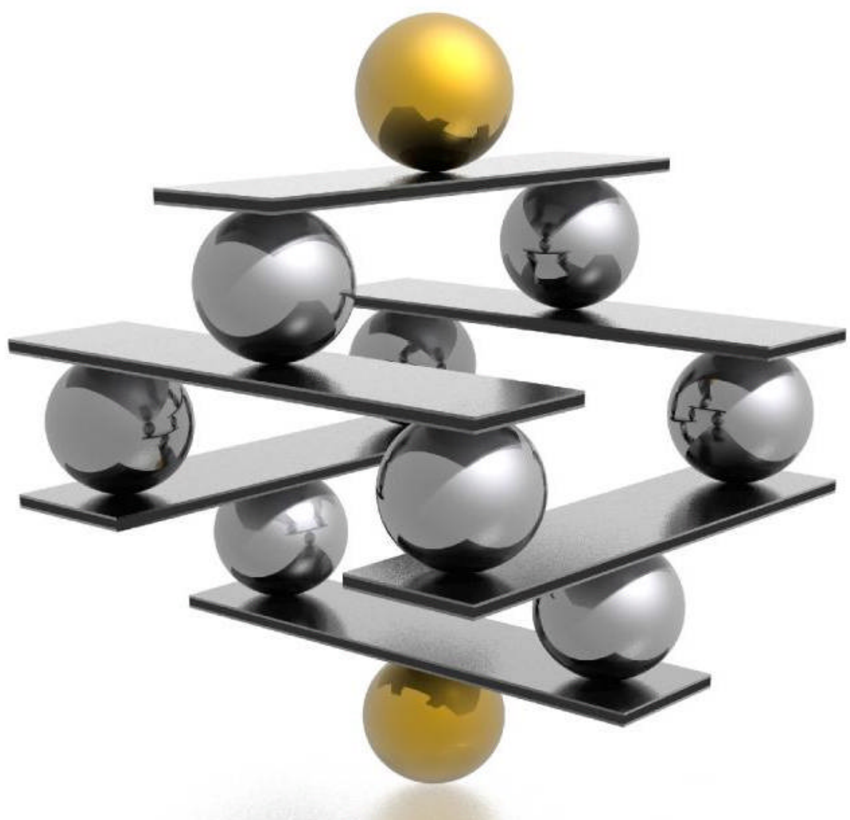
# Actuarial Valuation as at December 31, 2012

*Universities Academic Pension Plan*
*Registration Number: 0339572*

*January 28, 2014*



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# Executive Summary

An actuarial valuation has been prepared for the Universities Academic Pension Plan (the "Plan") as at December 31, 2012 for the primary purpose of establishing a funding recommendation for the Plan until the next actuarial valuation is performed. This section provides an overview of the important results and the key valuation assumptions which have had a bearing on these results. The next actuarial valuation for the purposes of developing funding requirements should be performed no later than as at December 31, 2015.

## Summary of Principal Results[1]

| | December 31, 2012 | | December 31, 2010 | |
|---|---|---|---|---|
| **(000's)** | **Going Concern** | **Solvency** | **Going Concern** | **Solvency** |
| **Assets** | $ 2,889,700 | $ 2,949,400 | $ 2,427,300 | $ 2,537,800 |
| **Liabilities** | 4,153,300 | 6,559,600 | 3,641,200 | 5,146,900 |
| **Excess/(Deficit)** | **$ (1,263,600)** | **$ (3,610,200)** | **$ (1,213,900)** | **$ (2,609,100)** |
| **Funded Ratio** | 0.6958 | 0.4496 | 0.6666 | 0.4931 |

## Contribution Requirements

Considering the funding status of the Plan, the minimum member and employer contributions recommended in this report with effect from July 1, 2014, and those recommended at December 31, 2010 and effective July 1, 2012, are as follows:

| **(000's)** | **December 31, 2012** | **December 31, 2010** |
|---|---|---|
| Estimated normal cost | $151,400 | $136,100 |
| As a % of capped earnings | 18.40% | 17.80% |
| Pre-1992 unfunded liability payments as a percentage of total earnings (excluding government share) | 2.87% | 2.34% |
| Post-1991 unfunded liability payments as a percentage of capped earnings | 5.79% | 5.54% |
| Minimum annual member and employer contribution effective July 1, 2014 (2012) | 27.06% of earnings | 25.68% of earnings |
| Maximum member and employer contribution until the next valuation | 18.40% of pensionable earnings plus $3,567,000 | 17.80% of pensionable earnings plus $2,330,100 |
| Implemented contribution rate effective July 1, 2014 (2012) (excluding government share) | 27.06% | 25.68% |
| Government share of pre-1992 unfunded liability contributions as a percentage of total earnings | 1.25% | 1.25% |

[1] Net of all adjustments such as estimated wind up expenses, where applicable.

## Basic Membership Information

As at December 31, 2012 the basic membership information is as follows:

| | Active | Deferred | HODs | Retired and Survivors |
|---|---|---|---|---|
| Percentage of going concern liabilities | 45% | 4% | <1% | 51% |
| Number | 7,713 | 1,247 | 321 | 4,189 |
| Average age | 48.6 years | 48.0 years | 53.8 years | 72.4 years |
| Average earnings/lifetime pension/account balance/lifetime pension | $108,922 | $8,092 | $9,225 | $43,307 |

## Key Assumptions

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

| | Going Concern | |
|---|---|---|
| | **December 31, 2012** | **December 31, 2010** |
| **Discount rate** | 6.25% per annum | 6.4% per annum |
| **Inflation rate** | 2.25% per annum | 2.4% per annum |
| **Salary Increase – Base** | 1.5% for 2 years, 2.75% plus merit and promotion scale thereafter | 4.0% for 2 years, 2.90% plus merit and promotion scale thereafter |
| **Maximum Pension Increase** | 2.75% per annum | 2.9% per annum |
| **Mortality table** | 92% of UP94; generational projection, using scale BB | 100% of UP94; generational projection, using scale AA |
| **Retirement rates** | Varies by age | Varies by age |

| | Solvency | |
|---|---|---|
| | **December 31, 2012** | **December 31, 2010** |
| **Discount rate (net of indexing)** | Annuity purchases: 1.12%<br>Transfers:<br>1.6% for 10 years, 2.2% thereafter | Annuity purchases: 2.04%<br>Transfers:<br>2.3% for 10 years, 3.3% thereafter |
| **Mortality table** | 100% of UP94; generational projection, using scale AA | 100% of UP94; projected to 2020 using scale AA |
| **Retirement rates** | 100% immediate retirement if at least age 55; otherwise 100% at age 55 | 100% immediate retirement if at least age 55; otherwise 100% at age 55 |

# Section 1: Introduction

## Purpose and Terms of Engagement

We have been engaged by the Universities Academic Pension Plan Board of Trustees and hereafter referred to as the “Board”, to conduct an actuarial valuation of the Plan as at December 31, 2012 for the general purpose of determining the minimum and maximum funding contributions required by pension standards, based on the actuarial assumptions and methods summarized herein. More specifically, the purposes of the valuation are to:

- Determine the financial position of the Plan on a going concern basis as at December 31, 2012;
- Determine the financial position of the Plan as at December 31, 2012 on a solvency basis;
- Determine the funding requirements of the Plan as at December 31, 2012; and
- Provide the necessary actuarial certification required under the Alberta *Employment Pension Plans Act* (the "*Act*") and the *Income Tax Act* (the "*ITA*").

The results of this report may not be appropriate for accounting purposes or any other purposes not listed above.

As per our engagement, we have summarized the results of this actuarial valuation along with the ensuing opinions and recommendations in this report to the Board.

While we have been engaged by the Board to conduct this actuarial valuation, we note that users of our work may well extend to parties external to the Board, notably Alberta Treasury Board and Finance, Canada Revenue Agency and the Plan participants. Out of respect for the confidentiality of the Board, 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.

As directed by the Board, this report will be filed with Alberta Treasury Board and Finance and Canada Revenue Agency.

## Summary of Changes Since the Last Valuation

The last such actuarial valuation in respect of the Plan was performed as at December 31, 2010. Since the time of the last valuation, we note that the following events have occurred:

- Solvency assumptions have been revised based on the Canadian Institute of Actuaries standard of practice for determining pension plan commuted values. Also, changes in annuity purchase rate discount factors and general fluctuations in bond rates over the past two years have affected the solvency liability calculations. The changes affecting solvency liabilities are summarized as follows:
  - Net annuity purchase discount rate decreased to 1.12% per annum from 2.04% per annum.
  - Net transfer value discount rate decreased to 1.6% per annum for 10 years and 2.2% per annum thereafter from 2.3% per annum for 10 years and 3.3% thereafter.
  - Mortality table changed to the 1994 Uninsured Pensioner table with generational projection from the same table projected to 2020.
- Going concern actuarial assumptions have been revised. The changes are summarized as follows:
  - The discount rate assumption was changed to 6.25% per annum from 6.4% per annum.
  - The inflation rate assumption was changed to 2.25% per annum from 2.4% per annum.
  - The salary rate assumption was changed to 1.5% per annum for 2 years and 2.75% per annum plus a salary increase for merit and promotion thereafter from 4.0% per annum for 2 years and 2.9% per annum plus a salary increase for merit and promotion thereafter.
  - The ITA maximum pension limit increase was changed to 2.75% per annum from 2.9% per annum.
  - The mortality table was changed to 92% of the 1994 Uninsured Pensioner (UP94) table projected generationally with scale BB, from 100% of the UP94 table projected generationally with scale AA.
  - The interest on employee contributions assumption was changed to 3.5% per annum from 4.0% per annum.

## Board Information and Inputs

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

- The previous valuation report as at December 31, 2010;
- Membership data compiled as at December 31, 2012 by Buck Consultants, and staff of the Board as summarized in Appendix C;
- Asset data taken from the Plan's audited financial statements as summarized in Appendix B; and
- A copy of the latest plan text and amendments up to and including December 31, 2012.

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

As of the date of this report, 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 after December 31, 2012 will result in gains or losses which will be reflected in the next actuarial valuation report;
- The results of this valuation were completed prior to October 30, 2013. Subsequent to the completion of these valuation results, the Canadian Institute of Actuaries issued a draft report on Canadian pensioners' mortality experience. A final report has not been issued. It is expected that the next valuation would include modifications to the mortality assumption used in this valuation; 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 may be currently under review. To the extent that actual changes in the regulatory and legal environment transpire, any financial impact on the Plan as a result of such changes will be reflected in future valuations.

# Section 2: Going Concern Valuation Results

## Going Concern Financial Position of the Plan

The going concern valuation provides an assessment of the Plan's financial position at the valuation date on the premise that the Plan continues on into the future indefinitely.

The selection of the applicable actuarial assumptions and methods reflect the Plan's funding objectives, as communicated by the Board, actuarial standards of practice, and pension standards.

On the basis of the plan provisions, membership data, going concern assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan as at December 31, 2012 is shown in the following table. The results as at December 31, 2010 are also shown for comparison purposes.

**Going Concern Financial Position (000's)**

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Actuarial Value of Assets** | | |
| Market Value | $ 2,952,000 | $ 2,540,400 |
| Smoothing adjustment | (62,300) | (113,100) |
| **Total actuarial value of assets** | **$ 2,889,700** | **$ 2,427,300** |
| **Going Concern Liabilities** | | |
| Active members | $ 1,893,500 | $ 1,703,200 |
| Deferred vested members | 148,300 | 117,800 |
| Amounts held on deposit | 3,000 | 3,200 |
| Retired members and beneficiaries | 2,108,500 | 1,817,000 |
| **Total Liabilities** | **$ 4,153,300** | **$ 3,641,200** |
| **Excess Assets/(Unfunded Liability)** | **$ (1,263,600)** | **$ (1,213,900)** |
| Funded Ratio | 0.6958 | 0.6666 |

Since an agreement is in place whereby a portion of the pre-1992 unfunded liabilities are funded by the government of Alberta, it is necessary to track the financial status of the benefits in respect of service pre and post January 1, 1992. The following table summarizes this split:

| | As at December 31, 2012 ($000's) | | |
|---|---|---|---|
| | **Pre-1992** | **Post-1991** | **Total** |
| **Actuarial value of assets** | | | |
| Market value | $ 819,500 | $2,132,500 | $2,952,000 |
| Smoothing adjustment | (20,200) | (42,100) | (62,300) |
| **Total actuarial value of assets** | **$ 799,300** | **$2,090,400** | **$2,889,700** |
| **Actuarial liability** | | | |
| Present value of accrued benefits for: | | | |
| Active members | $ 253,300 | $1,640,200 | $1,893,500 |
| Deferred vested members | 30,000 | 118,300 | 148,300 |
| Amounts held on deposit | 1,300 | 1,700 | 3,000 |
| Retired members and beneficiaries | 1,378,500 | 730,000 | 2,108,500 |
| **Total liability** | **$1,663,100** | **$2,490,200** | **$4,153,300** |
| **Excess assets (unfunded liability)** | **$ (863,800)** | **$ (399,800)** | **$ (1,263,600)** |
| Funded ratio | 0.4806 | 0.8395 | 0.6958 |
| Government share of unfunded liability | $ 264,000 | $ 0 | $ 264,000 |
| Members' and employers' share of unfunded liability | $ 599,800 | $ 399,800 | $ 999,600 |

On the basis of the plan provisions, membership data, going concern assumptions and methods and asset information described in the Appendices, the going concern normal cost of the Plan as at December 31, 2012 is shown in the following table. The normal cost as at December 31, 2010 is also shown for comparison purposes.

