	3.5%	6.0%	7.5%	5.0%	6.5%	6.5%	25.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
14	3.5%	3.0%	3.5%	3.5%	6.5%	7.5%	5.0%	6.5%	6.5%	25.0%	30.0%	20.0%	30.0%	50.0%	50.0%	100.0%
15	3.5%	3.0%	3.5%	3.5%	6.5%	7.5%	5.0%	6.5%	6.5%	25.0%	35.0%	20.0%	30.0%	50.0%	50.0%	100.0%
16	3.5%	3.0%	3.5%	3.5%	6.5%	7.5%	5.0%	6.5%	6.5%	25.0%	35.0%	20.0%	30.0%	50.0%	50.0%	100.0%
17	3.5%	3.0%	4.0%	3.5%	6.5%	7.5%	5.0%	6.5%	6.5%	25.0%	35.0%	20.0%	30.0%	50.0%	50.0%	100.0%
18	3.5%	3.0%	4.0%	3.5%	6.5%	7.5%	6.5%	6.5%	9.5%	25.0%	35.0%	20.0%	30.0%	50.0%	50.0%	100.0%
19	3.5%	3.0%	4.0%	3.5%	7.0%	7.5%	6.5%	6.5%	9.5%	25.0%	35.0%	20.0%	30.0%	50.0%	50.0%	100.0%
20	4.0%	3.0%	4.0%	3.5%	7.0%	7.5%	6.5%	6.5%	9.5%	25.0%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
21	4.0%	3.0%	4.0%	3.5%	7.0%	7.5%	6.5%	6.5%	15.0%	25.0%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
22	4.0%	3.0%	4.0%	3.5%	7.0%	7.5%	6.5%	12.5%	15.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
23	4.0%	3.0%	4.0%	3.5%	7.0%	11.0%	17.5%	17.5%	12.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
24	5.0%	3.0%	4.0%	5.0%	7.0%	20.0%	17.5%	12.5%	10.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
25	5.0%	3.0%	4.0%	7.5%	12.5%	20.0%	12.5%	12.5%	10.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
26	5.0%	3.0%	4.0%	12.5%	12.5%	11.0%	12.5%	12.5%	10.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
27	5.0%	3.0%	12.5%	12.5%	10.0%	10.5%	12.5%	12.5%	10.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
28	5.0%	12.5%	12.5%	10.0%	10.0%	13.5%	10.0%	10.0%	7.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
29	10.0%	12.5%	10.0%	10.0%	10.0%	13.5%	10.0%	10.0%	7.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
30	15.0%	10.0%	10.0%	10.0%	10.0%	14.5%	10.0%	10.0%	7.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
31	14.0%	10.0%	10.0%	10.0%	12.5%	16.0%	10.0%	10.0%	7.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
32	13.0%	10.0%	10.0%	10.0%	12.5%	14.5%	10.0%	10.0%	10.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
33	12.5%	10.0%	10.0%	10.0%	12.5%	13.5%	10.0%	15.0%	15.0%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
34	9.5%	10.0%	10.0%	10.0%	10.0%	11.0%	10.0%	15.0%	12.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
35	18.5%	15.0%	10.0%	19.5%	19.5%	20.5%	10.0%	20.0%	12.5%	27.5%	50.0%	20.0%	30.0%	50.0%	50.0%	100.0%
36	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Rates are set at 100% for ages 70 and over and for service over 35 years.
Green shading indicates the earliest age / service combination at which unreduced retirement is available.

Appendix C: Going-Concern Assumptions and Methods

Male Retirement Rates – Active / CPS Members – 2010 Experience Study

	Age									
Service	55	56	57	58	59	60	61	62	63	64
2	3.0%	3.5%	3.5%	3.5%	4.5%	6.5%	5.5%	6.5%	6.5%	14.5%
3	3.5%	3.5%	3.5%	3.5%	4.5%	6.5%	6.0%	6.5%	6.5%	15.0%
4	3.5%	3.5%	3.5%	3.5%	5.0%	6.5%	6.0%	6.5%	6.5%	15.0%
5	3.5%	3.5%	3.5%	3.5%	5.0%	6.5%	6.0%	6.5%	6.5%	15.0%
6	3.5%	3.5%	3.5%	4.0%	5.0%	6.5%	6.0%	6.5%	6.5%	15.5%
7	3.5%	3.5%	4.0%	4.0%	5.0%	7.0%	6.0%	7.0%	7.0%	15.5%
8	3.5%	4.0%	4.0%	4.0%	5.0%	7.0%	6.0%	7.0%	7.0%	16.0%
9	3.5%	4.0%	4.0%	4.0%	5.0%	7.0%	6.5%	7.0%	7.0%	16.0%
10	3.5%	4.0%	4.0%	4.0%	5.0%	7.0%	6.5%	7.0%	7.0%	16.5%
11	4.0%	4.0%	4.0%	4.0%	5.5%	7.0%	6.5%	7.0%	7.0%	16.5%
12	4.0%	4.0%	4.0%	4.0%	5.5%	7.5%	6.5%	7.5%	7.5%	17.0%
13	4.0%	4.0%	4.0%	4.0%	5.5%	7.5%	6.5%	7.5%	7.5%	17.0%
14	4.0%	4.0%	4.0%	4.5%	5.5%	7.5%	7.0%	7.5%	7.5%	17.0%
15	4.0%	4.0%	4.5%	4.5%	5.5%	7.5%	7.0%	7.5%	7.5%	17.5%
16	4.0%	4.0%	4.5%	4.5%	5.5%	7.5%	7.0%	7.5%	7.5%	17.5%
17	4.0%	4.5%	4.5%	4.5%	6.0%	8.0%	7.0%	8.0%	8.0%	18.0%
18	4.0%	4.5%	4.5%	4.5%	6.0%	8.0%	7.0%	8.0%	8.0%	18.0%
19	4.0%	4.5%	4.5%	4.5%	6.0%	8.0%	7.0%	8.0%	8.0%	18.5%
20	4.5%	4.5%	4.5%	4.5%	6.0%	8.0%	7.5%	8.0%	8.0%	18.5%
21	4.5%	4.5%	4.5%	4.5%	6.0%	8.0%	7.5%	8.0%	8.0%	29.0%
22	4.5%	4.5%	4.5%	4.5%	6.0%	8.5%	7.5%	8.5%	17.5%	27.5%
23	4.5%	4.5%	4.5%	5.0%	6.0%	8.5%	7.5%	25.0%	8.5%	28.0%
24	4.5%	4.5%	5.0%	5.0%	6.5%	8.5%	17.0%	7.5%	8.0%	28.5%
25	4.5%	5.0%	5.0%	5.0%	6.5%	16.5%	7.0%	7.0%	7.0%	28.5%
26	4.5%	5.0%	5.0%	5.0%	9.5%	8.5%	8.0%	8.5%	8.5%	29.0%
27	4.5%	5.0%	5.0%	15.5%	9.0%	9.5%	9.5%	9.5%	9.5%	29.5%
28	4.5%	5.0%	9.0%	8.5%	8.5%	9.0%	8.5%	9.0%	9.0%	29.5%
29	5.0%	12.5%	8.5%	8.5%	8.5%	9.0%	9.0%	9.0%	9.0%	30.0%
30	14.5%	11.5%	11.5%	11.5%	11.5%	12.5%	12.0%	12.0%	12.0%	30.0%
31	11.0%	11.5%	11.5%	11.5%	11.5%	12.5%	12.0%	12.0%	12.0%	30.5%
32	11.5%	11.5%	11.5%	11.5%	12.0%	12.5%	12.0%	12.0%	12.5%	31.0%
33	12.5%	12.5%	12.5%	13.0%	13.0%	13.5%	13.0%	13.5%	13.5%	31.0%
34	14.5%	15.0%	15.0%	15.0%	15.5%	16.0%	15.5%	16.0%	16.0%	31.5%
35	23.5%	24.0%	24.0%	24.5%	24.5%	26.0%	25.0%	25.5%	25.5%	32.0%

