

YORK UNIVERSITY PENSION PLAN Actuarial Valuation Update

05 DECEMBER 2011

Michael Banks and Tracey Delahey

Agenda

- Actuarial valuation results as at December 31, 2010
 - as presented to the Pension Fund Trustees, June 2011
 - assumptions as presented at March 2, 2011 meeting
 - formal actuarial report filed with FSCO September 2011
- Review of non-reduction costs
- Update for 2011

ACTUARIAL VALUATION RESULTS AS AT DECEMBER 31, 2010

The background of the slide features a dark blue top section. Below this, there are three horizontal, wavy bands of varying shades of blue and teal, creating a layered, abstract effect. The bottom-most band is a bright cyan color, while the middle band is a lighter, pale blue, and the top band of this section is a medium teal.

Highlights

- Investment returns for 2009 of 15.98% and for 2010 of 9.76% have not been sufficient to recover from the effect of the 2008 return of -19.24%. Three year cumulative return is 2.8% vs. assumed three year return of 20.8%, a shortfall of 18%
- Going concern deficiency of \$217.2 million as at December 31, 2010 vs. \$228.4 million as at December 31, 2009 and \$44.1 million as at December 31, 2007 (the last valuation filed with FSCO)
- On wind-up basis, funded ratio of 87.0% at December 31, 2010 vs. 86.3% at December 31, 2009 and 99.1% at December 31, 2007
- Minimum employer contribution, reflecting “Stage 1” solvency funding relief is 245% of employee contributions for 2011 and 321% of employee contributions for 2012
- Minimum employer contribution of 431% of employee contributions for 2011 vs. 198% for 2010 (based on last filed valuation report at December 31, 2007), absent funding relief measures
- Approximately 96% of active members are now projected to retire with a minimum guarantee pension

Going Concern Financial Position

	At December 31 (\$Million)		
	2010	2009	2007
Market Value of Assets	1,333.9	1,221.0	1,320.4
Money Purchase Accounts	723.8	650.6	724.3
Defined Benefit Assets	610.1	570.4	596.1
Pensioner Liability	608.6	600.6	536.8
Active Member Minimum Guarantee Liability	218.7	198.2	103.4
Excess/(Unfunded Liability)	(217.2)	(228.4)	(44.1)

Major Experience Items

	At December 31 (\$ Million)	
	2010	2009
Excess/(Unfunded Liability) at beginning of year	(228.4)	(265.6)
Interest on Deficiency	(14.3)	(17.3)
Special Payments with Interest	5.0	5.0
Gain/(Loss) on Investment Experience	30.9	75.5
Retirement Experience Different than Assumed	1.9	2.2
Cost of Non-Reduction for New Pensioners	0.6	0.5
Change in Assumption re: Non-Reduction Reserve	(18.4)	N/A
Salary Gain/(Loss)	3.7	(2.4)
Pensioner Mortality Experience	1.4	(0.9)
Change in Discount Rate Assumption	N/A	(22.7)
Data Adjustments	0.3	0.3
Change in Retirement Assumption for Members Over Age 65	2.3	N/A
Other (Termination, New Members, etc.)	(2.2)	(3.0)
Excess/(Unfunded Liability) at end of year	(217.2)	(228.4)

Summary of Going Concern Actuarial Assumptions

	December 31, 2010 Assumption	Comments
Interest Rate	6.25% per annum	No change from December 31, 2009 assumption
Salary Increase	5.0% per annum	No change from December 31, 2009 assumption
Wage Index Inflation	3.5% per annum	No change from December 31, 2009 assumption
Increase in Income Tax Act Maximum Pension Limit	3.5% per annum	No change from December 31, 2009 assumption
Retirement	Age 65; members over age 65 assumed to retire in one year	Previously members over age 65 were assumed to retire immediately
Mortality	70% of GAM 1994 table with future projected improvements	No change from December 31, 2009 assumption
Administration Expenses	6.0% of member contributions	Reduced from 8.50% of member contributions as at December 31, 2009
Termination	Based on plan experience during 2004-2006	No change from December 31, 2009 assumption
Non-reduction reserve	6.0% of liabilities for active members	Strengthened from 3.5% of liabilities for active members at December 31, 2009