**Going Concern Normal Cost in the 12 Months Following the Valuation Date (000's)**

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Normal Cost** | | |
| Actuarial present value of benefits | $ 151,400 | $ 136,100 |
| **Total Normal Cost** | **$ 151,400** | **$ 136,100** |
| Estimated pensionable earnings (in year following valuation date) | $ 822,700 | $ 764,800 |
| **Total Normal Cost** | | |
| As a % of total pensionable earnings | 18.40% | 17.80% |

## Change in Financial Position

During the period from December 31, 2010 to December 31, 2012, the going concern financial position of the Plan changed from an unfunded liability of $1,213.9 million to an unfunded liability of $1,263.6 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, 2010 to December 31, 2012 ($000's)**

| | Pre-92 | Post-91 | Total |
|---|---|---|---|
| **Excess Assets/(Unfunded Liability) as at December 31, 2010** | **$ (786,900)** | **$ (427,000)** | **$ (1,213,900)** |
| Expected interest on excess assets/(unfunded liability) | (103,900) | (56,500) | (160,400) |
| Contributions towards unfunded liability with interest | 61,700 | 85,800 | 147,500 |
| **Expected Excess Assets/(Unfunded Liability) as at December 31, 2012** | **$ (829,100)** | **$ (397,700)** | **$ (1,226,800)** |
| Experience gains/(losses) due to: | | | |
| Investment earnings greater/(lower) than expected | 50,900 | 57,100 | 108,000 |
| Contributions less than normal cost | 0 | (11,300) | (11,300) |
| Salary increases different than expected | 900 | (2,900) | (2,000) |
| Retirement experience different than expected | 4,000 | 500 | 4,500 |
| Termination experience different than expected | (1,600) | (5,400) | (7,000) |
| Mortality experience different than expected | (13,000) | (4,000) | (17,000) |
| COLA lower/(greater) than expected | 10,200 | 6,200 | 16,400 |
| Pension limit lower/(greater) than expected | 0 | 1,300 | 1,300 |
| Miscellaneous items | (11,800) | 4,300 | (7,500) |
| **Excess Assets/(Unfunded Liability) after experience gains/(losses) as at December 31, 2012** | **$ (789,500)** | **$ (351,900)** | **$ (1,141,400)** |
| Change in liabilities due to assumption changes: | | | |
| Change due to discount rate assumption | (20,000) | (51,700) | (71,700) |
| Change due to other economic assumptions | 17,300 | 90,400 | 107,700 |
| Change due to mortality assumption | (71,600) | (86,600) | (158,200) |
| **Excess Assets/(Unfunded Liability) as at December 31, 2012** | **$ (863,800)** | **$ (399,800)** | **$ (1,263,600)** |

| Analysis of Experience During Intervaluation Period | Actual | Assumed |
|---|---|---|
| Average annual actuarial investment return, net of expenses | 8.5% | 6.4% |
| Average annual salary increase | 4.4% | 4.0% |
| Average annual YMPE increase | 2.9% | 2.9% |
| Average *Income Tax Act* maximum pension limit increase | 2.8% | 2.9% |
| Average COLA | 1.1% | 1.4% |
| **Membership experience:** | | |
| Terminations from active membership | 820 | 446 |
| Retirements from active membership | 427 | 674 |
| Average age of active retirements | 64.1 | 63.6 |
| Deaths from retired membership | 188 | 249 |
| Deaths from non-retired membership | 13 | 34 |

# Discussion of Changes in Assumptions

Effective December 31, 2012, the following assumptions were changed:

## Economic Assumption

§ The discount rate assumption was changed to 6.25% per annum from 6.4% per annum.

- This change in assumptions increased the going concern liabilities by $71.7 million and increased the total normal cost by $3.9 million.

§ The inflation rate assumption was changed to 2.25% per annum from 2.4% per annum.

§ The salary rate assumption was changed to 1.5% per annum for 2 years and 2.75% per annum plus a salary increase for merit and promotion thereafter from 4.0% per annum for 2 years and 2.9% per annum plus a salary increase for merit and promotion thereafter.

§ The ITA maximum pension limit increase was changed to 2.75% per annum from 2.9% per annum.

- In combination, the changes to economic assumptions excluding the discount rate, decreased the going concern liabilities by $107.7 million and decreased the total normal cost by $9.4 million.

## Demographic Assumptions

§ The mortality table was changed to 92% of the 1994 Uninsured Pensioner (UP94) table projected generationally with scale BB from 100% of the UP94 table projected generationally with scale AA.

- This change in assumptions increased the going concern liabilities by $158.2 million and increased the total normal cost by $5.1 million.

## Reconciliation of Normal Cost

The total normal cost as a percentage of pensionable earnings has increased from 17.80% at December 31, 2010 to 18.40% at December 31, 2012. A reconciliation of this change is shown in the table below:

| **Normal cost at December 31, 2010** | 17.80% |
|---|---|
| Plan data and experience different from expected since previous valuation | 0.29% |
| Changes in actuarial assumptions | 0.31% |
| **Normal cost at December 31, 2012** | **18.40%** |

## Going Concern Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans that became effective December 31, 2010, the table below presents the sensitivity of the going concern liabilities and the total normal cost of using a discount rate 1% lower than that used for the going concern valuation.

| | **Valuation Basis** | **Based on Rate of** | **Effect** | |
|---|---|---|---|---|
| **(000's)** | **December 31, 2012** | **1% Lower** | **$** | **%** |
| **Going concern liabilities** | $ 4,153,300 | $ 4,716,000 | $ 562,700 | 14% |
| **Normal cost** | $ 151,400 | $ 182,300 | $ 30,900 | 20% |

The total going concern liabilities and the total normal cost are based on a nominal discount rate assumption of 6.25% per year. Combined with an assumed inflation rate of 2.25% per year, the real discount rate assumption is 4.0% per year. The table above presents the impact of reducing the nominal discount rate assumption by 1% per year to 5.25% per year, which means the real discount rate assumption is lowered from 4.0% per year to 3.0% per year.

Note that using a discount rate 1% higher than that assumed would result in a comparable reduction in the Plan's going concern liabilities and normal cost.

# Section 3: Solvency Valuation Results

## Solvency Financial Position of the Plan

The solvency valuation is a financial assessment of the Plan that is required by the *Act* and is performed in accordance with requirements prescribed by that legislation. It is intended to provide an assessment of the Plan's financial position at the valuation date on the premise that certain obligations as prescribed by the *Act* are settled on the valuation date for all members. The *Act* does not require funding based on the solvency valuation results.

On the basis of the plan 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 Plan as at December 31, 2012 is shown in the following table. The solvency financial position of the Plan as at December 31, 2010 is shown for comparison purposes.

**Solvency Financial Position (000's)**

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Assets** | | |
| Solvency assets | $ 2,952,000 | $ 2,540,400 |
| Estimated wind up expenses | (2,600) | (2,600) |
| **Total Assets** | **$ 2,949,400** | **$ 2,537,800** |
| | | |
| **Solvency Liabilities** | | |
| Active members | $ 3,418,400 | $ 2,593,700 |
| Deferred vested members | 246,800 | 169,500 |
| Amounts held on deposit | 3,000 | 3,200 |
| Retired members and beneficiaries | 2,891,400 | 2,380,500 |
| **Total Liabilities** | **$ 6,559,600** | **$ 5,146,900** |
| | | |
| **Solvency Excess/(Deficiency)** | **$ (3,610,200)** | **$ (2,609,100)** |
| Solvency Ratio | 0.4496 | 0.4931 |

The financial position as at December 31, 2012 on a solvency basis split for service pre and post January 1, 1992 is as follows:

**Financial Position - Solvency Basis (000's)**

| | As at December 31, 2012 | | |
|---|---|---|---|
| | **Pre-1992** | **Post-1991** | **Total** |
| **Assets** | | | |
| Market value of assets | $ 819,500 | $2,132,500 | $2,952,000 |
| Wind-up expenses | 0 | (2,600) | (2,600) |
| **Actuarial value of assets** | **$ 819,500** | **$2,129,900** | **$2,949,400** |
| | | | |
| **Liabilities** | | | |
| Active members | $ 424,700 | $2,993,700 | $3,418,400 |
| Deferred vested members | 42,700 | 204,100 | 246,800 |
| Amounts held on deposit | 1,300 | 1,700 | 3,000 |
| Retired members and beneficiaries | 1,843,400 | 1,048,000 | 2,891,400 |
| **Total** | **$2,312,100** | **$4,247,500** | **$6,559,600** |
| | | | |
| **Solvency surplus (deficiency)** | **($1,492,600)** | **($2,117,600)** | **(3,610,200)** |
| Solvency ratio | 0.3544 | 0.5014 | 0.4496 |

## Impact of Plan Wind Up

In our opinion, the value of the Plan's assets would be less than its actuarial liabilities if the Plan were to be wound up on the valuation date.

Specifically, actuarial liabilities would exceed the market value of Plan assets by $3,610.2 million. This calculation includes a provision of $2.6 million for termination expenses that might be payable from the pension fund if the plan were wound up.

Part of this deficiency would be shared by the Government of Alberta in respect of pre-1992 service.

## Solvency Valuation Sensitivity Results

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans that became effective December 31, 2010, the table below presents the sensitivity of the solvency liabilities to using a discount rate of 1% lower than that used for the solvency valuation.

| (000's) | Valuation Basis December 31, 2012 | Based on Rate of 1% Lower | Effect $ | Effect % |
|---|---|---|---|---|
| **Solvency liabilities** | $ 6,559,600 | $ 7,635,600 | $ 1,076,000 | 16% |

Note that using a discount rate 1% higher than that assumed would result in a comparable reduction in the solvency wind up liabilities.

## Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at December 31, 2012 of the expected aggregate change in the solvency liabilities between December 31, 2012 and the next calculation date, that is December 31, 2015. Appendix E gives more details on the calculation methodology and on assumptions.

Based on this methodology and on these assumptions, the incremental cost on a solvency basis, for the period from December 31, 2012 to December 31, 2015, is $1,013.6 million.

# Section 4: Contribution Requirements

## Contribution Requirements in Respect of the Normal Cost

The annual going concern cost of benefits in respect of service accruing after the valuation date is known as the normal cost. The following table sets out:

- The normal cost in the 12 months following the valuation date; and
- The development of the rule to determine the normal cost until the next actuarial funding recommendation is certified.

**Going Concern Normal Cost (000's)**

| | 2013 | 2011 |
|---|---|---|
| **Normal Cost** | | |
| Actuarial present value of benefits | $151,400 | $ 136,100 |
| **Total Normal Cost** | **$151,400** | **$ 136,100** |
| Total pensionable earnings | $822,700 | $ 764,800 |
| **Total Normal Cost** | | |
| As a % of pensionable earnings | 18.40% | 17.80% |

In the event an updated funding recommendation is not certified before December 31, 2015, the rule for determining the total normal cost contributions disclosed in this section will continue to be appropriate for the plan year commencing on the next valuation date of December 31, 2015. Adjustment to the total contributions may be required once the next actuarial funding recommendations are certified.

# Development of Special Payments

Due to the different funding arrangements in place for unfunded liabilities relating to service before and after January 1, 1992, the special payments for these two periods are determined separately, as shown in this section.

The amortization schedules for unfunded liabilities were developed using the going concern interest rate of 6.25% per year compounded annually in arrears with monthly payments; salary increases of 1.5% for two years and 4.25% thereafter (the assumed base salary increase including average merit and promotion) have been used for the post-1991 amortization. For the pre-1992 amortization table, we have also increased total earnings by a further 0.75% per annum headcount growth rate.