Rates are set at 100% for ages over 64 years and for service over 35 years.
Green shading indicates exactly 85 points.

Appendix C: Going-Concern Assumptions and Methods

Female Retirement Rates – Active / CPS Members – 2010 Experience Study

	Age									
Service	55	56	57	58	59	60	61	62	63	64
2	3.5%	3.0%	3.0%	3.5%	5.5%	8.0%	6.5%	6.5%	7.5%	19.0%
3	3.5%	3.0%	3.0%	4.0%	5.5%	8.5%	6.5%	6.5%	7.5%	19.0%
4	3.5%	3.0%	3.0%	4.0%	5.5%	8.5%	6.5%	6.5%	7.5%	19.5%
5	3.5%	3.0%	3.0%	4.0%	5.5%	8.5%	6.5%	6.5%	8.0%	19.5%
6	3.5%	3.0%	3.0%	4.0%	5.5%	8.5%	7.0%	7.0%	8.0%	20.0%
7	4.0%	3.0%	3.0%	4.0%	5.5%	9.0%	7.0%	7.0%	8.0%	20.5%
8	4.0%	3.0%	3.5%	4.0%	6.0%	9.0%	7.0%	7.0%	8.0%	20.5%
9	4.0%	3.5%	3.5%	4.0%	6.0%	9.0%	7.0%	7.0%	8.5%	21.0%
10	4.0%	3.5%	3.5%	4.0%	6.0%	9.5%	7.0%	7.0%	8.5%	21.0%
11	4.0%	3.5%	3.5%	4.5%	6.0%	9.5%	7.5%	7.5%	8.5%	21.5%
12	4.0%	3.5%	3.5%	4.5%	6.0%	9.5%	7.5%	7.5%	8.5%	21.5%
13	4.0%	3.5%	3.5%	4.5%	6.0%	9.5%	7.5%	7.5%	9.0%	22.0%
14	4.0%	3.5%	3.5%	4.5%	6.5%	10.0%	7.5%	7.5%	9.0%	22.5%
15	4.5%	3.5%	3.5%	4.5%	6.5%	10.0%	7.5%	7.5%	9.0%	22.5%
16	4.5%	3.5%	3.5%	4.5%	6.5%	10.0%	8.0%	8.0%	9.0%	23.0%
17	4.5%	3.5%	4.0%	4.5%	6.5%	10.0%	8.0%	8.0%	9.0%	23.0%
18	4.5%	3.5%	4.0%	4.5%	6.5%	10.5%	8.0%	8.0%	9.5%	23.5%
19	4.5%	4.0%	4.0%	5.0%	7.0%	10.5%	8.0%	8.0%	9.5%	23.5%
20	4.5%	4.0%	4.0%	5.0%	7.0%	10.5%	8.5%	8.0%	9.5%	24.0%
21	4.5%	4.0%	4.0%	5.0%	7.0%	10.5%	8.5%	8.0%	9.5%	52.5%
22	4.5%	4.0%	4.0%	5.0%	7.0%	11.0%	8.5%	8.5%	27.0%	35.5%
23	4.5%	4.0%	4.0%	5.0%	7.0%	11.0%	8.5%	16.0%	8.5%	36.0%
24	5.0%	4.0%	4.0%	5.0%	7.0%	11.0%	23.5%	11.5%	11.5%	36.5%
25	5.0%	4.0%	4.0%	5.0%	7.5%	24.5%	10.0%	10.0%	10.5%	37.0%
26	5.0%	4.0%	4.0%	5.0%	11.0%	11.0%	11.0%	11.0%	11.0%	37.0%
27	5.0%	4.0%	4.5%	10.0%	10.0%	10.5%	10.0%	10.5%	10.5%	37.5%
28	5.0%	4.0%	12.0%	12.5%	13.0%	13.5%	13.0%	13.5%	13.5%	38.0%
29	5.0%	12.5%	12.5%	12.5%	13.0%	13.5%	13.0%	13.5%	13.5%	38.5%
30	14.5%	13.5%	13.5%	13.5%	14.0%	14.5%	14.0%	14.5%	14.5%	39.0%
31	14.0%	14.5%	14.5%	14.5%	15.0%	16.0%	15.0%	15.5%	15.5%	39.5%
32	13.0%	13.0%	13.0%	13.5%	13.5%	14.5%	14.0%	14.0%	14.0%	39.5%
33	12.5%	12.5%	12.5%	13.0%	13.0%	13.5%	13.0%	13.5%	13.5%	40.0%
34	9.5%	10.0%	10.0%	10.0%	10.0%	11.0%	10.5%	10.5%	10.5%	40.5%
35	18.5%	19.0%	19.0%	19.5%	19.5%	20.5%	20.0%	20.0%	20.5%	41.0%

Rates are set at 100% for ages over 64 years and for service over 35 years.
Green shading indicates exactly 85 points.