See Appendix for details and other supporting data

Solvency/Hypothetical Wind-Up Position

	At December 31 (\$ Million)		
	2010	2009	2007
Assets			
Market Value of Assets	1,333.9	1,221.0	1,320.4
Provision for Wind-up Expenses	(2.5)	(2.5)	(2.5)
Net Assets	1,331.4	1,218.5	1,317.9
Money Purchase Accounts	723.8	650.6	724.4
Defined Benefit Assets	607.6	567.9	593.5
Pensioner Liabilities	660.6	636.6	557.4
Active Member Minimum Guarantee Liabilities	145.8	124.0	47.9
Wind-Up Excess/(Deficiency)	(198.8)	(192.7)	(11.8)
Present value of Special Payments	103.5	107.5	21.7
Reserve for future indexing	0	0	6.5
Solvency Excess/(Deficiency)	(95.3)	(85.2)	16.4
Transfer Ratio	87.0%	86.3%	99.1%

Summary of Solvency/Hypothetical Wind-Up Assumptions

	December 31, 2010	December 31, 2009
Interest Rate		
<ul style="list-style-type: none"> For members assumed to elect the transfer option (active and deferred members under age 55) 	3.30% per annum for 10 years; 5.00% per annum thereafter	3.90% per annum for 10 years, 5.40% per annum thereafter
<ul style="list-style-type: none"> For members assumed to have an annuity purchased on their behalf (active and deferred members over age 55 and pensioners/beneficiaries) 	4.48% per annum	4.49% per annum
Mortality		
<ul style="list-style-type: none"> For members assumed to elect the transfer option (active and deferred members under age 55) 	UP94; projected to 2020	UP94; projected to 2020
<ul style="list-style-type: none"> For members assumed to have an annuity purchased on their behalf (active and deferred members over age 55 and pensioners/beneficiaries) 	90% of UP94; projected to 2020	UP94; projected to 2020
Wind-up Expenses	\$2.5 million	\$2.5 million
Retirement	Age which results in highest commuted value of benefits	Age which results in highest commuted value of benefits

See Appendix for details and supporting data

Estimated Contribution Requirements

Reflecting “Stage 1” solvency funding relief

	2011		2012	
	\$ Million	%*	\$ Million	%*
Member Contributions	19.1	100%	20.0	100%
Employer Contributions:				
Money Purchase	19.6	103%	20.7	103%
Minimum Guarantee Normal Cost**	18.4	96%	19.3	97%
Unfunded Liability Special Payments	4.8	25%	24.2	121%
Solvency Deficiency Special Payments	3.8***	20%	0.0	0%
Total Minimum Employer Contribution	46.7	245%	64.2	321%

Note: (1) Based on Ontario Regulation “Solvency Funding Relief for Certain Public Sector Pension Plans” and assuming that the increase in going-concern special payments arising for the December 31, 2010 actuarial valuation is deferred for one year and amortized over 15 years from January 1, 2012.

(2) Next valuation required to be filed with FSCO will be December 31, 2013

*As a % of member contributions

** Includes expenses

*** Required to cover interest on solvency deficit

Estimated Contribution Requirements

Without consideration of “funding relief” measures

	2011		2010		2008	
	\$ Million	%*	\$ Million	%*	\$ Million	%*
Member Contributions	19.1	100%	18.3	100%	16.6	100%
Employer Contributions:						
Money Purchase	19.6	103%	18.9	103%	17.1	103%
Minimum Guarantee Normal Cost**	18.4	96%	16.6	91%	10.9	66%
Unfunded Liability Special Payments	23.1	121%	24.0	131%	4.8	29%
Solvency Deficiency Special Payments	21.2	111%	19.0	104%	0.0	0%
Total Minimum Employer Contribution	82.3	431%	78.5	429%	32.8	198%

*As a % of member contributions

** Includes expenses

Pension Benefits Guarantee Fund Annual Assessment

- Pension Benefits Guarantee Fund Annual Assessment will increase from approximately \$21,000 based on the prior valuation to \$760,000 based on the current valuation and to approximately \$1,237,000 based on changes announced August 24, 2010, not yet incorporated in regulations

New Disclosure Requirements

1. Sensitivity to 1% Reduction in Interest Rate

\$Millions	Valuation Basis	Interest Rate Reduced by 1%
Going Concern Funding Target*	\$827	\$954
Hypothetical Wind-up/Solvency Liability	\$1,530	\$1,630

* Excludes money purchase account balances

2. Incremental Cost

Incremental cost on hypothetical wind-up/solvency basis for 3 years to December 31, 2013

\$186,202,000

Going concern normal cost (employee and employer) for period to December 31, 2013

\$169,432,000

APPENDIX



Actuarial Assumptions: Revised Actuarial Standards of Practice – Effective December 31, 2010