## Special Payments in Respect of the Pre-1992 Unfunded Liability

Under the terms of the Plan and the *Public Sector Pension Plans Act* which, in accordance with the *Act,* remain in effect, additional contributions will be made by the Government of Alberta, plan members, and employers to eliminate the Plan's unfunded liability in respect of pre-1992 service and the benefits that were in place, as at December 31, 1991. These contributions are to be determined such that the pre-1992 unfunded liability will be eliminated on or before December 31, 2043 and will be split between the three parties as follows:

| | **Percent of Total** |
|---|---|
| Government | 1.25% of total payroll |
| Members and Employers | Each, 50% of remaining balance |
| Total | 100% |

The following table summarizes the previously established amortization schedules of pre-1992 going concern special payments before adjustment to reflect any gains or losses due to the going concern results.

| | | | | | **Present Value as of December 31, 2012** |
|---|---|---|---|---|---|
| | **Effective Date** | **End Date** | **Annual Special Payment as % of Pensionable Earnings** | **Annual Special Payment (000's)** | **For Going Concern Valuation (000's)** |
| Government contributions | 1-Jan-2013 | 31-Dec-2043 | 1.25% | $ 10,940 | $ 264,000 |
| Member contributions | 1-Jan-2013 | 31-Dec-2043 | 1.17% | 10,240 | 247,100 |
| Employer contributions | 1-Jan-2013 | 31-Dec-2043 | 1.17% | 10,240 | 247,100 |
| Total | | | 3.59% | $ 31,420 | $ 758,200 |

As at December 31, 2012, the pre-1992 unfunded liability is $863.8 million. The following table summarizes the amortization schedules of pre-1992 going concern special payments after adjustment to reflect any gains or losses due to the going concern results.

| | Effective Date | End Date | Annual Special Payment as % of Pensionable Earnings | Annual Special Payment (000's) | Present Value as of December 31, 2012 For Going Concern Valuation (000's) |
|---|---|---|---|---|---|
| Government contributions | 1-Jan-2013 | 31-Dec-2043 | 1.25% | $ 10,940 | $ 264,000 |
| Member contributions | 1-Jan-2013 | 31-Dec-2043 | 1.17% | 10,240 | 247,100 |
| Employer contributions | 1-Jan-2013 | 31-Dec-2043 | 1.17% | 10,240 | 247,100 |
| Member contributions | 1-Jul-2014 | 31-Dec-2043 | 0.265% | 2,330 | 52,800 |
| Employer contributions | 1-Jul-2014 | 31-Dec-2043 | 0.265% | 2,330 | 52,800 |
| Total | | | 4.12% | $ 36,080 | $ 863,800 |

The special payment schedule effective December 31, 2012, is calculated on the assumption that contribution changes take effect July 1, 2014. Until then, the existing pre-1992 contribution schedule of 3.59% of pay will remain in place. The percentage of covered earnings is calculated as a level percentage of pay through to the last payment date, assuming covered earnings grow at 1.5% per year for 2 years after the valuation date and 4.25% thereafter (the assumed base salary increase including average merit and promotion) and membership grows at 0.75% per year. Note that pre-1992 additional contributions are payable as a percentage of total unannualized earnings, whereas normal cost contributions and post-1991 unfunded liability special payments are payable as a percentage of capped pensionable earnings.

## Special Payments in Respect of the Post-1991 Unfunded Liability

Under the terms of the Plan, any unfunded liability in respect of post-1991 service shall be funded in accordance with the *Act*. Since the Plan has an unfunded liability with respect to post-91 service, special payments must be made in order to eliminate the deficiency over no more than 15 years from the date that the unfunded liability was established.

The following table summarizes previously established amortization schedules of post-1991 going concern special payments before adjustment to reflect any gains or losses due to the going concern results.

| | Effective Date | End Date | Annual Special Payment as % of Capped Earnings | Annual Special Payment (000's) | Present Value as of December 31, 2012 — For Going Concern Valuation (000's) |
|---|---|---|---|---|---|
| Member contributions | 31-Dec-2006 | 31-Dec-2021 | 0.54% | $ 4,440 | $ 34,500 |
| Employer contributions | 31-Dec-2006 | 31-Dec-2021 | 0.54% | 4,440 | 34,500 |
| Member contributions | 31-Dec-2008 | 31-Dec-2021 | 1.50% | 12,340 | 95,800 |
| Employer contributions | 31-Dec-2008 | 31-Dec-2021 | 1.50% | 12,340 | 95,800 |
| Member contributions | 31-Dec-2008 | 31-Dec-2023 | 0.505% | 4,150 | 38,600 |
| Employer contributions | 31-Dec-2008 | 31-Dec-2023 | 0.505% | 4,150 | 38,600 |
| Member contributions | 31-Dec-2010 | 31-Dec-2025 | 0.225% | 1,850 | 19,900 |
| Employer contributions | 31-Dec-2010 | 31-Dec-2025 | 0.225% | 1,850 | 19,900 |
| Total | | | 5.54% | $ 45,560 | $ 377,600 |

As at December 31, 2012, the post-1991 unfunded liability is $399.8 million. The following table summarizes the amortization schedules of post-1991 going concern special payments after adjustment to reflect any gains or losses due to the going concern results.

| | Effective Date | End Date | Annual Special Payment as % of Capped Earnings | Annual Special Payment ($,000) | Present Value as of December 31, 2012 For Going Concern Valuation ($,000) |
|---|---|---|---|---|---|
| Member contributions | 31-Dec-2006 | 31-Dec-2021 | 0.54% | $ 4,440 | $ 34,500 |
| Employer contributions | 31-Dec-2006 | 31-Dec-2021 | 0.54% | 4,440 | 34,500 |
| Member contributions | 31-Dec-2008 | 31-Dec-2021 | 1.50% | 12,340 | 95,800 |
| Employer contributions | 31-Dec-2008 | 31-Dec-2021 | 1.50% | 12,340 | 95,800 |
| Member contributions | 31-Dec-2008 | 31-Dec-2023 | 0.505% | 4,150 | 38,600 |
| Employer contributions | 31-Dec-2008 | 31-Dec-2023 | 0.505% | 4,150 | 38,600 |
| Member contributions | 31-Dec-2010 | 31-Dec-2025 | 0.225% | 1,850 | 19,900 |
| Employer contributions | 31-Dec-2010 | 31-Dec-2025 | 0.225% | 1,850 | 19,900 |
| Member contributions | 31-Dec-2012 | 31-Dec-2027 | 0.125% | 1,030 | 11,100 |
| Employer contributions | 31-Dec-2012 | 31-Dec-2027 | 0.125% | 1,030 | 11,100 |
| **Total** | | | 5.79% | $ 47,620 | $ 399,800 |

The special payment schedule effective December 31, 2012, is calculated on the assumption that contributions commence on July 1, 2014 and are amortized over 13.5 years. The percentage of covered earnings is calculated as a level percentage of pay through to the last payment date, assuming covered earnings grow at 1.5% per year for 2 years after the valuation date and 4.25% thereafter (the assumed base salary increase including average merit and promotion).

Post-1991 unfunded liability special payments are payable as a percentage of capped pensionable earnings.

## Excess Surplus

The *Income Tax Act* requires that any excess surplus first be applied to reduce or eliminate the employer contribution requirements. Excess surplus is defined in Section 147.2(2)(d) of the *Income Tax Act*, as the portion of surplus (if any) that exceeds 25% of the going concern liabilities.

Since the Plan has an unfunded liability, there is no excess surplus and therefore it does not impact the development of the total contribution requirements.

## Total Contributions

The minimum amount under the *Act* and the maximum amount, under the *Income Tax Act* that the member and employer must contribute are described in Appendix A.

The member and employer contributions recommended in this valuation report are at least equal to the legislated minimum requirements and do not exceed the legislated maximum requirements.

The minimum and maximum member and employer contributions to the Plan each year, as a percentage of the applicable earnings amount, are shown in the following table.

| | **Minimum Permitted Under the *Employment Pension Plans Act*** | **Maximum Permitted Under the *Income Tax Act*** |
|---|---|---|
| Pre-1992 unfunded liability | | |
| § Government | 1.25% | 1.25% |
| § Members and employers | 2.87% | 25.78% |
| Post-1991 unfunded liability | 5.79% | 13.31% |
| Solvency deficiency | 0.00% | 67.67% |
| Post-1991 normal cost | 18.40% | 18.40% |
| Total | | |
| § Government | 1.25% | 1.25% |
| § Members and employers | 27.06% | 125.16% |

The minimum permitted under the *Employment Pension Plans Act* column illustrates the minimum amount of funding that would be required for the period July 1, 2014 to the effective date of the next actuarial valuation to meet the Act's funding requirements, expressed as a percentage of pay. The maximum permitted under the *Income Tax Act* column represents the maximum amount of funding that would be permitted under the *Income Tax Act* for the period January 1, 2013 to December 31, 2016, expressed as a level percentage of pay each year.

Based on the results of the valuation, the Board has adopted a 1.38% increase in total employer and member contribution rates. The total employer and member contribution rate will increase from 25.68% to 27.06% effective July 1, 2014.

The new contribution rates effective July 1, 2014 are shown in the following table. Note that the employers pay matching contributions except at the Athabasca University and the Banff Centre where employers contribute 1.0% more than members.

**New Contribution Rates effective July 1, 2014**

| | **Equal Share** | | **Employer = Members + 1%** | |
|---|---|---|---|---|
| | Member | Employer | Member | Employer |
| Pre-1992 unfunded liability additional contributions | 1.435% | 1.435% | 1.435% | 1.435% |
| Post-1991 unfunded liability amortization payments | 2.895% | 2.895% | 2.895% | 2.895% |
| Normal cost: | | | | |
| - earnings below YMPE | 7.49% | 7.49% | 6.99% | 7.99% |
| - earnings above YMPE | 10.69% | 10.69% | 10.19% | 11.19% |
| **Total Contributions** | | | | |
| On earnings below YMPE | 11.82% | 11.82% | 11.32% | 12.32% |
| On earnings above YMPE, but less than pensionable salary cap | 15.02% | 15.02% | 14.52% | 15.52% |
| On earnings above pensionable salary cap | 1.44% | 1.44% | 1.44% | 1.44% |

Note that pre-1992 additional contributions are payable as a percentage of total earnings whereas the normal cost contributions and post-1991 unfunded liability special payments are payable as a percentage of capped pensionable earnings.

The amortization schedules for unfunded liabilities were developed using the going concern interest rate of 6.25% per year compounded annually in arrears with monthly payments. Capped pensionable earnings are assumed to grow at 1.5% per year for 2 years after the valuation date and 4.25% per year thereafter (the assumed base salary increase including average merit and promotion). Total earnings used to determine the pre-1992 additional contributions are assumed to grow at rates 0.75% higher than are used for the post-1991 amortization payments due to the inclusion of projected headcount growth.

# Section 5: Actuarial Certificate

## Actuarial Opinion, Recommendations and Certification for the Universities Academic Pension Plan
## Registration Number: 0339572

### Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at December 31, 2012. We confirm that we have prepared an actuarial valuation of the Plan as at December 31, 2012 for the purposes outlined in the Introduction section to this report and consequently:

**We hereby recommend that:**

§ Contributions in the amounts outlined in Section 4 of this report should be made to the Plan.

§ The next actuarial valuation for the purpose of developing funding requirements should be performed no later than as at December 31, 2015.

**We hereby certify that, in our opinion:**

§ With respect to the purposes of determining the Plan's financial position on a going concern basis as at December 31, 2012:

- The Plan has a going concern unfunded liability of $1,263.6 million as at December 31, 2012, based on going concern assets of $2,889.7 million less going concern liabilities of $4,153.3 million.
- There is no excess surplus as defined by Section 147.2(2) of the *Income Tax Act* in the Plan at December 31, 2012.

§ With respect to the purpose of determining the Plan's financial position on a solvency basis:

- The Plan has a solvency deficiency of $3,610.2 million as at December 31, 2012, determined as solvency assets (less windup expenses) of $2,949.4 million less solvency liabilities of $6,559.6 million.
- The Plan's liabilities would exceed the Plan's assets by $3,610.2 million if the Plan was terminated and wound up as at December 31, 2012.

§ With respect to determining the funding requirements of the Plan:

– The rule for determining the total normal cost for the 12 months following the valuation date is 18.40% of pensionable earnings.

The estimated total normal cost is as follows:

| (000's) | | 2013 | | 2011 |
|---|---|---|---|---|
| **Normal Cost** | | | | |
| Actuarial present value of benefits | $ | 151,400 | $ | 136,100 |
| **Total Normal Cost** | **$** | **151,400** | **$** | **136,100** |
| Total pensionable earnings | $ | 822,700 | $ | 764,800 |
| **Total Normal Cost** | | | | |
| As a % of pensionable earnings | | 18.40% | | 17.80% |

– The minimum special payments and additional contributions effective July 1, 2014 until the next actuarial opinion, as a percentage of earnings, are as summarized in the following table:

**Minimum Special Payments and Additional Contributions for Unfunded Liability**

| | Pre-1991 | Post-1991 | Annual Special Payment as % of Pensionable Earnings |
|---|---|---|---|
| Government | 1.25% | n/a | 1.25% |
| Member | 1.435% | 2.895% | 4.33% |
| Employer | 1.435% | 2.895% | 4.33% |
| | 4.12% | 5.79% | 9.91% |

Note that contributions with respect to the pre-1992 unfunded liability are expressed as a percentage of total earnings, and contributions with respect to the post-1991 unfunded liability are expressed as a percentage of capped pensionable earnings. The complete amortization schedules with respect to the unfunded liabilities are shown in Section 4.

– The total maximum special payments and additional contributions from January 1, 2013 to December 31, 2016, as a percentage of earnings each year are 27.03% for the pre-1992 unfunded liability, 13.31% for the post-1991 unfunded liability, and 67.67% for the solvency deficiency. Note that contributions with respect to the pre-1992 unfunded liability are expressed as a percentage of total earnings, and contributions with respect to the post-1991 unfunded liability are expressed as a percentage of capped pensionable earnings.