Appendix C: Going-Concern Assumptions and Methods

Termination of Employment

A member's benefit entitlement under the PSPP is affected by whether the member terminates employment prior to retirement for reasons other than death. In order to account for this in the calculation of the actuarial liability, an assumption regarding the probability that a member will terminate employment for reasons other than death has been made.

The termination rates used in the valuation are shown in the following tables. These rates are based on the results of a study performed in 2015 on the PSPP's retirement experience and are considered best estimate. The retirement rates used in the December 31, 2011 valuation were based on a retirement experience study performed in 2010. For comparison, the previous valuation's retirement rates are also shown.

Appendix C: Going-Concern Assumptions and Methods

Male Termination Rates – 2015 Experience Study

Age	Less than 1 yr	At least 1 but not 2 yrs	At least 2 but not 3 yrs	At least 3 but not 4 yrs	At least 4 but not 5 yrs	At least 5 yrs
<21	27%	26%	20%	12%	10%	9%
21	27%	26%	20%	12%	10%	9%
22	27%	25%	20%	12%	10%	9%
23	27%	20%	17%	12%	10%	9%
24	27%	20%	17%	12%	10%	9%
25	25%	20%	17%	12%	9%	8%
26	24%	20%	17%	12%	9%	8%
27	23%	20%	17%	12%	9%	8%
28	22%	18%	17%	12%	9%	8%
29	21%	18%	13%	12%	9%	8%
30	18%	16%	13%	11%	9%	7%
31	18%	16%	13%	11%	9%	7%
32	18%	16%	13%	11%	9%	7%
33	18%	16%	13%	11%	9%	7%
34	18%	16%	13%	11%	9%	7%
35	16%	13%	10%	9%	9%	5%
36	16%	13%	10%	9%	9%	5%
37	16%	13%	10%	9%	9%	5%
38	16%	13%	10%	9%	9%	5%
39	16%	13%	10%	9%	9%	5%
40	16%	12%	8%	9%	7%	4%
41	16%	12%	8%	9%	7%	4%
42	16%	12%	8%	9%	7%	4%
43	16%	12%	8%	9%	7%	4%
44	16%	12%	8%	7%	7%	4%
45	11%	12%	7%	7%	6%	3%
46	11%	12%	7%	7%	6%	3%
47	11%	12%	7%	7%	6%	3%
48	11%	12%	7%	7%	6%	3%
49	11%	12%	7%	7%	6%	3%
50	11%	11%	7%	6%	5%	3%
51	11%	11%	7%	6%	5%	3%
52	11%	11%	7%	6%	5%	3%
53	11%	11%	7%	6%	5%	3%
54	11%	11%	7%	6%	5%	3%

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Female Termination Rates – 2015 Experience Study

	Service					
Age	**Less than 1 yr**	**At least 1 but not 2 yrs**	**At least 2 but not 3 yrs**	**At least 3 but not 4 yrs**	**At least 4 but not 5 yrs**	**At least 5 yrs**
<21	25%	23%	17%	14%	11%	10%
21	25%	23%	17%	14%	11%	10%
22	25%	22%	17%	14%	11%	10%
23	25%	21%	16%	14%	11%	10%
24	25%	20%	15%	13%	11%	10%
25	24%	20%	15%	13%	11%	9%
26	23%	20%	15%	13%	11%	9%
27	22%	20%	15%	13%	11%	9%
28	21%	19%	15%	13%	11%	9%
29	20%	18%	15%	13%	11%	9%
30	20%	17%	14%	11%	11%	8%
31	20%	16%	14%	11%	11%	8%
32	20%	15%	14%	11%	11%	8%
33	20%	15%	14%	11%	11%	8%
34	20%	15%	14%	11%	11%	8%
35	18%	15%	13%	11%	9%	7%
36	18%	15%	13%	11%	9%	7%
37	18%	15%	13%	11%	9%	7%
38	18%	15%	13%	11%	9%	6%
39	18%	15%	13%	11%	9%	6%
40	18%	14%	10%	10%	8%	5%
41	18%	14%	10%	10%	8%	5%
42	18%	14%	10%	10%	8%	5%
43	18%	14%	10%	10%	8%	4%
44	18%	14%	10%	10%	8%	4%
45	18%	14%	10%	10%	8%	4%
46	18%	14%	10%	10%	8%	4%
47	18%	14%	10%	10%	8%	4%
48	18%	14%	10%	7%	8%	4%
49	18%	14%	10%	7%	8%	4%
50	18%	12%	8%	7%	8%	4%
51	18%	12%	8%	7%	8%	4%
52	18%	12%	8%	7%	8%	4%
53	18%	12%	8%	7%	8%	4%
54	18%	12%	8%	7%	8%	4%

Appendix C: Going-Concern Assumptions and Methods

Male Termination Rates – 2010 Experience Study

Less than 1 yr service	At least 1 but not 2 yrs service	At least 2 but not 3 yrs service	At least 3 but not 4 yrs service	At least 4 but not 5 yrs service	At least 5 yrs service
27%	26%	20%	12%	10%	9%
27%	26%	20%	12%	10%	9%
27%	25%	20%	12%	10%	9%
27%	20%	15%	12%	10%	9%
27%	20%	15%	12%	10%	9%
21%	20%	15%	11%	9%	8%
20%	20%	15%	11%	9%	8%
19%	20%	15%	11%	9%	8%
19%	18%	15%	11%	9%	8%
19%	18%	12%	11%	9%	8%
16%	16%	12%	11%	9%	8%
16%	16%	12%	11%	9%	8%
16%	16%	12%	11%	9%	8%
16%	16%	12%	11%	9%	8%
16%	16%	12%	11%	9%	8%
14%	13%	10%	9%	9%	5%
14%	13%	10%	9%	9%	5%
14%	13%	10%	9%	9%	5%
14%	13%	10%	9%	9%	5%
14%	13%	10%	9%	9%	5%
14%	12%	8%	7%	7%	4%
14%	12%	8%	7%	7%	4%
14%	12%	8%	7%	7%	4%
14%	12%	8%	7%	7%	4%
14%	12%	8%	7%	7%	4%
11%	11%	7%	7%	6%	3%
11%	11%	7%	7%	6%	3%
11%	11%	7%	7%	6%	3%
11%	11%	7%	7%	6%	3%
11%	11%	7%	7%	6%	3%
11%	10%	7%	6%	5%	3%
11%	10%	7%	6%	5%	3%
11%	10%	7%	6%	5%	3%
11%	10%	7%	6%	5%	3%
11%	10%	7%	6%	5%	3%
0%	0%	0%	0%	0%	0%