- Each assumption is to be best estimate or best estimate plus a margin for adverse deviation
- Margins for adverse deviation are included to the extent required by law or by the terms of engagement
- Inclusion of allowance for active management in setting of interest rate assumption restricted:
 - Cannot assume additional returns from active management (net of active management fees) unless “the actuary has reason to believe, based on relevant supporting data, that such additional returns will be consistently and reliably earned over the long term”
 - Past outperformance is a necessary (but not sufficient) condition to support inclusion of such additional returns

Actuarial Assumptions: Going Concern - Interest Rate

Long term Government of Canada Bond Yields*

December 31, 2010	3.51%
December 31, 2009	4.08%
December 31, 2008	3.45%
December 31, 2007	4.18%
December 31, 2006	4.11%

*Statistics Canada CANSIM B14013

Actuarial Assumptions: Going Concern - Interest Rate

- Mercer model uses pension fund target asset mix and expectations of future asset returns to determine median return for the pension fund assets
- Model reflects market yields for fixed income investments and assumed equity premium at date of calculation
- Mercer model at December 31, 2010 based on target asset mix of 60% equities (20% Canadian; 15% U.S.; 15% International; 10% Global); 30% fixed income (Long bonds) and 10% infrastructure

Equity Premium	Median Return (Updated Asset Mix)	Median Return (Prior Asset Mix)
Conservative (3.16%)	6.53%	6.28%
Normal (3.74%)	6.94%*	6.68%*
Optimistic (4.51%)	7.47%	7.22%

Effect of change in asset mix (universe bonds to long bonds) more than offsets what would have been a reduction of 0.20% in the expected return

*Comparable rates for earlier years (based on target asset mix in effect for those years): December 31, 2009 – 6.88%; 2008 – 7.60%; 2007 – 7.42%; 2006 – 6.75%; 2005 – 6.90%

Note: No provision for benefit of active management or for investment management expenses

Actuarial Assumptions: Going Concern - Interest Rate

Determination of interest rate based on long-term expected rate of return using target asset mix with adjustments for fees to be paid from the pension fund assets and with a margin for adverse deviations

	31.12.2010 Updated Asset Mix*	31.12.2010 Prior Asset Mix	31.12.2009
Median return using “normal” premium under Mercer model	6.94%	6.68%	6.88%
Allowance for active management	0.20%**	0.20%**	0.30%
Allowance for investment expenses	(0.40%)	(0.40%)	(0.40%)
Interest rate prior to margins	6.74%	6.48%	6.78%
Margin for adverse deviation	(0.49%)***	(0.48%)***	(0.53%)
Valuation interest rate	6.25%	6.00%	6.25%

* Updated asset mix reflects move from universe bonds to long bonds for entire fixed income target allocation of 30%

** Estimated difference in fees for passive vs. active management (ie. additional returns on actively managed assets assumed to be equal to additional fees required for active management above passive management)

*** Margin set at similar level to prior year, subject to rounding

Actuarial Assumptions: Going Concern - Interest Rate

- Rate of 6.25% per annum (same as last year) is consistent with prior practice
- Median going-concern interest rate as at December 31, 2009 for pension plans in Mercer's database was 6.2% per annum
 - 75th percentile was 6.5% per annum
 - 25th percentile was 5.75% per annum

Actuarial Assumptions: Going Concern - Inflation/Salary Increase

- General methodology

Inflation (CPI)	2.0% - 3.0%
Plus: Wage Index Inflation	1.0%
Plus: Individual Promotion/Merit	<u>0.5% - 1.5%</u>
Total Salary Increases	<u>3.5% - 5.5%</u>

- Assumptions used for York valuation as at December 31, 2009

- Salary increases: 5.0% per annum
- Wage index inflation (applied to project CPP maximum earnings and Income Tax Act maximum pension/contribution limits): 3.5% per annum

- Long-term expected inflation as at December 31, 2010 from Mercer model is 2.5% per annum (difference between long-term nominal and real return bond yields)

Actuarial Assumptions: Going Concern - Inflation/Salary Increase

- Review of actual salary increases for last several years confirms that 5.0% per annum salary increase assumption is consistent with prior experience

Year	Average salary increase	Gain/(loss)
2004	6.03%	(\$921,000)
2005	5.36%	(\$761,000)
2006	4.36%	\$1,654,000
2007	6.61%	(\$3,987,000)
2008	3.99%	\$1,758,000
2009	6.40%	(\$2,435,000)
2010	4.47%	\$3,651,000
Average	5.32%	