– The contributions as recommended in this report are expected to be sufficient to satisfy the Plan's funding requirements.

– The contributions recommended in this report are eligible contributions under Section 147.2(2) of the *Income Tax Act.*

– The member contributions recommended in this report exceed the limits imposed by paragraph 8503(4)(a) of the *Income Tax Regulations*, however we will apply for a ministerial waiver in accordance with paragraph 8503(5) of the *Income Tax Regulations*. Upon approval by the Minister, the member contributions recommended in this report will be eligible contributions.

§ 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.

§ 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*.

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

Robert J. Thiessen, FSA, FCIA
Associate Partner

Karen J. Hall, FSA, FCIA
Associate Partner

January 28, 2014

# Appendix A: Glossary of Terms

§ The **actuarial value of assets** is the asset value used for going concern valuation purposes. Smoothing methods are sometimes used to smooth investment gains and losses over a certain period.

§ The **estimated wind up expenses** is an estimate of the administrative and other expenses expected to be charged against the pension fund if the Plan were to terminate on the valuation date.

§ The **going concern liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The going concern liabilities are calculated using the going concern assumptions and methods summarized in Appendix D of this report.

§ The **going concern financial position** is the difference between the actuarial value of assets and the going concern liabilities.

§ The **maximum permissible employer contribution** refers to an eligible contribution pursuant to Section 147.2(2) of the *Income Tax Act*. Under Subsection 8502(b) of the Regulations to the *Income Tax Act*, each employer contribution made after 1991 in respect of a defined benefit provision of a registered pension plan must be such eligible contribution.

In an employer's fiscal year, the following contributions are eligible under Section 147.2 of the *Income Tax Act*.

- The employer normal cost, eligible under Section 147.2(2) subject to certification by the actuary and approval by the Canada Revenue Agency; plus
- Special payments eligible under Section 147.2(2) up to the amount of the unfunded liability, subject to certification by the actuary and approval by the Canada Revenue Agency; less
- Required application of excess surplus.

The employer normal cost and special payments for this Plan will be deductible under Section 147.2(2) of the *Income Tax Act*, subject to the approval of the Canada Revenue Agency.

Note that contributions to a Plan are still permissible and deductible if there is an excess surplus, providing there is simultaneously a solvency deficiency in the Plan or the contributions are required as minimum contributions under provincial legislation, pursuant to Subsections 8516(2) and (3) of the Regulations to the *Income Tax Act*.

One restriction under the *Income Tax Act* is that if there is an excess surplus, and a solvency deficiency, the maximum deductible contribution is restricted to the full amount of the deficiency without allowance for interest or any other contributions such as employer normal cost and/or transfer deficiency payments.

In order to be deductible in a given fiscal year, employer contributions must be made not later than 120 days after the end of the fiscal year.

- The **minimum required employer** contribution for each plan year is equal to:
  - The employer normal cost; plus
  - The employer special payments toward amortizing any unfunded liability over 15 years from the date on which the unfunded liability was established; plus
  - Required application of excess surplus; less
  - Permitted application of excess assets.
- **Solvency assets** are the market value of pension fund assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in-transit at the valuation date.
- The **solvency liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date determined as if the Plan were wound up on the valuation date.

  The solvency liabilities are determined using benefit entitlements on the assumption that the Plan has neither excess assets nor a deficit. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix E of this report.
- The **solvency financial position** is the difference between the solvency assets (net of estimated wind up expenses) and the solvency liabilities.
- The **special payments** are contributions required to liquidate the unfunded liability. The going concern special payments are payments required to liquidate the unfunded liability, with interest at the going concern valuation discount rate, by calculating the required percentage of pensionable earnings that must be contributed over a period of 15 years from the valuation date of the report in order to pay off the existing deficits. The special payments commence 18 months following the valuation date and continue for 13.5 years (15 years after the valuation date).
- The **excess assets/(unfunded liability)** is the difference between the actuarial value of assets and the going concern liabilities.
- The **total normal cost** is the actuarial present value of benefits expected to be earned in respect of service for each year starting on the valuation date. The total normal cost is calculated using the going concern valuation assumptions and methods summarized in Appendix D of this report.

# Appendix B: Assets

## Asset Data

The Plan assets are held in trust by the Board, and are invested by Alberta Investment Management Corporation (AIMCo) in accordance with the Statement of Investment Policies and Goals (SIP&G) approved by the Board. At the asset class level, the Plan's investments are managed for purposes of evaluating the Plan's risk exposure and investment performance against approved benchmarks based on market value. The Plan's investments are primarily invested in pooled funds managed by AIMCo.

This type of trust arrangement governs only the investment of the assets deposited into the fund and in no way guarantees the benefits provided under the Plan or the costs of providing such benefits. Any excess income or, in fact, any other profit caused by the actual Plan experience varying from the actuarial assumptions will accrue to the fund. It is, of course equally true that any losses due to variations of actual experience from the actuarial assumptions will emerge as a liability of the Plan, 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 information presented in this report is based on asset data obtained from staff of the Board.

Tests of the sufficiency and reliability of the asset data were performed and the results were satisfactory. The tests included:

§ A reconciliation of actual cash flow with expected cash flow from the previous actuarial report; and

§ A reconciliation with the asset data provided for the previous valuation.

## Market Value of Assets

The following is a summary of the market values of the fund as reported in the Plans' Financial Statements as at December 31, 2012. For comparison purposes, the composition at the previous valuation date of December 31, 2010 is also shown.

| (000's) | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Invested Assets | $ 2,933,339 | $ 2,524,800 |
| Net receivables and payables | 18,669 | 15,559 |
| **Market Value** | **$ 2,952,008** | **$ 2,540,359** |

## Asset Allocation

The following is a summary of the allocation of the Plan's invested assets:

| (000's) | 2012 Fair Value | 2012 % | 2010 Fair Value | 2010 % |
|---|---|---|---|---|
| **Interest-bearing securities** | | | | |
| Cash and short-term securities | $ 13,735 | 0.5 | $ 23,345 | 0.9 |
| Bonds and mortgages | 686,874 | 23.4 | 453,905 | 18.0 |
| Real return bonds | 197,919 | 6.7 | 187,997 | 7.4 |
| | **898,528** | **30.6** | **665,247** | **26.3** |
| **Equities** | | | | |
| Canadian public equities | 509,580 | 17.4 | 445,292 | 17.7 |
| Foreign public equities | 885,055 | 30.2 | 1,129,119 | 44.7 |
| Emerging markets equities | 270,894 | 9.2 | 0 | 0.0 |
| | **1,665,529** | **56.8** | **1,574,411** | **62.4** |
| **Alternative investments** | | | | |
| Real estate | 220,774 | 7.5 | 171,024 | 6.8 |
| Infrastructure | 126,591 | 4.3 | 79,199 | 3.1 |
| Absolute return strategy hedge funds | 0 | 0.0 | 27,390 | 1.1 |
| Timberland | 21,917 | 0.8 | 7,529 | 0.3 |
| | **369,282** | **12.6** | **285,142** | **11.3** |
| **Total investments** | **$ 2,933,339** | **100.0** | **$ 2,524,800** | **100.0** |

# Target Asset Mix

The target asset mix of the Plan is contained in the Plan's Statement of Investment Policies and Procedures and is as follows:

| Asset Class | Benchmark | Policy Weight (%) | Allowable Range (%) |
|---|---|---|---|
| **Fixed Income** | | | |
| Cash and Short-term | DEX 91 Day T-bill Index | 0.0 | 0-1 |
| Canadian Bonds (Universe) | DEX Universe Bonds | 10.5 | 8-12 |
| Long-term Canadian Bonds | DEX Long Bond Index | 12.5 | 10-15 |
| Real Rate of Return Bonds | DEX Real Return Index | 7.0 | 5-9 |
| | | **30.0** | **25-35** |
| **Equities** | | | |
| Canadian Equities | S&P/TSX Composite Capped Index | 17.5 | 15-20 |
| Global Equities | MSCI ACWI | 33.5 | 30-35 |
| Emerging Markets Equities | MSCI Emerging Markets Index, Net | 4.0 | 0-5 |
| | | **55.0** | **50-60** |
| **Alternatives** | | | |
| Hedge Funds (Fund-of-Funds) | HFRX Global Investable Index (Hedged C$) | 2.0 | 0-5 |
| Canadian Real Estate (Direct) | ICREIM/IPD Large Institutional All Property Index | 8.0 | 5-11 |
| Private Income | CPI + 600 BPS | 4.0 | 1-6 |
| Timberland | CPI + 400 BPS | 1.0 | 0-1 |
| | | **15.0** | **7.5-20** |
| **Total Investments** | | **100.0** | |

# Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between December 31, 2010 and December 31, 2012.

| (000's) | 2011 | 2012 |
|---|---|---|
| **Market Value of Assets, Beginning of Plan Year** | **$ 2,540,359** | **$ 2,627,547** |
| **Contributions During Plan Year** | | |
| Employer | $ 93,419 | $ 99,454 |
| Member | 93,287 | 99,515 |
| Prior service | 1,145 | 2,192 |
| Government | 10,712 | 10,876 |
| | **$ 198,563** | **$ 212,037** |
| **Benefit Payments During Plan Year** | | |
| Non-retired members[1] | $ (20,134) | $ (20,881) |
| Retired members | (163,899) | (173,921) |
| | **$ (184,033)** | **$ (194,802)** |
| **Fees/Expenses** | | |
| Investment fees/expenses | $ (6,924) | $ (9,245) |
| Non-investment fees/expenses | (1,911) | (1,772) |
| | **$ (8,835)** | **$ (11,017)** |
| **Investment Income** | **$ 81,493** | **$ 318,243** |
| **Market Value of Assets, End of Plan Year** | **$ 2,627,547** | **$ 2,952,008** |
| **Rate of return, net of fees/expenses** | **2.85%** | **11.65%** |

[1] Includes members who have terminated employment or died.

# Development of Actuarial Value of Assets

The method to determine the actuarial value of assets is described in Appendix D. The development of the actuarial value of assets as of December 31, 2012 is shown below:

**Actuarial Value of Assets**
**(Three-Year Average Market Value)**
**($ millions)**

| | Pre-1992 | Post-1991 | Total |
|---|---|---|---|
| **Market value at January 1, 2011** | **886.3** | **1,654.1** | **2,540.4** |
| Contributions | 28.3 | 170.3 | 198.6 |
| Benefit Payments & Expenses | (121.6) | (64.5) | (186.1) |
| Assumed Investment Income (at 6.4% per annum) | 53.7 | 109.2 | 162.9 |
| Projected value at December 31, 2011 | 846.7 | 1,869.1 | 2,715.8 |
| Contributions | 30.2 | 181.8 | 212.0 |
| Benefit Payments & Expenses | (125.2) | (71.4) | (196.6) |
| Assumed Investment Income (at 6.4% per annum) | 51.3 | 123.2 | 174.5 |
| **Projected value at December 31, 2012 (A)** | **803.0** | **2,102.7** | **2,905.7** |
| **Market value at January 1, 2012** | **821.1** | **1,806.4** | **2,627.5** |
| Contributions | 30.2 | 181.8 | 212.0 |
| Benefit Payments & Expenses | (125.2) | (71.4) | (196.6) |
| Assumed Investment Income (at 6.4% per annum) | 49.5 | 119.1 | 168.6 |
| **Projected value at December 31, 2012 (B)** | **775.6** | **2,035.9** | **2,811.5** |
| **Market Value of Assets at December 31, 2012 (C)** | **819.5** | **2,132.5** | **2,952.0** |
| **Actuarial Value of Assets at December 31, 2012** | | | |
| Smoothed Market Value (average of A, B, and C) | 799.3 | 2,090.4 | 2,889.7 |
| 110% of market value | 901.4 | 2,345.8 | 3,247.2 |
| **Capped Actuarial Value of Assets** | **799.3** | **2,090.4** | **2,889.7** |

# Appendix C: Membership Data

## Source of Data

This funding valuation was based on member data provided by Buck Consultants, and staff of the Board as of December 31, 2012. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test was performed to ensure that all members were accounted for. A summary of this reconciliation follows on the next page;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of credited service against the corresponding amount provided for the last valuation to ensure that no member accrued more than 2 years of credited service from December 31, 2010, notwithstanding increases due to service purchases during the inter-valuation period. This test also revealed any members who had any unexpected changes in service, such as having accrued less than 2 years of credited service or had no change in credited service;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases (more than 15% per annum) or decreases;
- A reconciliation of accrued benefits against the corresponding amounts provided for the last valuation to identify any unusual benefit accruals;
- A reconciliation of pensions for retired employees against the corresponding amounts provided for the last valuation to ensure consistency of data;
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

The following information was missing, and assumptions were made as follows with respect to such missing data:

- Annualization of Pensionable Earnings: Since the data provided did not include annualized earnings for some members, earnings were annualized using actual earnings and in-year service where required. Annualized earnings for the first year after the valuation date (2013) were assumed to be 1.5% higher than those provided for 2012.
- Earnings: If earnings were available for 2007 to 2011, the most recent data was utilized and increased to 2012 using the salary increase assumptions from the previous valuation. Otherwise, the overall average of the group was utilized.
- Service Ratios: If the service ratio was blank we assumed a service ratio of 1.0.
- Detail in Financial Information: Due to the nature of the financial information, it was not possible to trace the refunds individually for every terminating member. The potential effect of this data omission was immaterial to the overall results of the valuation; however, it could affect the gain/loss analysis.
- Pension Amounts: For members included in active member data with termination dates before the valuation date we have calculated the value of benefits based on available active member data.