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Female Termination Rates – 2010 Experience Study

Age	Less than 1 yr service	At least 1 but not 2 yrs service	At least 2 but not 3 yrs service	At least 3 but not 4 yrs service	At least 4 but not 5 yrs service	At least 5 yrs service
<21	25%	24%	17%	14%	11%	10%
21	25%	23%	17%	14%	11%	10%
22	25%	22%	17%	14%	11%	10%
23	25%	21%	16%	14%	11%	10%
24	25%	20%	15%	12%	11%	10%
25	20%	19%	14%	12%	11%	9%
26	19%	18%	14%	12%	11%	9%
27	18%	17%	14%	12%	11%	9%
28	18%	16%	14%	12%	11%	9%
29	18%	15%	14%	12%	11%	9%
30	17%	15%	13%	11%	11%	8%
31	17%	15%	13%	11%	11%	8%
32	17%	14%	13%	11%	11%	8%
33	17%	13%	13%	11%	11%	8%
34	17%	12%	13%	11%	11%	8%
35	16%	12%	12%	10%	9%	6%
36	16%	12%	12%	10%	9%	6%
37	16%	12%	12%	10%	9%	6%
38	16%	12%	12%	10%	9%	6%
39	16%	12%	12%	10%	9%	6%
40	15%	12%	10%	7%	6%	4%
41	15%	12%	10%	7%	6%	4%
42	15%	12%	10%	7%	6%	4%
43	15%	12%	10%	7%	6%	4%
44	15%	12%	10%	7%	6%	4%
45	14%	12%	9%	7%	6%	4%
46	14%	12%	9%	7%	6%	4%
47	14%	12%	9%	7%	6%	4%
48	14%	12%	9%	7%	6%	4%
49	14%	12%	9%	7%	6%	4%
50	14%	12%	8%	7%	6%	4%
51	14%	12%	8%	7%	6%	4%
52	14%	12%	8%	7%	6%	4%
53	14%	12%	8%	7%	6%	4%
54	14%	12%	8%	7%	6%	4%
>=55	0%	0%	0%	0%	0%	0%

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Proportion of Vested Terminated Members Electing a Lump Sum Payment versus a Deferred Annuity

Given the additional cost to the PSPP at the present time of a member electing a lump sum transfer, an assumption regarding the proportion of members electing a lump sum transfer in lieu of the deferred pension has been made. The proportion of future terminations electing a lump sum settlement is assumed to be in accordance with the following rates and is based on an experience study performed in 2015. The previous valuation assumed that 80% of vested members terminating with less than 5 years of service and at 50% for members terminating after 5 years of service would elect a lump sum settlement. This assumption is considered to be best estimate.

Years of Service at Termination	Proportion Assumed to Elect a Lump Sum Settlement
Less than 5	80%
Between 5 and 15	50%
Between 15 and 20	60%
Between 20 and 25	70%
More than 25	75%

Proportion of Members with Spouses and Spousal Age Differential

Under the PSPP terms, the value of pre-retirement death benefits depends on the existence and age of a surviving spouse. It has again been assumed that 100% of members are married to a spouse of the opposite gender, with the male spouse being 3 years older than the female spouse. This assumption may contain a small yet immaterial margin.

Future PSPP Membership for Funding the Unfunded Liability

The PSPP's unfunded liabilities are amortized in accordance with established amortization schedules as a level percentage of contributory payroll. For purposes of determining the applicable contribution rates, it has again been assumed that future new entrants will keep the active PSPP membership stable following the valuation date, and that the total contributory pensionable earnings of these active members will increase at the assumed rate of general wage increases for PSPP members.

If the PSPP salary base were to grow more rapidly than assumed, existing unfunded liabilities might be eliminated sooner than assumed. Conversely, if the PSPP salary base were to grow less rapidly than assumed, contribution increases may be required in order to be able to eliminate existing unfunded liabilities within the required timeframe.

Economic Assumptions

Inflation Rate

As the level of inflation influences the rate of increase in several economic factors that affect the PSPP, it is necessary for a going-concern valuation to make an assumption regarding the future inflation rate. The

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inflation rate is assumed to be 2.25% per annum. This assumption is considered to be best estimate considering current economic and financial market conditions.

The previous valuation at December 31, 2011 assumed inflation to be 2.50% per annum; however, it is important to note that the previous assumption included a margin for adverse deviation of 0.25% per annum.

Long-Term Rate of Return

The actuarial present value of a future stream of benefit payments represents an estimate of the assets required at the valuation date that, together with future expected investment income, will be sufficient to provide for the future benefit stream. Therefore, in calculating actuarial present values, it is necessary to make an assumption with respect to the future expected investment returns that will be earned on the PSPP's assets. This future investment rate of return is called the long-term rate of return.

In selecting the going-concern long-term rate of return assumption, the following factors are typically taken into consideration:

- the PSPP's investment policy;
- long-term historical trends;
- the expected return on the invested assets; and
- the pattern of future expected benefit payments.

Based on the PSPP's current target asset mix, expected long-term asset class returns, and an underlying best-estimate long-term inflation rate of 2.25% per annum, PSPP’s market value of invested assets is expected to earn a rate of return of 6.60% per annum, before value added from active investment management and after passive investment management fees. This expected rate of return is consistent with the mean return over a 30 year period produced from Aon's proprietary multi-variable asset model, using the PSPP's target asset mix policy.