Actuarial Assumptions: Going Concern – Retirement Age

- Retirement age assumption of 65 has been used consistently for preparation of prior going-concern actuarial valuations
- Review of average age at retirement confirms that this assumption is not inconsistent with actual experience

Year	Average age at retirement	Gain/(loss) Minimum Guarantee
2007	62.7	\$106,000
2008	64.1	(\$1,339,000)
2009	64.5	\$2,056,000
2010	63.8	\$1,602,000
Average	63.8	

Actuarial Assumptions: Going Concern – Retirement Age

- Given the early retirement reductions provided by the plan (.25% per month between age 60 and age 65 and 0.50% per month prior to age 60), there is little financial impact on the plan of individuals retiring before age 65
- Given the elimination of mandatory retirement, there will likely be an increase in members retiring after age 65 which will possibly result in small gains to the plan
 - Difficult to fix a long-term assumption at this point
 - As at December 31, 2010, there are 238 active members aged 65 or older participating in the plan
- Modification made to assume members aged 65 or older will retire in one year rather than retiring immediately

Actuarial Assumptions: Going Concern - Mortality

- GAM 1994 table with projection scale AA with mortality improvements limited to 1% per annum starting in 2000 with a 70% experience load factor was adopted at December 31, 2008
- Mortality study update prepared in 2010 covering 2006-2009 experience confirmed that 70% experience load factor remains appropriate in aggregate
- 2010 mortality study showed that actual deaths for males and females were lower than expected based on the mortality table assumed and weighted by liability, actual mortality was significantly lower than expected and somewhat lower than the tables based on the 70% load factor currently in use

2006-2009 Experience	Male	Female	Total
Actual Deaths	106	71	177
Expected Deaths*	116	89	205
Ratio based on number of deaths	91%	80%	86%
Ratio weighted by liability	63%	58%	62%

* Expected based on average over period 2006 to 2009 based on 100% experience load factor

Actuarial Assumptions: Going Concern - Mortality

- For males, the 2006 – 2009 experience showed a distinct trend by age, as illustrated in the following table

Age	Experience by Liabilities (Male) Ratio of Actual/Expected
65-69	48%
70-74	55%
75-79	76%
80-84	83%
85-89	92%
90-94	138%
Overall average	62%

- Currently a 65% male/35% female weighting is used in establishing conversion factors to be used on a unisex basis. Of the money purchase balances for Plan members aged 55 and older who are not receiving a pension, male members account for approximately 58%

Actuarial Assumptions: Going Concern - Mortality

- An alternate basis formulated using the age weighted experience and updated male/female weighting produced results very similar to the current assumptions (70% experience load factor with 65%/35% male/female weighting)

Actuarial Assumptions: Going Concern – Administration Expenses

- Administration expense assumption of 8.5% of member contributions has been consistently used for preparation of prior going-concern valuations
- Review of actual administration expenses indicates that assumption consistently produces small gains for the plan

Year	Administrative expenses as % of member contributions	Gain/(loss)
2007	4.9%	\$651,000
2008	6.0%	\$522,000
2009	5.0%	\$599,000
2010	4.4%	\$706,000

- Administration expense assumption updated to 6% of member contributions to more closely reflect prior experience

Actuarial Assumptions: Going Concern – Termination

- Termination table with lower termination rates, reflecting 2004-2006 liability-weighted experience was adopted for the December 31, 2007 valuation
- Sample rates based on 2004-2006 actual experience are provided below:

Age	Rate per 1,000
20	68.0
25	63.0
30	58.0
35	48.0
40	35.0
45	23.0
50	17.0
55	0.0

Actuarial Assumptions: Going Concern - Reserves

- Based on valuation assumptions, most current retirees are not projected to receive any increase (based on 4 year average return over 6%) for many years
- For current valuation, pensions are valued at 2010 paid level
 - Incorporates substantial cost for non-reduction to cover the difference between pensions payable and current paid level
 - No additional reserve for current retirees needed for non-reduction in respect of possible benefits in excess of current paid level
- No Investment Fluctuation Reserve since no change in pensions paid related to past fund returns is anticipated

Actuarial Assumptions: Going Concern – Non Reduction Reserve

- Reserve for active members for December 31, 2009 valuation was 3.5% of pension liabilities based on Mercer Investment Consulting model as at December 31, 2008
- Updated results at December 31, 2010 using model assumptions and target asset mix at that date indicate that reserve should be strengthened from 3.5% to 6.00%
- Higher reserve level is consistent with median expected future return of 6.94% at December 31, 2010 compared to 7.60% at December 31, 2008