- Pension Amounts for Pensioners: Current pension amounts in-pay were provided by UAPP staff, and included actual pension indexing up to January 1, 2013. Any incomplete data was supplemented with the pensioner data provided by Buck Consultants.

## Administrator Certification

A copy of the administrator certification certifying the accuracy and completeness of the member data (and the plan provisions summarized in this report) is included in Appendix G of this report.

## Membership Reconciliation

The table below reconciles the number of members as of December 31, 2012 with the number of members as of December 31, 2010 and the changes due to experience in the period.

| | Actives | Deferreds | HODs | Pensioners & Survivors | Total |
|---|---|---|---|---|---|
| Members, December 31, 2010 | 7,576 | 981 | 377 | 3,840 | 12,774 |
| Changes due to: | | | | | |
| New entrants | 1,370 | 0 | 0 | 0 | 1,370 |
| Termination | | | | | |
| Non-vested | (1) | (3) | 4 | 0 | 0 |
| Deferred vested pension | (398) | 399 | (1) | 0 | 0 |
| Lump sum | (421) | (74) | (52) | (1) | (548) |
| Death | | | | | |
| Lump sum | (4) | (8) | (1) | (103) | (116) |
| Surviving beneficiary | 0 | 0 | 0 | (85) | (85) |
| Expiry of guarantee period | 0 | 0 | 0 | (7) | (7) |
| New beneficiary | 0 | 0 | 0 | 85 | 85 |
| Retirement | (427) | (50) | 0 | 477 | 0 |
| Transfer | 17 | (12) | (5) | 0 | 0 |
| Data correction | 1 | 14 | (1) | (17) | (3) |
| Net change | 137 | 266 | (56) | 349 | 696 |
| **Members, December 31, 2012** | **7,713** | **1,247** | **321** | **4,189** | **13,470** |

# Membership Summary

## Active Members

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 7,713 | 7,576 |
| Average age | 48.6 | 48.2 |
| Average credited service | 9.8 | 9.5 |
| Total expected 2013 unlimited earnings for members with a normal cost | $ 875,521,372 | $ 832,074,077 |
| Total expected 2013 capped earnings for members with a normal cost | $ 822,706,184 | $ 764,797,523 |
| Total expected 2013 annualized capped earnings for all members | $ 840,114,486 | $ 798,474,661 |
| Average expected 2013 annualized capped earnings for all members | $ 108,922 | $ 105,395 |
| Average expected 2013 annualized capped earnings for members with normal cost | $ 108,799 | $ 105,209 |
| Proportion female | 46.4% | 45.0% |

## Active Members – Pre-1992 Service

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 1,047 | 1,272 |
| Average age | 59.8 | 58.8 |
| Average pre-1992 pensionable service | 6.5 | 7.4 |
| Average expected 2013 annualized unlimited earnings for all members | $ 157,388 | $ 151,301 |
| Proportion of female | 30.7% | 30.1% |

## Deferred Vested Members

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 1,247 | 981 |
| Average age | 48.0 | 47.9 |
| Average annual pension | $ 8,092 | $ 8,591 |
| Average annual pre-1992 pension | $ 968 | $ 1,766 |
| Proportion of female | 48.1% | 47.3% |

## Participants with Amounts Held-on-Deposit

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 321 | 377 |
| Average age | 53.8 | 50.5 |
| Average contributions with interest | $ 9,225 | $ 8,543 |
| Proportion of female | 48.9% | 49.9% |

## Retired Members and Survivors

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 4,189 | 3,840 |
| Average age | 72.4 | 71.9 |
| Average annual pension | $ 43,307 | $ 42,235 |
| Average years since retirement | 11.8 | 12.3 |
| Proportion of female | 36.1% | 33.9% |

## Retired Members and Survivors – Pre-1992 Pension

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| Number | 3,491 | 3,335 |
| Average age | 73.9 | 73.1 |
| Average annual pre-1992 pension | $ 36,423 | $ 36,088 |
| Average years since retirement | 13.3 | 12.7 |
| Proportion of female | 32.7% | 31.2% |

## Active Membership Distribution

The following table provides a detailed summary of the active membership at the valuation date by years of credited service and by age group using expected average annualized capped 2013 earnings.

| | | Years of Credited Service | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Age** | | **< 5** | **5–10** | **10–15** | **15–20** | **20–25** | **25–30** | **30–35** | **>=35** | **Total** |
| < 25 | Count | 7 | | | | | | | | 7 |
| | AvgErngs | $ 54,478 | | | | | | | | $ 54,478 |
| 25–30 | Count | 141 | 4 | | | | | | | 145 |
| | AvgErngs | $ 70,836 | $ 75,938 | | | | | | | $ 70,977 |
| 30–35 | Count | 458 | 67 | 2 | | | | | | 527 |
| | AvgErngs | $ 81,897 | $ 88,684 | $ 87,779 | | | | | | $ 82,782 |
| 35–40 | Count | 571 | 337 | 46 | | | | | | 954 |
| | AvgErngs | $ 85,962 | $ 97,783 | $102,060 | | | | | | $ 90,914 |
| 40–45 | Count | 510 | 486 | 233 | 19 | | | | | 1,248 |
| | AvgErngs | $ 91,006 | $100,898 | $117,281 | $127,336 | | | | | $100,317 |
| 45–50 | Count | 379 | 376 | 382 | 149 | 24 | | | | 1,310 |
| | AvgErngs | $ 93,259 | $103,780 | $121,090 | $129,950 | $129,852 | | | | $109,238 |
| 50-55 | Count | 309 | 301 | 317 | 198 | 118 | 49 | 2 | | 1,294 |
| | AvgErngs | $ 96,339 | $109,877 | $119,954 | $130,867 | $135,563 | $131,217 | $129,873 | | $115,506 |
| 55-60 | Count | 224 | 243 | 216 | 131 | 186 | 135 | 40 | 2 | 1,177 |
| | AvgErngs | $104,819 | $114,912 | $121,983 | $129,418 | $137,824 | $138,554 | $134,830 | $104,016 | $122,894 |
| 60-65 | Count | 109 | 112 | 130 | 74 | 102 | 117 | 100 | 34 | 778 |
| | AvgErngs | $109,088 | $114,006 | $124,181 | $126,418 | $138,739 | $141,246 | $142,754 | $145,759 | $128,620 |
| >=65 | Count | 23 | 39 | 25 | 21 | 23 | 35 | 41 | 66 | 273 |
| | AvgErngs | $ 94,217 | $116,403 | $123,214 | $134,140 | $142,886 | $141,999 | $145,234 | $148,399 | $134,100 |
| **Total** | Count | 2,731 | 1,965 | 1,351 | 592 | 453 | 336 | 183 | 102 | **7,713** |
| | AvgErngs | $ 90,086 | $104,611 | $119,949 | $129,762 | $137,276 | $138,780 | $141,437 | $146,649 | **$108,922** |

The following table provides a detailed summary of the active membership who have pre-1992 service at the valuation date by years of pre-1992 credited service and by age group using expected average annualized 2013 earnings.

| Age | | Years of Pre-1992 Credited Service | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | < 5 | 5–10 | 10–15 | 15–20 | 20–25 | |
| 45–50 | Count | 18 | | | | | 18 |
| | Average Earnings | $ 141,587 | | | | | $ 141,587 |
| 50-55 | Count | 120 | 33 | 3 | | | 156 |
| | Average Earnings | $ 149,453 | $ 137,915 | $ 126,509 | | | $ 146,571 |
| 55-60 | Count | 205 | 114 | 31 | 2 | | 352 |
| | Average Earnings | $ 146,207 | $ 163,646 | * | * | | $ 152,336 |
| 60-65 | Count | 120 | 124 | 84 | 24 | 1 | 353 |
| | Average Earnings | $ 150,826 | $ 155,731 | $ 170,295 | * | * | $ 158,957 |
| >=65 | Count | 28 | 36 | 47 | 47 | 10 | 168 |
| | Average Earnings | $ 167,789 | $ 174,330 | * | $ 183,176 | * | $ 176,416 |
| **Total** | Count | 491 | 307 | 165 | 73 | 11 | **1,047** |
| | Average Earnings | $ 149,191 | $ 158,936 | $ 167,544 | $ 179,013 | $ 184,260 | **$ 157,388** |

* *Not shown for confidentiality reasons to comply with privacy legislation.*

## Retired Membership Distribution

The distribution by pensioner age and spouse age for the pensioners and survivors in receipt of monthly pension payments is as follows:

| | | Spouse Age | | | | | | No | |
|---|---|---|---|---|---|---|---|---|---|
| **Age** | | **< 55** | **55–65** | **65–75** | **75–85** | **85–95** | **>=95** | **Spouse** | **Total** |
| < 55 | Count | 1 | | | | | | 19 | 20 |
| | Average Pension | * | | | | | | * | $ 17,775 |
| | Average of J&S%** | 1.00 | | | | | | * | 7.36 |
| 55–60 | Count | 35 | 113 | 21 | | 1 | | 72 | 242 |
| | Average Pension | $ 29,370 | $ 28,396 | $ 23,273 | | * | | * | $ 28,160 |
| | Average of J&S%** | 0.83 | 0.87 | 0.84 | | 1.00 | | 4.76 | 2.02 |
| 60–65 | Count | 26 | 222 | 106 | 3 | 1 | | 165 | 523 |
| | Average Pension | $ 30,141 | $ 38,156 | $ 38,841 | * | * | | $ 37,295 | $ 37,473 |
| | Average of J&S%** | 0.83 | 0.86 | 0.84 | 0.78 | 0.67 | | 2.92 | 1.50 |
| 65–70 | Count | 34 | 200 | 410 | 25 | 1 | | 269 | 939 |
| | Average Pension | $ 42,094 | $ 42,940 | $ 46,592 | * | * | | $ 39,099 | $ 43,227 |
| | Average of J&S%** | 0.86 | 0.83 | 0.83 | 0.84 | 1.00 | | 2.59 | 1.34 |
| 70–75 | Count | 14 | 85 | 477 | 60 | 6 | | 332 | 974 |
| | Average Pension | $ 47,222 | $ 48,799 | $ 51,452 | $ 45,975 | $ 45,549 | | $ 45,346 | $ 48,704 |
| | Average of J&S%** | 0.86 | 0.82 | 0.82 | 0.85 | 0.89 | | 1.04 | 0.90 |
| 75–80 | Count | 3 | 26 | 182 | 206 | 3 | | 267 | 687 |
| | Average Pension | $ 48,703 | $ 43,694 | $ 48,897 | $ 49,972 | $ 68,135 | | $ 43,811 | $ 47,129 |
| | Average of J&S%** | 1.00 | 0.76 | 0.83 | 0.87 | 0.89 | | 0.24 | 0.61 |
| 80-85 | Count | 1 | 3 | 36 | 181 | 39 | 1 | 195 | 456 |
| | Average Pension | * | $ 44,286 | $ 42,741 | $ 46,136 | $ 45,810 | * | $42,310 | $ 44,152 |
| | Average of J&S%** | 0.67 | 0.78 | 0.85 | 0.88 | 0.92 | 1.00 | 0.03 | 0.52 |
| 85-90 | Count | | 3 | 8 | 38 | 59 | 3 | 130 | 241 |
| | Average Pension | | $ 46,702 | $ 40,141 | $ 46,851 | $ 48,010 | $ 15,459 | $ 39,305 | $ 42,449 |
| | Average of J&S%** | | 0.67 | 0.79 | 0.89 | 0.90 | 1.00 | 0.00 | 0.41 |
| 90-95 | Count | | | 2 | 4 | 23 | | 57 | 86 |
| | Average Pension | | | $ 32,867 | $ 33,868 | $ 39,021 | | $ 37,898 | $ 37,894 |
| | Average of J&S%** | | | 0.67 | 0.83 | 0.86 | | 0.00 | 0.28 |
| >=95 | Count | | | | | 3 | 3 | 15 | 21 |
| | Average Pension | | | | | * | * | $ 23,766 | $ 29,083 |
| | Average of J&S%** | | | | | 0.72 | 0.78 | 1.44 | 1.25 |
| **Total** | Count | 114 | 652 | 1,242 | 517 | 136 | 7 | 1,521 | **4,189** |
| | Average Pension | $ 35,970 | $39,608 | $ 47,565 | $ 46,873 | $ 46,090 | $ 27,549 | $ 40,573 | **$ 43,307** |
| | Average of J&S%** | 0.85 | 0.84 | 0.83 | 0.87 | 0.89 | 0.90 | 1.38 | 0.84 |