Assuming the value add provided by active management will cover active investment management fees, the resulting long-term rate of return on the market value of assets net of investment expenses is assumed to be 6.60% per annum. This assumption is considered best estimate.

The previous valuation at December 31, 2011 assumed a best estimate long-term rate of return assumption of 7.08% per annum; however, it should be noted that this assumption was also based on an underlying inflation assumption of 2.50% per annum.

Discount Rate

The discount rate equals the long-term rate of return assumption less a margin for adverse deviation of 0.55% or 6.05% per annum.

The discount rate used in the previous valuation at December 31, 2011 was 6.35% per annum and reflected a margin of 0.73% per annum.

Discount Rate and Inflation Rate for Vested Terminated Members Electing a Lump Sum

As it is assumed that a portion of vested terminated members will elect a lump sum settlement in lieu of a deferred pension, an assumption regarding the rate that will be used to determine the value of the lump

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sum amount is necessary. The discount rate has been assumed to be 3.50% and the inflation rate has been assumed to be 2.00%, both of which are representative of the prescribed assumptions used to determine such lump sum settlements at December 31, 2014 and seen to be best estimate.

The previous valuation at December 31, 2011 assumed the discount rate to be 4.1% and the inflation rate to be 2.46%.

Increases to Average Wages

As the rate of increase in average wages in the economy influences the rates of increase in the YMPE, member salaries, and other economic factors that affect the PSPP, it is necessary for a going-concern valuation to make an assumption regarding the future increases in average wages. Average wages are assumed to increase at 3.50% per annum. This assumption is considered best estimate and is comprised of an annual increase of 2.25% on account of inflation, plus a best-estimate assumed increase of 1.25% on account of productivity.

The previous valuation at December 31, 2011 assumed average wages to increase 3.75% per annum; however, this assumption was built upon an inflation assumption of 2.50% per annum which, as noted previously, included a margin of 0.25% per annum.

Increases in Pensionable Earnings

As the benefits paid to a member from the PSPP are dependent on the member's future pensionable earnings, it is necessary for a going-concern valuation to make an assumption regarding the future increases in such earnings. A member's pensionable earnings are assumed to increase in line with the rate of general earnings increases, plus age-related merit and promotion increases as follows.

General Earnings Increases

The best estimate general earnings increase rate for pensionable earnings in the long-term is equal to the rate of average wage increase of 3.50% per annum. To reflect current expectations of near-term increases for the year following this valuation, 2014 pensionable earnings have been assumed to increase by a best estimate of 2.25% at January 1, 2015. The previous valuation at December 31, 2011 assumed general earnings increases of 3.0% at each of January 1, 2012, 2013 and 2014 and 3.75% per annum thereafter.

Merit and Promotion Increases

The assumed age-related merit and promotion increases used for this valuation are as outlined in the following table of rates. These rates are based on an experience study conducted in 2015 and are considered best estimate. The merit and promotion increases assumed for the previous valuation at December 31, 2011 were based on an experience study conducted in 2010 and are also shown below.

Merit and Promotion Increases – 2015 Experience Study

Age	Rate of increase	Age	Rate of increase
<23	7.75%	40	0.50%
23	7.25%	41	0.50%
24	6.75%	42	0.25%
25	5.75%	43	0.25%
26	5.00%	44	0.25%
27	4.25%	45	0.25%

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28	3.75%	46	0.25%
29	3.25%	47	0.25%
30	3.00%	48	0.25%
31	2.50%	49	0.35%
32	2.25%	50	0.35%
33	2.00%	51	0.35%
34	1.75%	52	0.35%
35	1.50%	53	0.35%
36	1.25%	54	0.35%
37	1.25%	55	0.35%
38	1.00%	56	0.35%
39	0.75%	>56	0.35%

Merit and Promotion Increases – 2010 Experience Study

Age	Rate of increase	Age	Rate of increase
<22	6.84%	39	0.75%
22	6.39%	40	0.70%
23	6.10%	41	0.65%
24	5.50%	42	0.61%
25	4.74%	43	0.56%
26	3.94%	44	0.51%
27	3.49%	45	0.47%
28	3.03%	46	0.42%
29	2.92%	47	0.37%
30	2.52%	48	0.33%
31	2.14%	49	0.28%
32	1.94%	50	0.23%
33	1.55%	51	0.19%
34	1.29%	52	0.14%
35	1.09%	53	0.09%
36	0.93%	54	0.05%
37	0.84%	55	0.00%
38	0.79%	>55	0.00%

YMPE Increase

As the benefits paid to a member from the PSPP are dependent on the future YMPE, it is necessary to make an assumption regarding the future increases in the YMPE. The YMPE is assumed to increase, up until the time the member retires, dies or terminates from active employment, at the assumed increase in average wages or 3.50% per annum. The previous valuation at December 31, 2011 assumed the maximum pension limit would increase at 3.75% per annum which was consistent with the increase in average wages assumed in that valuation.

Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *Income Tax Act*. Consistent with the provisions of the *Income Tax Act,* it is assumed that the maximum pension limit will increase at the assumed increase in average wages or 3.50% per annum. The previous valuation at December 31, 2011 assumed the maximum pension limit would increase at 3.75% per annum which was consistent with the increase in average wages assumed in that valuation.

Appendix C: Going-Concern Assumptions and Methods

Cost-of-Living Adjustments ("COLA")

As the PSPP's benefits are increased after termination/retirement at 60% of inflation, it is necessary to make an assumption regarding the rate of COLA that will be applied in the future. It has been assumed that COLA will be applied at 60% of the assumed inflation rate of 2.25%, or 1.35% per annum.

The previous valuation at December 31, 2011 assumed future COLA increases of 1.50% which was based on 60% of the assumed inflation rate of 2.50% per annum.

Interest on Member Contributions

As the PSPP's benefits are dependent to some degree on the member contribution account balances (the "50% Rule" test), it is necessary to make an assumption regarding interest that will be credited to member contribution account balances in the future. It has been assumed that member contribution account balances will be credited with interest at the assumed inflation rate plus 2.0%, or at 4.25% per annum. This assumption is based on the long-term expected spread of five-year term deposit rates over inflation and is considered best estimate.