** Not shown for confidentiality reasons to comply with privacy legislation.*

*** J&S % for members with no spouse is remaining guarantee period.*

The distribution by pensioner age and spouse age for the pensioners and survivors in receipt of monthly pre-92 pension payments is as follows:

| Age | | Spouse Age < 50 | 50–60 | 60–70 | 70–80 | 80–90 | >=90 | No Spouse | Total |
|---|---|---|---|---|---|---|---|---|---|
| < 55 | Count | | | | | | | 6 | 6 |
| | Average Pension | | | | | | | $ 20,319 | $ 20,319 |
| | Average of J&S%** | | | | | | | 1.87 | 1.87 |
| 55–60 | Count | 9 | 36 | 26 | 1 | | | 38 | 110 |
| | Average Pension | * | $ 14,029 | $ 15,125 | * | | | $ 18,495 | $ 16,181 |
| | Average of J&S%** | 0.85 | 0.85 | 0.87 | 0.67 | | | 3.93 | 1.92 |
| 60–65 | Count | 5 | 38 | 157 | 14 | | | 114 | 328 |
| | Average Pension | $ 22,353 | $ 22,203 | $ 25,322 | $ 18,952 | | | $ 22,188 | $ 23,554 |
| | Average of J&S%** | 0.87 | 0.85 | 0.86 | 0.74 | | | 2.19 | 1.31 |
| 65–70 | Count | 10 | 49 | 343 | 94 | 5 | | 201 | 702 |
| | Average Pension | $ 29,800 | $ 30,052 | $ 34,222 | $ 31,315 | $ 24,613 | | $ 29,893 | $ 32,171 |
| | Average of J&S%** | 0.83 | 0.86 | 0.83 | 0.84 | 0.93 | | 2.26 | 1.24 |
| 70–75 | Count | 6 | 34 | 226 | 292 | 11 | 2 | 303 | 874 |
| | Average Pension | $ 34,469 | $ 33,195 | $ 38,113 | $ 41,229 | $ 37,301 | $ 41,600 | $ 37,282 | $ 38,648 |
| | Average of J&S%** | 0.83 | 0.82 | 0.81 | 0.84 | 0.85 | 1.00 | 0.93 | 0.86 |
| 75–80 | Count | 1 | 9 | 64 | 292 | 43 | 1 | 262 | 672 |
| | Average Pension | * | $ 28,550 | $ 36,559 | $ 44,814 | * | * | $ 39,911 | $ 41,531 |
| | Average of J&S%** | 1.00 | 0.78 | 0.79 | 0.86 | 0.86 | 0.67 | 0.23 | 0.60 |
| 80-85 | Count | | 1 | 11 | 104 | 133 | 10 | 193 | 452 |
| | Average Pension | | * | $ 36,213 | * | $ 43,903 | $ 48,926 | $41,263 | $ 42,392 |
| | Average of J&S%** | | 0.67 | 0.82 | 0.86 | 0.90 | 0.93 | 0.03 | 0.52 |
| 85-90 | Count | | 2 | 4 | 18 | 71 | 16 | 130 | 241 |
| | Average Pension | | * | * | $ 42,079 | $ 49,715 | $ 37,927 | $ 39,481 | $ 42,551 |
| | Average of J&S%** | | 0.67 | 0.75 | 0.85 | 0.90 | 0.91 | 0.00 | 0.41 |
| 90-95 | Count | | | 1 | 1 | 22 | 5 | 57 | 86 |
| | Average Pension | | | * | * | $ 39,536 | $ 33,335 | $ 37,825 | $ 37,886 |
| | Average of J&S%** | | | 0.67 | 0.67 | 0.85 | 0.87 | 0.00 | 0.28 |
| >=95 | Count | | | | | 1 | 5 | 14 | 20 |
| | Average Pension | | | | | * | * | $ 23,395 | $ 29,089 |
| | Average of J&S%** | | | | | 1.00 | 0.70 | 0.00 | 0.23 |
| **Total** | Count | 31 | 169 | 832 | 816 | 286 | 39 | 1,318 | **3,491** |
| | Average Pension | $ 26,158 | $25,697 | $ 33,190 | $ 41,159 | $ 43,719 | $ 41,074 | $ 35,429 | **$ 36,423** |
| | Average of J&S%** | 0.85 | 0.84 | 0.83 | 0.85 | 0.89 | 0.88 | 0.92 | 0.84 |

** Not shown for confidentiality reasons to comply with privacy legislation.*

*** J&S % for members with no spouse is remaining guarantee period.*

## Deferred Vested Membership Distribution

Annual pension amounts shown for deferred pensioners are the amounts payable without adjustment for early or postponed retirement, but include cost of living adjustments granted up to January 1, 2013.

| Age | | | |
|---|---|---|---|
| 25–30 | Count | | 20 |
| | Average pre-92 pension | $ | 0 per year |
| | Average total pension | $ | 1,645 per year |
| 30–35 | Count | | 68 |
| | Average pre-92 pension | $ | 0 per year |
| | Average total pension | $ | 3,237 per year |
| 35–40 | Count | | 139 |
| | Average pre-92 pension | $ | 0 per year |
| | Average total pension | $ | 3,952 per year |
| 40–45 | Count | | 239 |
| | Average pre-92 pension | $ | 0 per year |
| | Average total pension | $ | 6,053 per year |
| 45–50 | Count | | 265 |
| | Average pre-92 pension | $ | 98 per year |
| | Average total pension | $ | 7,372 per year |
| 50–55 | Count | | 234 |
| | Average pre-92 pension | $ | 434 per year |
| | Average total pension | $ | 10,499 per year |
| 55–60 | Count | | 191 |
| | Average pre-92 pension | $ | 2,143 per year |
| | Average total pension | $ | 10,537 per year |
| 60–65 | Count | | 62 |
| | Average pre-92 pension | $ | 3,835 per year |
| | Average total pension | $ | 11,878 per year |
| 65–70 | Count | | 21 |
| | Average pre-92 pension | $ | 13,061 per year |
| | Average total pension | $ | 22,158 per year |
| >=70 | Count | | 8 |
| | Average pre-92 pension | $ | 19,777 per year |
| | Average total pension | $ | 27,175 per year |
| **Total** | Count | | **1,247** |
| | Average pre-92 pension | **$** | **968 per year** |
| | Average total pension | **$** | **8,092 per year** |

# Appendix D: Going Concern Assumptions and Methods

## 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. The cost of each member's benefits is allocated in some fashion over the 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 based on assumptions in respect of future events upon which a plan's benefits are contingent and methods that effectively determine the way in which a plan's costs will be allocated over the members' service. 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 used for the going concern valuation of the Plan at the valuation date. The going concern assumptions and methods have been chosen to reflect our understanding of the Plan's funding objectives with due respect to accepted actuarial practice and regulatory constraints. For purposes of this valuation, the going concern methods and assumptions were reviewed and changes as indicated were made.

# Assumptions and Methods

The actuarial assumptions and methods used in the current and previous valuations are summarized below and described on the following pages.

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Economic Assumptions** | | |
| Discount rate | 6.25% | 6.4% |
| Inflation rate | 2.25% | 2.4% |
| Increases in pensionable earnings | 1.5% for two years and 2.75% plus merit and promotion scale thereafter | 4.0% for two years and 2.9% plus merit and promotion scale thereafter |
| Increases in maximum pension limit | In accordance with *Income Tax Act*, then 2.75% | In accordance with *Income Tax Act*, then 2.9% |
| Interest on member contributions | 3.5% | 4.0% |
| Investment expenses | 0.29% of assets (included in discount rate) | 0.31% of assets (included in discount rate) |
| Non-investment expenses | 0.09% of assets (included in discount rate) | 0.08% of assets (included in discount rate) |
| Margin for adverse deviation | 0.76% (in discount rate) | 0.84% (in discount rate) |
| **Demographic Assumptions** | | |
| Mortality | 92% of 1994 Uninsured Pensioner Mortality Table; Generational Projection with scale BB | 100% of 1994 Uninsured Pensioner Mortality Table; Generational Projection with scale AA |
| Retirement | Varies by age (Table A following) | Same |
| Termination of employment | Varies by age (Table B following) | Same |
| Disability | None | Same |
| Merit and promotion | Varies by age (Table C following) | Same |
| Proportion married | | |
| Non-retired proportion with spouse | 80% | Same |
| Non-retired spousal age differential | Males four years older | Same |
| Retired members | Actual marital status and ages are used | Same |
| Deferred pension take-up | 70% | Same |
| Headcount growth | 0.75% | Same |
| Margin for adverse deviation | None | Same |
| **Methods** | | |
| Actuarial cost method | Projected accrued benefit | Same |
| Asset valuation method | Market value smoothed over three years | Same |

## Table A— Retirement Rates

Age-based retirement rates are in accordance with the following table:

| Age | Rate (%) |
|---|---|
| 55 | 10.0 |
| 56 – 58 | 5.0 |
| 59 – 64 | 10.0 |
| 65 – 68 | 75.0 |
| 69 | 100.0 |

Deferred participants are assumed to retire at age 55 or their current age, if older.

## Table B—Termination Rates

Age-based termination rates are in accordance with the following table:

| Selected Age | Rate (%) |
|---|---|
| 20 | 9.0 |
| 30 | 9.0 |
| 35 | 7.5 |
| 40 | 6.0 |
| 45 | 3.0 |
| 50 | 3.0 |
| 55 | 0.0 |

## Table C—Merit and Promotion Scale

Age-based merit and promotion rates used for this valuation are 3.25% per annum at ages less than 36 years and 1.0% at ages older than 59 years. Selected rates are shown in the following table:

| Selected Age | Rate (%) |
|---|---|
| 20 | 3.25 |
| 30 | 3.25 |
| 40 | 3.00 |
| 50 | 1.75 |
| 60 | 1.00 |

# Justification of Actuarial Assumptions and Methods

## Economic Assumptions

### Discount Rate

We have used a discount rate of 6.25%.

The overall expected return ("best-estimate") is 7.21%, which is based on an inflation rate of 2.25%, yielding a real rate of return on the pension fund assets of 4.96%. This best-estimate rate of return was developed using best-estimate returns for each major asset class in which the pension fund is invested and then using a building block approach, based on the Plan's investment policy, to develop an overall best-estimate rate of return for the entire pension fund. Any additional gains from rebalancing and diversification have been included above.

In order to set the discount rate, we have incorporated the following adjustments to the overall expected rate of return:

| Development of Discount Rate | | | | |
|---|---|---|---|---|
| Overall expected return | | | | 7.21% |
| Investment expenses | | | | |
| Passive | (1) | (0.11)% | | |
| Actively managed | (2) | (0.18)% | | |
| | | | (1)+(2) | (0.29)% |
| Non-investment expenses | | | | (0.09)% |
| Additional returns due to active management | | | | 0.18% |
| Margin for adverse deviation | | | | (0.76)% |
| **Discount Rate** | | | | **6.25%** |

### Inflation Rate

The inflation rate is assumed to be 2.25% per annum. This reflects our best estimate of future inflation considering current economic and financial market conditions. This assumption has changed from the previous valuation where an inflation assumption of 2.4% per annum was used.

## Increases in Pensionable Earnings

To reflect anticipated short-term salary budgets, we have assumed pensionable earnings increase at 1.5% per annum for two years from the valuation date and then increase at the rate of inflation plus 0.5% per annum for productivity growth, plus seniority, merit and promotion ("SMP") (or 1.5% for two years and 2.75% per annum, plus SMP thereafter). For the previous valuation, it was assumed that salaries would increase at 4.0% per annum for two years from the valuation date and then would increase at the rate of inflation plus 0.5% per annum for productivity (or 4.0% for two years and 2.9% per annum, plus SMP thereafter).

## Total Payroll

In order to determine contribution rates for amortization of the unfunded liabilities as a percentage of earnings, it is necessary to make an assumption for the total payroll growth under the Plan. For this purpose, we have used the same increases for inflation and general wage increases as are used for individual member earnings, and we have also included average increases due to SMP of 1.5% per annum. Due to the nature of the funding arrangement for the pre-1992 unfunded liability we have also included a provision for estimated headcount growth of 0.75% per annum in calculating the present value of pre-1992 additional contributions from January 1, 2013 to December 31, 2043. The resulting salary increase rates that were used to determine contribution rates associated with unfunded liabilities of the plan are as follows:

| | |
|---|---|
| Pre-1992: | 2.25% for two years, and 5.00% thereafter |
| Post-1991: | 1.50% for two years, and 4.25% thereafter. |

The construction of this assumption is the same as for the previous valuation, but the underlying assumption for increases in pensionable earnings has been changed as described above. The assumed rates for average SMP and headcount growth are unchanged from the previous valuation.

## Increases in the Maximum Pension Limit

We assumed that the *Income Tax Act* maximum annual pension benefit per year of pensionable service will be indexed at 2.75% per annum. This assumption consists of inflation of 2.25% per annum, general wage productivity of 0.50% per annum. For the previous valuation, we assumed the rate of increase of the limit to be 2.9% per annum.

## Interest on Member Contributions

Interest is credited on member contributions at 3.5% per annum. The assumption reflects the expected future interest credited on 5-year personal term deposits, and likely includes a margin for adverse deviation. For the previous valuation, we assumed interest was credited on member contributions at 4.0% per annum.

## Expenses

Investment expenses expected to be paid from the Plan in the future are assumed to be 29 basis points (11 basis points for passive and 18 basis points for active management) and are taken into account in the discount rate assumption. The Board believes that active management of the funds will recoup the active portion of the fees. We assumed 20 basis points at the previous valuation. Based on past plan experience, administrative expenses are assumed to be 0.09% of assets and this amount is included in the discount rate determination.

## Economic Margins for Adverse Deviations

Margins for conservatism or provisions for adverse deviation have been built into the going concern assumptions where appropriate.

The margins have been chosen so as to balance the need for financial security for existing Plan members against overly conservative contribution requirements that potentially result in intergenerational inequity among members and unnecessary financial strain on the Plan sponsor.

A margin for adverse deviations of 0.76% has been reflected in the discount rate assumption.

The actuary has discussed the Plan's experience with the Board and compared it to the expected experience. This review indicates that there is a need for use of margins for adverse deviations. The margins for adverse deviations incorporated in the assumptions reflect this review and the Board's desire to maintain safety cushions. The actuary has discussed with the Board the implications of incorporating margins for adverse deviations and the Board is fully cognizant and supports incorporating margins for adverse deviations.

# Demographic Assumptions

## Mortality

The membership of this Plan is not sufficiently large enough to develop its own plan-specific mortality table. The 1994 Uninsured Pensioner Mortality Table ("UP94") reflects the mortality experience as of 1994 for a large sample of North American pension plans. Applying projection scale AA on a generational basis provides allowance for improvements in mortality after 1994 and has been generally considered reasonable for projecting mortality experience into the future. This table has been commonly used for valuations where the mortality experience of the membership of a plan is insufficient to assess plan specific experience and where there is no reason to expect the mortality experience of the Plan to differ significantly from that of other pension plans. It is expected based on experience with other universities, and supported by experience of the Plan that university academics experience lower mortality than average pensioners. Mortality improvement scale BB provides for greater mortality improvement than scale AA. This valuation uses 92% of UP94 with generational projection according to scale BB. This mortality assumption is considered to be a best estimate assumption for this plan. For the previous valuation, assumed mortality rates were derived from 100% of the UP94 table, generationally projected using scale AA.

Subsequent to the completion of these valuation results, the Canadian Institute of Actuaries (CIA) issued a draft report on Canadian pensioner mortality. The draft report indicates mortality rates have improved greater than anticipated. The CIA mortality rates and improvement scales are in draft form and these rates will be different in the final report. We expect that the mortality table and improvement scale for the next actuarial valuation of the Plan will be changed. The use of 92% of the UP94 table with a generational projection using scale BB for this valuation reflects greater mortality improvement than in the previous valuation, and remains an acceptable best estimate assumption.

## Retirement

Retirement rates are typically developed taking into account the past experience of the Plan. Accordingly, the rates of retirement for active participants have been developed based on an estimate of plan experience for the years 1988 to 1993. These rates are considered best-estimate rates of retirement based on the plan provisions and are unchanged from the previous valuation.

As in the previous valuation, all participants in receipt of disability benefits from an employer's approved long-term disability plan are assumed to continue to be disabled until termination or retirement. As such, they are included as active participants.

Deferred participants are assumed to retire at age 55 or their current age if older.

## Termination of Employment

A member's benefit entitlement under the Plan 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 prior to retirement for reasons other than death has been made.

The termination rates were developed based on plan experience from the years 1988 to 1993 and are considered to be best estimate. The rates are unchanged from the previous valuation.

## Option Elections on Termination

Seventy percent (70%) of vested terminated members were assumed to elect a deferred pension with remaining members choosing to transfer their benefit out of the Plan. This assumption has not changed from the previous valuation. This assumption is based on an estimate of Plan experience and is considered best estimate.

## Disability

As in the previous valuation, the probability of future disability of current active members was assumed to be nil. Members who become disabled normally continue to accrue benefits with earnings at the pre-disability level, with general increases, so long as they are in receipt of long term disability benefits. In most cases, gains would arise when a member becomes disabled. Consequently, this assumption is considered to include a margin.

## Proportion of Members with Spouses and Spousal Age Differential

These assumptions are relevant to the valuation of benefits since there is a subsidized joint and survivor benefit available for members with a spouse. The proportion of members who will have a spouse and the spousal age difference are based on broad population statistics.

For retired members, the actual marital status and spousal age are used.

As with the previous valuation, we assumed that 80% of participants would have a pension partner at the relevant time. All pension partners are assumed to be the opposite gender of the participant. Male partners were assumed to be four years older than their female partners based on an analysis of recent retirements. The remaining 20% of participants were assumed to have no pension partner. While the definition of pension partner includes same-sex relationships, this assumption adequately provides for all such contingencies.

## Demographic Margins for Adverse Deviations

All demographic assumptions are considered best estimate so no margins for conservatism or provisions for adverse deviation have been built into the going concern demographic assumptions.

## Seniority Merit and Promotion (SMP)

As described under “Increases in Pensionable Earnings”, we have included a SMP scale for salary increases after two years from the valuation date. The SMP rates (Table C) were developed based on Plan experience form the years 1985 to 1993 and are considered to be best estimate. The rates are unchanged from the previous valuation.

# Other

## 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 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.

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 excess assets 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 normal cost) net of any required employee contributions is expressed as a percentage of the expected value of participating payroll for that year. The employer normal cost contributions are determined each year by applying this percentage to the actual participating payroll for the year.

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 their 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 normal cost will remain relatively level as a percentage of payroll. The projected accrued benefit actuarial cost method therefore allocates contributions among different periods in an orderly and rational manner for a stable population group.

In the event of future adverse experience, contributions in addition to the normal cost calculated under the projected accrued benefit actuarial cost method may be required to ensure that the Plan assets are adequate to provide the benefits. Conversely, favourable experience may generate excess assets which may serve to reduce future contribution requirements.

## Asset Valuation Method

The actuarial value of assets is a smoothed market value and is calculated as the average of the market value of invested assets at the valuation date and the two market values from preceding calendar year-ends accumulated to the valuation date. The accumulated market values at the end of each year equal the sum of:

- the appropriate (accumulated or actual) market value at the beginning of the year;
- the net contributions during the year (calculated as contributions less benefit payments plus net transfers); and
- the assumed investment return (determined as the going-concern liability discount rate applicable to the most recent funding valuation prior to the particular year).

To ensure that the asset valuation method develops an asset value that appropriately tracks market value over time, the calculated actuarial value of assets is adjusted, if necessary, so that it falls within 10% of the market value of assets ("10% corridor").

This asset valuation method is unchanged from the previous valuation.

## Other Methodologies

We have prepared a list of additional assumptions and methods used in the valuation of the Plan. This list is intended to assist users of this report in understanding the specific benefits valued. Small differences in methods and assumptions in a plan of this size can sometimes have effects in the millions of dollars. Appendix C of the report deals with data omissions so they will not be repeated here.

§ It is administrative practice for the Plan that indexation of deferred and immediate pensions commences January 1 of the year following termination or retirement;

§ Normal cost contributions are based on pensionable earnings below the maximum earnings limit described earlier in this report;

§ The pensionable earnings for calculating normal cost percentage is nil for participants with 35 years of combined pensionable service;

§ For deferred benefits on termination (post-1991 service), the pensions were deferred to 55 with the early reduction factor calculated from the earlier of age 60 and the attainment of 80 points. Deferred pensioners over age 55 at the valuation date were assumed to retire on July 1, 2013.

# Appendix E: Solvency Assumptions and Methods

## Valuation Assumptions

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Economic Assumptions** | | |
| Discount Rate | | |
| Transfer value basis | | |
| —*Without indexation* | | |
| Active and deferred members not retirement-eligible | 2.4% for 10 years; 3.6% thereafter | 3.3% for 10 years; 5.0% thereafter |
| Annuity purchase basis | | |
| —*Without indexation* | | |
| Retirement-eligible active and deferred members and all retired members, survivors and beneficiaries | 3.0% | 4.5% |
| Transfer value basis | | |
| —*With indexation* | | |
| Active and deferred members not retirement-eligible | 1.6% for 10 years; 2.2% thereafter | 2.3% for 10 years; 3.3% thereafter |
| Annuity purchase basis | | |
| —*With indexation* | | |
| Retirement-eligible active and deferred members and all retired members, survivors and beneficiaries | 1.12% | 2.04% |

| | | |
|---|---|---|
| **Demographic Assumptions** | | |
| Mortality rates | 1994 Uninsured Pensioner Mortality Table with fully generational projection scale AA (sex-distinct rates) | 1994 Uninsured Pensioner Mortality Table projected to 2020 with projection scale AA (sex-distinct rates) |
| Withdrawal rates | Not Applicable | Same |
| Retirement age | | |
| Active and deferred vested members | 100% immediate retirement if at least age 55 at employment termination; otherwise 100% at age 55 | Same |
| Retired members and beneficiaries | Not applicable | Same |
| Termination of employment | Terminate with full vesting | Same |
| Proportion married | | |
| Non-retired proportion with spouse | 80% | Same |
| Non-retired spousal age differential | Males four years older | Same |
| Retired members | Actual marital status and ages are used | Same |

| | December 31, 2012 | December 31, 2010 |
|---|---|---|
| **Other** | | |
| Wind up expenses | $2,600,000 | Same |
| Actuarial cost method | Unit credit | Same |
| Asset valuation method | Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date | Same |
| **Solvency Incremental Normal Cost** | | |
| Increases in pensionable earnings | 2.75% | 2.90% |
| Increases in maximum pension limit | In accordance with *Income Tax Act*, then 2.75% | In accordance with *Income Tax Act*, then 2.90% |
| Inflation rate | 2.25% | 2.40% |
| New entrants | Full replacement for decrementing members | Same |

Based on the Canadian Institute of Actuaries' Guidance and information such as pension legislation, Plan provisions and Plan experience, we have made the following assumptions regarding how the Plan's benefits would be settled on Plan wind up:

| | **Percent of Liability Assumed to be Settled By Purchase of Annuities** | **Percent of Liability Assumed to be Settled By Lump-Sum Transfer** |
|---|---|---|
| Active members | | |
| Not retirement-eligible | 30% | 70% |
| Retirement-eligible | 100% | 0% |
| Deferred vested members | | |
| Not retirement-eligible | 30% | 70% |
| Retirement-eligible | 100% | 0% |
| Retired members and beneficiaries | 100% | 0% |

## Benefits Valued

| | **Solvency Valuation** |
|---|---|
| **Vesting** | We have treated all accrued benefits as vested on Plan wind-up. |
| **Post-valuation date benefit increases** | Benefits are based on the average earnings and service at the valuation date. |
| **Indexing** | According to Plan provisions, the benefits to which a member would be entitled if the Plan was terminated on the valuation date would include pension indexing of 60% of Alberta CPI. This indexing rate has been accounted for in the With Indexation discount rates summarized earlier in this Section. |

## Justification for Valuation Assumptions

| | |
|---|---|
| Solvency lump-sum discount rate for 10 years (Non-indexed) | = V122542[1] + 90 bps<br>= 1.47 + 0.90<br>**= 2.37 (rounded to 2.40)** |
| Solvency lump-sum discount rate for 10 years (Fully indexed) | = V122542[1] x (V122553[1] / V122544[1]) + 90 bps<br>= 1.47 x (0.34 / 2.31) + 0.90<br>**= 1.12 (rounded to 1.10)** |
| Solvency lump-sum discount rate thereafter (Non-indexed) | = V122544[1] + 0.5 x (V122544[1] – V122542[1]) + 90 bps<br>= 2.31 + 0.5 x (2.31 – 1.47) + 0.90<br>**= 3.63 (rounded to 3.60)** |
| Solvency lump-sum discount rate thereafter (Fully indexed) | = V122553[1] + 0.5 x [V122553[1] – (V122542[1] x (V122553[1] / V122544[1]))] + 90 bps<br>= 0.34 + 0.5 x [0.34 – (1.47 x (0.34 / 2.31))] + 0.90<br>**= 1.30 (rounded to 1.30)** |
| Solvency annuity purchase discount rate (Non-indexed) | **= 2.96** (V39062 + 70 bps) |
| Solvency annuity purchase discount rate (Fully indexed) | **= 0.38** (V39057) |
| Implied inflation ($\pi$) | **= 1.87** [(1+V39062) / (1+V39057) – 1] |
| Solvency annuity purchase discount rate (60% indexed) | **= 1.12** [(1+V39062) / (1+0.6 $\pi$) – 1] |

The indexed rates currently used in the valuation were derived by applying 60% of CPI to the fully indexed rates.