The previous valuation at December 31, 2011 also assumed interest would be credited on member contributions at a rate that exceeded the assumed inflation by 2.0% per annum.

Increase on Advance Pensioners

Advance pensioners are pensioners who receive a pension payment, but have not elected their pension form as at the date of the valuation. In order to take into account a reduction for a more generous payment form, the administrator has reduced the pension in payment. We have made the best estimate assumption that the reduction was 10% and have increased the advance pension by this amount. Also, we have valued the pension under the normal form of payment.

The same assumption was used in the previous valuation.

Expenses

Expenses relating to investment management fees and certain administration and consulting fees incurred in relation to the PSPP are paid from the PSPP's assets. Consequently, it is appropriate that an assumption regarding such expenses be made.

Investment expenses expected to be paid from the PSPP fund in the future are taken into account in the discount rate assumption. Administration and custodial expenses charged to the PSPP fund have been in the range of 0.4% to 0.5% of pensionable earnings over the past few years. An best estimate allowance for expenses of 0.5% of pensionable earnings has been added to the current service contribution rate.

This expense assumption is unchanged from the previous valuation.

Going-Concern Actuarial Cost Method

An actuarial cost method is a technique used to allocate in a systematic and consistent manner the expected cost of a pension plan over the years of service during which plan members earn benefits under the plan. By pre-funding the cost of a pension plan in an orderly and rational manner, the security of benefits provided under the terms of the plan in respect of service that has already been rendered is significantly enhanced.

Appendix C: Going-Concern Assumptions and Methods

The Projected Accrued Benefit Actuarial Cost Method has been used for this valuation. Under this method, the actuarial present value of benefits in respect of service prior to the valuation date, but based on pensionable earnings projected to retirement, is compared with the actuarial asset value, revealing either a surplus or an unfunded actuarial liability.

With respect to service after the valuation date, the expected value of benefits for service in the year following the valuation date (i.e. the actuarial normal cost) is expressed as a percentage of the expected value of contributory pensionable earnings for that year. Actual contributions are determined each year by applying this percentage to the actual contributory pensionable earnings for the year.

Expected future benefits reflect pensionable earnings, YMPE, and *Income Tax Act* benefit limits projected to the time of benefit determination. Future service, as it relates to benefit eligibility (e.g. vesting, early retirement reductions), was also projected in projecting future benefits. When calculating the actuarial present value of benefits at the valuation date, the present value of all retirement, withdrawal and pre-retirement death benefits are included. For each member, the retirement, withdrawal and pre-retirement death benefits for a particular period of service are first projected each year into the future taking into account future vesting, early retirement entitlements and minimum pension/value entitlements. These “projected” benefits for each future year are then capitalized, multiplied by the probability of the member leaving the plan in that year and discounted with interest and survivorship to the valuation date. The actuarial present value of benefits for the particular period of service is then determined by summing the “present values” of these projected benefits.

The pattern of future contributions necessary to pre-fund future benefit accruals for any one particular individual will increase gradually as a percentage of his or her pensionable earnings as the individual approaches retirement. For a stable population (i.e., one where the demographics of the group remain constant from year to year), the current service cost will remain relatively level as a percentage of contributory pensionable earnings.

In the event of future adverse experience, contributions in addition to the current service cost calculated under the Projected Accrued Benefit Method may be required to ensure that the plan assets are adequate to provide the benefits. Conversely, favourable experience may generate surplus which may serve to reduce future contribution requirements.

The previous valuation also used the Projected Unit Credit Actuarial Cost Method.

Going-Concern Asset Valuation Method

The going-concern asset valuation method determines the value that will be assigned to the assets on the valuation date. The actuarial value of assets has been determined by applying a smoothing methodology to the PSPP's market value of assets at the valuation date. The same method was used in the previous valuation.

The actuarial value of assets is based on the market value of PSPP assets (adjusted for accrued contributions and payments), plus an Asset Fluctuation Adjustment. This adjustment is based on a five-year smoothing of market rates of return over the expected long-term rate of return, specifically:

Appendix C: Going-Concern Assumptions and Methods

- investment income is assumed to accrue each year at a rate equal to the expected long-term rate of return assumed in the most recent valuation as at the beginning of that year[4];
- actual market values of the PSPP's assets from each of the four previous year-ends are then projected to the current valuation date, using actual (adjusted) annual net cash flows and imputed investment income at these assumed rates for each year;
- these four projected results at the current valuation date, together with the actual market value at the current valuation date, are then averaged;
- this averaged value is then constrained to be no less than 90%, and no greater than 110%, of the current market value;
- the Asset Fluctuation Adjustment is calculated as the excess (positive or negative) of this constrained averaged value over the market value.

The actuarial asset value is then determined as the market asset value at the valuation date, plus the Asset Fluctuation Adjustment. Calculation of the Asset Fluctuation Adjustment for the current valuation is detailed in Appendix A of this report.

[4] The expected long-term rate of return net of margin (i.e. the discount rate) was used to calculate the imputed investment income for years prior to 2012.

Appendix D: Solvency Assumptions and Methods

The *Act* requires disclosure of the PSPP's financial position at the valuation date under the solvency valuation provisions of the Alberta *Employment Pension Plans Act* (the "*EPPA*"). The *Act* does not require funding of any solvency deficit.

The *EPPA* requires that a plan's solvency valuation liabilities be determined with the presumption that:

- the plan is terminated and wound up on the valuation date, and
- the plan's liabilities are settled immediately.

The following summarizes the prescribed assumptions, methods and benefits that make up the solvency basis for the PSPP at the valuation date. Judgement must be exercised in setting certain assumptions, especially as related to determining:

- the proportion of the PSPP's benefits expected to be settled by way of annuity purchase and by way of lump sum transfer; and
- the hypothetical annuity purchase rates at the valuation date.

Consequently, if the PSPP was terminated and settled on the valuation date, these solvency liabilities may be different than the PSPP's actual termination liabilities. Such differences may be attributed to:

- differences between the actual and assumed proportion of benefits being settled by annuity purchase and lump sum transfer; and
- an actual annuity purchase rate that is different than the rates assumed to be representative of the annuity market on the valuation date.

Appendix D: Solvency Assumptions and Methods

Solvency Assumptions

Proportion of benefits settled by lump sum transfer and annuity purchase	The following members are assumed to have their benefit entitlement settled by way of annuity purchase: ▪ all members receiving a monthly pension at the valuation date; and ▪ members who, on the valuation date, are eligible for immediate retirement. All other members are assumed to have their benefit entitlement settled by way of a lump sum transfer.
Discount rate – annuity purchase	The net discount rate assumed to apply to benefits that are settled by way of annuity purchase is 0.75% per annum. This discount rate assumption is representative of the rate that, together with the UP-94 Generational Mortality Table, approximates partially indexed annuity purchase rates at the valuation date, in accordance with guidance provided by the Canadian Institute of Actuaries for solvency valuations as at December 31, 2014.
Discount rate – lump sum transfer	The net discount rate assumed to apply to benefits that are settled by way of lump sum transfer is 1.8% for 10 years and 2.5% thereafter.
Salary, YMPE and Maximum Pension Limits	No future increase is assumed.
Expenses	It is assumed that the windup expenses, if the PSPP were to be terminated, would be $25,000,000. These expenses have been treated as a reduction to assets, in accordance with the *EPPA* and accepted actuarial practice.
Mortality – annuity purchases	For benefits that are settled by way of annuity purchase, mortality is assumed to be in accordance with the gender distinct rates of the UP-94 Generational Mortality Table. This mortality assumption is representative of the mortality table that, together with the net discount rate assumption of 0.75%, approximates annuity purchase rates at the valuation date, in accordance with guidance provided by the Canadian Institute of Actuaries for solvency valuations as at the valuation date.
Mortality – lump sum transfer	For benefits that are settled by way of lump sum transfer, mortality is assumed to be in accordance with gender distinct rates of the UP-94 Generational Mortality Table.

Appendix D: Solvency Assumptions and Methods

Termination Rates	All members are assumed to terminate their active participation on the valuation date and subsequently retire from the PSPP in accordance with the retirement age assumption summarized below.
Retirement Age	The age at which members are assumed to retire from the PSPP varies depending on the specifics of each member as follows: ▪ members who are entitled to retire from the PSPP and commence an immediate pension on the valuation date are assumed to do so; and ▪ all other members are assumed to retire from the PSPP at age 55.

Solvency Actuarial Cost Method

The solvency liabilities have been calculated as the actuarial present value of the benefits to which a member would be entitled if participation in the PSPP was terminated on the valuation date. It is further noted that the solvency liabilities do not take into consideration any benefit reductions that may be required in the event of actual PSPP termination on the valuation date.

Solvency Asset Valuation Method

For purposes of the solvency valuation, assets have been valued at market value.

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value, at the calculation date (time 0), of the expected aggregate change in the solvency liability between time 0 and the next calculation date (time t), adjusted upwards for expected benefit payments between time 0 and time t.

An educational note was published in December 2010 by the Canadian Institute of Actuaries' Committee on Pension Plan Financial Reporting to provide guidance for actuaries on the calculation of this information.

Appendix D: Solvency Assumptions and Methods

The calculation of the solvency incremental cost can be summarized as follows:

- the present value at time 0 of expected benefit payments between time 0 and time t, discounted to time 0,

plus

- a projected hypothetical wind-up or solvency liability at time t, discounted to time 0, allowing for, if applicable to the pension plan being valued :
  - expected decrements and related changes in membership status between time 0 and time t,
  - accrual of service to time t,
  - expected changes in benefits to time t,
  - a projection of pensionable earnings to time t,

minus

- the hypothetical wind-up or solvency liability at time 0.

The projection calculations take into account the following assumptions and additional considerations:

- the assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings would be consistent with the assumptions used in the pension plan's going-concern valuation
- the assumptions used to calculate the projected liability at time t are consistent with the assumptions for the solvency liability at time 0, assuming that interest rates remain at the levels applicable at time 0, that the select period is reset at time t for interest rate assumptions that are select and ultimate and that the Standards of Practice for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect at time 0 remain in effect at time t.
- Active and inactive plan members as of time 0 and assumed new entrants over the period between time 0 and time t are considered in calculating the incremental cost.

Appendix E: Summary of PSPP Provisions

The following is a brief summary of the provisions of the PSPP that affect costs and liabilities as at the valuation date. This summary reflects all PSPP amendments up to the valuation date. This summary does not constitute a legal interpretation of the PSPP. The *Act* and regulation should be reviewed for an interpretation in any specific circumstance.

Effective Date

The PSPP was implemented by Bill 68 of the Alberta legislature which received Royal Assent on May 14, 1993. Most of its provisions, including those dealing with pension and related benefits, came into effect January 1, 1994. The PSPP is a continuation of the pension plan provided under the Public Service Pension Plan Act, which was applicable prior to 1994.

Schedule 2 to the *Act* established the Public Service Pension Board and outlines the duties of the Board and the funding disciplines. A separate regulation to the *Act* (the Public Service Pension Plan, Alberta Regulation 368/93) outlines the specific benefit provisions of the PSPP.

Eligibility

Full-time and part-time employees of the government of Alberta, and of the agencies, boards and Provincial corporations identified in Schedule 2 to regulation 368/93, are eligible to participate in the PSPP.

Retirement

Normal Retirement

The normal retirement age is 65.

Unreduced Early Retirement

A member who has attained age 55, and whose age and years of pensionable service total 85 or more, is entitled to an unreduced retirement pension commencing immediately.

Reduced Early Retirement

A member who has attained age 55 and who has completed two years of pensionable service, but whose age and years of pensionable service do not total 85, may elect to receive a pension commencing immediately that is reduced by an early retirement reduction. The early retirement reduction is 3% multiplied by the excess at pension commencement of 85 over the sum of age and years of pensionable service (without recognition of potential service).

Postponed Retirement

A member who is eligible for immediate retirement may defer pension commencement, up to the latest age permitted under the *Income Tax Act*. An actuarial increase applies in the case of postponement beyond the later of termination of employment and attaining eligibility for an unreduced pension.