We have set the aforementioned assumptions based on guidance prepared by the Canadian Institute of Actuaries Committee on Pension Plan Financial Reporting ("PPFRC") in the Educational Note Assumptions for Hypothetical Wind Up and Solvency Valuations with Effective Dates Between December 31, 2012 and December 30, 2013 ("CIA Guidance") released on February 13, 2013.

For benefit entitlements that are expected to be settled by purchase of annuities, we based the assumptions on information compiled by the PPFRC from insurance companies active in the group annuity market.

For benefit entitlements that are expected to be settled by lump-sum transfer, we based the assumptions on the Canadian Institute of Actuaries Standards of Practice for Pension Commuted Values, effective April 1, 2009, using rates corresponding to a valuation date of December 31, 2012.

## Pensionable Earnings

To estimate active and disabled members' best average earnings, we have used actual historical member earnings.

[1] CANSIM Series (annualized)

## Pre-retirement Mortality

We have made no allowance for pre-retirement mortality. The impact of including such an assumption would not have a material impact on the valuation, since the value of the death benefit is approximately equal to the value of the accrued pension.

## Mortality Rates

For benefits that are settled by way of annuity purchase, mortality is assumed to be in accordance with the sex distinct rates of the UP-94 Mortality Table with generational projection. This mortality assumption is representative of the mortality table that, together with the discount rate assumption of 1.12%, 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.

For benefits that are settled by way of lump sum transfer, mortality is assumed to be in accordance with the sex distinct rates generated from the UP-94 Mortality Table with generational projection in accordance with accepted actuarial practice as at the valuation date.

For the previous valuation, benefits settled by way of annuity purchase and lump sum transfer were both assumed to follow mortality in accordance with the sex distinct rates generated from the UP-94@2020 Mortality Table.

## Termination Rates

All participants who are actively employed on the valuation date are assumed to terminate their employment on this date and subsequently retire from the Plan in accordance with the retirement age assumption summarized below.

## Retirement Rates

All participants age 55 or older who are actively employed on the valuation date are assumed to retire immediately and receive a pension in accordance with the terms of the Plan and the member's age and continuous service. All other Plan members are assumed to retire at age 55.

## Assumptions Not Needed

The following are not relevant to the solvency valuation:

§ Increases in pensionable earnings;

§ Increases in Year’s Maximum Pensionable Earnings;

§ Increases in *Income Tax Act* maximum pension limit (we used the 2013 limit of $2,696.67); and

§ Disability rates.

## Estimated Wind-Up Expenses

Plan wind-up expenses would normally include such items as fees related to preparation of the actuarial wind-up report, fees imposed by a pension supervisory authority, legal fees, administration, custodial and investment management expenses. We have assumed these fees would be $2,600,000.

## Actuarial Cost Methods

Unit credit (accrued benefit) cost method as prescribed.

## Asset Valuation Method Considerations

Assets for solvency purposes have been determined using market value with adjustments for:

- In-transit items at the valuation date; and
- Expenses for Plan termination as outlined above.

## 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 liabilities 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 new information.

The calculation methodology 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

§ Projected solvency liabilities 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 solvency liabilities 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 liabilities 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.
- We have made an allowance for new entrants over the incremental cost period. Members who retire, terminate or die are immediately replaced by a new entrant matching a profile created based on actual historic Plan experience of new entrants.

# Appendix F: Summary of Plan Provisions

This funding valuation was based on plan design information provided by the Board as of December 31, 2012. The following is a summary of the main provisions of the Plan.

| | |
|---|---|
| **Effective Date** | Effective January 1, 2001 the Universities Academic Pension Plan became a non-statutory pension plan subject to and registered under the *Employment Pension Plans Act* of Alberta. Prior to January 1, 2001 the plan was governed by the Alberta *Public Sector Pension Plans Act* and the *Universities Academic Pension Plans Act* (before 1993). The Plan is also registered under the *Income Tax Act*. The Plan now operates under a Sponsorship and Trust Agreement signed by the Plan Sponsors. A complete description of the Plan can be found in the Sponsorship and Trust Agreement, and a summary of Plan provisions relevant to the valuation and extrapolation is included in this Appendix. |
| **Jurisdiction of Registration** | Alberta. |
| **Eligibility for Membership** | Open to full- and part-time employees who meet the criteria specified in the Plan. |
| **Vesting** | Benefits for all service are vested for members who terminate employment on or after January 1, 2001 and have accumulated at least 2 years of Continuous Plan Membership. Members who terminated employment before January 1, 2001 were vested with five years of pensionable service. |
| **Normal Retirement** | |
| Eligibility | Normal retirement date is the June 30th following the member's 65th birthday. |
| Benefit | Annual pension payable in equal monthly instalments calculated as the sum of the following:<br>a) for each year of pensionable service prior to January 1, 1992, 2.0% of the member's highest average salary, plus<br>b) for each year of pensionable service in 1992 and 1993, 2.0% of the member's highest average capped salary, plus |

c) for each year of pensionable service after December 31, 1993, 1.4% of the lesser of the highest average capped salary and the average YMPE plus 2.0% of the excess of the highest average capped salary over the average YMPE, if any, plus a bridge benefit of 0.6% of the lesser of the highest average capped salary and the average YMPE, payable to age 65.

Highest average pensionable salary is the participant's average annual salary in the five consecutive years of pensionable service in which such average is the highest, and the average YMPE is the average of the Year's Maximum Pensionable Earnings under the Canada Pension Plan in the years used to determine the member's highest average pensionable salary.

**Early Retirement**

From active service

| | |
|---|---|
| Eligibility | Age 55 with full vesting. |
| Benefit | For service after December 31, 1993, if a member commences pension payments prior to the normal retirement date, then the pension payable to the member will be equal to the normal retirement pension, reduced by an early retirement factor as described below.<br><br>The early retirement factor is 3.0% for each year by which the member's retirement date precedes the earliest of:<br><br>a) age 60; and<br>b) the day on which the member would have completed 80 points of age plus pensionable service (with no service after the date of termination).<br><br>If a member is vested and retires after attaining age 60 or 80 points as described above, no reduction is applied.<br><br>In addition, a member who retires before the normal retirement date will receive a bridge benefit for each year of pensionable service after December 31, 1993 equal to 0.6% of the lesser of the highest average capped salary and the average YMPE, |

| | |
|---|---|
| | reduced by the early retirement factor described above, and payable to age 65.<br>For service prior to January 1, 1994 the early retirement pension is equal to the unreduced normal retirement pension. |

**Postponed Retirement**

| | |
|---|---|
| Eligibility | Any time after normal retirement date and before December 31 of the year in which the participant attains age 69. A member who terminates or retires prior to age 69 may defer pension commencement. |
| Benefit | Normal retirement benefit accrued to postponed retirement date. When pension commencement is deferred past a member's date of termination, the pension with respect to pre-1994 service is actuarially increased for commencement after age 55 (actuarial increase for commencement after age 65 for post-1993 service). |

**Termination of Employment**

Pre-1994 service

| | |
|---|---|
| Eligibility | Members are fully vested. |
| Benefit | a) the member will receive a deferred pension, or<br>b) a refund or transfer of the commuted value of the member's accrued pension plus excess contributions, or<br>c) a refund or transfer of the member's and employer's contributions with interest. |

Post-1993 service

| | |
|---|---|
| Eligibility | Members are fully vested. |

Benefit

a) the member will receive a deferred pension, or
b) a transfer of the commuted value of the member's accrued pension plus excess contributions, or
c) a transfer of 175% of the member's contributions with interest.

In the event of a non-vested member's termination for reasons other than death or retirement the member will receive a refund of the member's contributions with interest.

**Pre-retirement Death**

Pre-1994 service

Eligibility

Members are fully vested upon death.

Benefit

No pension partner:
The beneficiary or estate will receive the commuted value of the member's accrued pension plus excess contributions or the member's and employer's contributions with interest.

Pension partner:
The spouse will receive a lifetime survivor pension as if the member had retired on the day before death and elected a joint and survivor 100% pension, or a refund of the member's and employer's contributions with interest.

Post-1993 service

Eligibility

Members are fully vested.

Benefit

No pension partner:
The beneficiary or estate will receive the commuted value of the member's accrued pension plus excess contributions or 175% of the member's contributions with interest.

Pension partner:
The spouse will receive a lifetime survivor pension as if the member had retired on the day before death and elected a joint and survivor 100% pension plus excess contributions, or

- a transfer of the commuted value of the member’s accrued pension plus excess contributions, or
- a transfer of 175% of the member's contributions with interest.

In the event of the death of a non-vested member before retirement the member’s spouse or beneficiary will receive a refund of the member’s contributions with interest.

**Post-retirement Death**

Pre-1994 service

| | |
|---|---|
| Benefit | The normal form of pension is payable for life and guaranteed for 15 years in any event |

Post-1993 service

| | |
|---|---|
| Benefit | If the member has a spouse at retirement, the normal form of pension provides a survivor benefit equal to 2/3 of the member's accrued pension would be paid, had the member continued to live. The normal form of pension for a member without a spouse at retirement is payable for life and guaranteed for ten years in any event.<br><br>A different form of pension may be elected at retirement in an actuarially equivalent amount. |

**Disability**

| | |
|---|---|
| Eligibility | Qualification for benefits under employer-sponsored long-term disability plan. |
| Benefit | For members who are receiving benefits under the LTD plan, participation in the Plan continues, but no pension is payable concurrently with the benefit paid under the LTD plan.<br><br>For members who are not receiving benefits under the LTD plan, are permanently and totally disabled, and vested, they are entitled to receive an immediate unreduced pension based on pensionable service and salary to the date of the disability. If the member is partially disabled, the |

pension is reduced in accordance with the Plan.

Earnings during disability are deemed to be at the same level as in effect just prior to disability, with subsequent wage increases applicable for that member's class.

**Contributions**

Members and employers contribute the entire cost of the benefits accruing for future benefits as well as the amortization of deficiencies related to post-1991 service in accordance with the *Employment Pension Plans Act*. An agreement is in place whereby the Government of Alberta contributes 1.25% of total payroll towards the pre-1992 unfunded liability until the pre-1992 unfunded liability is eliminated, or December 31, 2043 if earlier. The members and employers contribute the remaining amounts calculated as necessary to eliminate the unfunded liability by December 31, 2043.

**Maximum Benefit**

Effective January 1, 1992, and only in respect of pensionable service after 1991, pensionable earnings for service in 1992 and 1993 are limited to 50 times the defined benefit annual maximum pension limit for the year under the *Income Tax Act.* Pensionable earnings for post 1993 service are limited to 50 times the defined benefit annual maximum pension limit plus 0.6% of the YMPE for the year under the *Income Tax Act.*

For years after 2006, the limit is as follows:

| Year | Limit 1992-1993 Svc | Limit Post-93 Svc |
|---|---|---|
| 2007 | 111,111 | 124,221 |
| 2008 | 116,667 | 130,137 |
| 2009 | 122,222 | 136,112 |
| 2010 | 124,722 | 138,882 |
| 2011 | 127,611 | 142,101 |
| 2012 | 132,334 | 147,364 |
| 2013 | 134,834 | 150,164 |
| 2014 + | Indexed to Average Industrial Wage | Indexed to Average Industrial Wage |

**Cost-of-Living Increases**

Cost-of-living increases based on 60% of the Alberta CPI apply to both deferred pensions and pensions-in-payment.

**Definitions**

| | |
|---|---|
| Pensionable earnings | The participant's actual salary limited to the amount in any year after 1992 which results in the maximum defined benefit for that year under the *Income Tax Act Regulations*. |
| Credited interest | Prior to 1994, participants' contributions were accumulated at the rate of 4% per annum, compounded semi-annually. After 1993, the rate of interest credited to participants' contributions was changed to the average yield of 5-year personal fixed term chartered bank deposits (CANSIM series V122515) over the most recent 12-month period, calculated as of the first day of the calendar year. |
| Pensionable service | Combined pensionable service, as defined under the provisions of the Plan, cannot exceed 35 years. Combined pensionable service (service in the Plan plus pensionable service in the Public Service Pension Plan) is used to determine eligibility for benefits, vesting and determination of highest average salary. |

A copy of a letter from the Board certifying the accuracy and completeness of the plan provisions summarized in this report is included in Appendix G of this report.

# Appendix G: Administrator Certification

With respect to the Universities Academic Pension Plan, forming part of the actuarial report as at December 31, 2012, I hereby certify that, to the best of my knowledge and belief:

- The asset data contained in Appendix B of this report is complete and accurate;
- The actuary has been notified of all relevant events subsequent to the valuation measurement date;
- The membership data summarized in Appendix C of this report form a complete and accurate description of all persons who are entitled to benefits under the terms of the plan in respect of service up to the date of the valuation; and
- The summary of the Plan provisions contained in Appendix F is an accurate summary of the Plan provisions.

Chris Schafer
Name (print) of Authorized Signatory
Universities Academic Pension Plan Board of Trustees

Director, Finance and Administration
Title

Signature

23 January 2014
Date