Credited Pension

The benefit payable at normal retirement age is an annual pension equal to the sum of:

- 2.0% of average pensionable salary multiplied by years of pensionable service earned or credited in respects of periods prior to January 1, 1966, plus

Appendix E: Summary of PSPP Provisions

- 1.4% of average pensionable salary up to the average YMPE multiplied by years of pensionable service earned or credited in respect of periods after January 1, 1966, plus
- 2.0% of average pensionable salary in excess of average YMPE, multiplied by years of pensionable service earned or credited in respect of periods after January 1, 1966.
- Pensionable service accrues for a maximum of 35 years.
- Average pensionable salary is the member's average annual pensionable salary in the 60 consecutive months in which such average salary was the highest (including during continuing employment after attainment of 35 years of pensionable service). The pensionable salary of part time employees is grossed up to an annual basis to determine average pensionable salary.
- Average YMPE is the average of the Year's Maximum Pensionable Earnings (as defined in the Canada Pension Plan) over the same 60-month period over which pensionable earnings are averaged.
- Effective January 1, 1992, and only in respect of pensionable service after 1991, pensionable earnings for each calendar year are limited to the sum of:
  - 50 times the defined benefit annual maximum pension limit for the year under the *Income Tax Act*, plus
  - 30% of the YMPE for the year.

Cost-of-Living Increases

Pensions payable to retired members, former members with deferred pensions and survivors will be increased annually to reflect 60% of the increase in the Consumer Price Index for Alberta. The Board may approve additional ad hoc cost-of-living increases.

Benefits Paid Following Termination of Employment

Vesting

Benefits vest on attainment of 2 years of PSPP service.

Non-Vested Benefit

A non-vested terminated member is entitled to payment of the member's contributions with interest.

Vested Benefit

The vested termination benefit is a deferred pension, commencing at or after age 55 calculated to reflect the early retirement discount applicable at the actual date of retirement of the member (i.e., 3% per annum) and reflecting only pensionable service performed to the date of termination. Portability is permitted.

Death Benefits Prior to Retirement

Non-Vested Benefit

The non-vested death benefit is a refund of the member's required contributions with interest.

Appendix E: Summary of PSPP Provisions

Vested Benefit

The vested termination benefit is payment of the commuted value of the member's termination/retirement benefit. However, a surviving pension partner has the option to elect a monthly pension in lieu of the commuted value. Such a monthly pension is determined as the survivor's pension as if the member had retired on an unreduced pension and elected a Joint-and-Survivor 100% optional form.

Death Benefits After Retirement

The normal form of pension is payable for the member's lifetime with 60-month guarantee. Optional forms are available on an actuarial equivalence basis.

Disability

A member, or a former member who remains entitled to a deferred pension, who joined the PSPP prior to July 1, 2007, who is totally disabled and has completed two years of pensionable service, and who is not receiving benefits under an approved disability plan, is entitled to receive an immediate unreduced pension.

A person who satisfies the above conditions, but is only partially disabled, is entitled to receive a pension commencing immediately that is reduced as for early retirement.

A person who is receiving benefits from an approved disability plan is not entitled to receive, concurrently, a disability pension from the plan. While in receipt of benefits from an approved disability plan, participation in the plan continues. Salary, for the purpose of current service contributions or for the purpose of determining any pension to which the member may subsequently become entitled, is the salary that was being earned immediately before disability benefits commenced, increased by any subsequent general increases applicable to the pre-disability class of employment of the member.

Appendix E: Summary of PSPP Provisions

50% Rule (Excess Contributions)

Upon a member's retirement, or upon commuted value transfer after termination or death, if the member's own contributions with interest are greater than half the value of the benefit otherwise payable, then the member/spouse/beneficiary receives a refund of such excess. This does not apply to benefits/contributions for purchased service.

Contributions

Current Service Contributions

With effect from January 1, 1992, the current service benefit accruals of the PSPP are funded in equal parts by contributions from PSPP members and their employers which, in total, are equal to the normal cost of the benefit accruals attributable to the years for which the contributions are made.

Unfunded Liability Contributions

Any unfunded liability of the Plan arising after 1998 is to be funded over a period not exceeding 15 years from the applicable valuation date, in equal parts by contributions from PSPP members and their employers.

Solvency Deficit

The *Act* does not require funding of any solvency deficit.

Purchase of Service

Members are entitled to contribute for the purchase of certain periods of service. The actuarial basis for determining the purchase price approximates the going-concern actuarial liability that will arise in respect of that service.

Credited Interest

Prior to 1994, Plan member contribution accounts were credited with interest at the rate of 4% per annum. Effective January 1, 1994, the interest credited to accumulated member contributions is equal to the rate of return credited on 5-year term deposits by Canadian chartered banks as reported in CANSIM series B14045 maintained by Statistics Canada.

Combined Pensionable Service

Combined Pensionable Service (“CPS”) affects members who transfer to (or from) employment covered by the PSPP from (or to) employment covered by either the Management Employees Pension Plan (“MEPP”) or the Universities Academic Pension Plan (“UAPP”).

When a member of MEPP or UAPP transfers to PSPP, the member’s PSPP pensionable service is the only service recognized for purposes of calculating the PSPP accrued pension. However, determination of eligibility to benefits from PSPP, such as vesting, early retirement, and the amount of early retirement reduction, is based on the member’s CPS. In this case, the member’s CPS is equal to his pensionable service under PSPP plus the pensionable service earned under the former plan.

Similarly, when a PSPP member transfers to UAPP or to MEPP, the member’s PSPP pensionable service up to the time of transfer is the only service used to calculate the PSPP accrued pension. However, the member’s CPS is used to determine benefit eligibility as described above. In this case, the member’s CPS is equal to the pensionable service under PSPP plus the pensionable service under the new plan.

Appendix E: Summary of PSPP Provisions

In either case, the member's accrued PSPP pension is based on the highest five-year average earnings over the member's entire CPS.

Portability Agreements – Other Public Sector Plans

Portability agreements have been established with other public sector pension plans, under which a member who transfers between the PSPP and such other plan has the option to transfer service credits from his former plan to his new plan, with a corresponding transfer of funds between the plans. The amounts of such service transfer and fund transfer are generally based on the estimated respective actuarial funding valuation liability for such member in each of the plans.

PSPP Plan Termination

The *Act* does not contemplate termination of the PSPP.