Reserve Requirement %		
Percentile	Current Study (December 31, 2010)	Prior Study (December 31, 2008)
95 th	22.7%	14.4%
75 th	11.3%	7.1%
50 th	5.7%	3.3%
25 th	2.3%	1.3%
5 th	0.5%	0.3%

Actuarial Cost Method - Going Concern

- Projected unit credit actuarial cost method used to determine liabilities and current service cost on the going concern basis
 - Most common actuarial cost method for defined benefit pension plans
 - Under this method, amounts are determined as follows:
 - 1) Present value at the valuation date of projected minimum guarantee supplement at retirement is determined
 - 2) Present value of projected minimum guarantee supplement is allocated between past and future service for each employee
 - 3) Plan liabilities are equal to portion of present value of projected minimum guarantee supplement allocated to past service
 - 4) Current service cost calculated as the present value of projected minimum guarantee supplement in respect of one year of service

Asset Valuation Method – Going Concern

- Market value of assets used as asset valuation method for going concern valuation purposes

Actuarial Assumptions: Solvency/Hypothetical Wind-Up

Members assumed to elect the transfer option on plan wind-up

- Assumptions follow the Canadian Institute of Actuaries (“CIA”) standards for calculating pension commuted values as required by the Ontario Pension Benefits Act
 - Changes to these standards took effect February 1, 2011; need not be reflected in December 31, 2010 valuations and have minimal impact for York University Pension Plan
- Accounts for approximately 3% of defined benefit liabilities

Actuarial Assumptions: Solvency/Hypothetical Wind-Up

Members assumed to have annuity purchased on plan wind-up

- Based on CIA guidance
- Interest rate spread above government of Canada bond yields was 0.4% at December 31, 2009
 - changed to 0.7% effective June 30, 2010
 - changed to 1.1% effective September 30, 2010
 - changed to 1.0% effective December 31, 2010
- Mortality table to be adjusted to 90% of the prescribed standard table UP94 projected to 2020 to reflect guidance that “superstandard” mortality should be reflected
- Accounts for approximately 97% of defined benefit liabilities

Membership Data

	At December 31	
	2010	2009
Active and Disabled Members Number	4,266	4,260
Average Salary Rate	\$83,767	\$81,029
Average Service (years)	11.5	11.2
Average Age (years)	49.4	48.8
Average MPCA Balance	\$141,831	\$127,701
Suspended Members and Deferred Pensioners Number	1,515	1,488
Average Age (years)	50.9	50.7
Average MPCA Balance	\$62,547	\$57,017

Membership Data

	At December 31	
	2010	2009
Pensioners and Beneficiaries		
Number	1,805	1,739
Average Age (years)	73.8	73.6
Average Annual MPC Pension	\$29,416	\$29,973
Average Annual Supplementary Pension	\$1,023	\$869

Asset Data

(\$000's)	January 1, 2008 to December 31, 2008	January 1, 2009 to December 31, 2009	January 1, 2010 to December 31, 2010
Market value at beginning of period	1,322,579	1,060,455	1,220,976
Member contributions	16,671	17,908	18,547
University contributions	33,789	35,371	36,685
AVCs/other transfers	2,314	1,380	938
Investment income	(245,542)	175,240	125,717
Expenses	(9,060)	(7,365)	(7,711)
Pension payments	(49,918)	(55,264)	(55,779)
Lump sum transfers	(10,378)	(6,749)	(5,491)
Market value at end of period	1,060,455	1,220,976	1,333,882
Fund rate of return	-19.24%	15.98%	9.76%

REVIEW OF NON-REDUCTION COSTS

Non-Reduction Reserve

- Actuarial valuations include a reserve to provide for the cost of non-reduction of pensions.
- In the December 31, 2010 actuarial valuation, the non-reduction reserve for active members was increased to 6% of basic pension liabilities from 3.5% at prior valuations (since December 31, 2005).

Non-Reduction Reserve

Percentile	Reserve Requirement %	
	Current Study (December 31, 2010)	Prior Study (December 31, 2008)
95 th	22.7%	14.4%
75 th	11.3%	7.1%
50 th	5.7%	3.3%
25 th	2.3%	1.3%
5 th	0.5%	0.3%

- Higher reserve level arises because of lower expected long term investment returns (resulting from lower long term interest rates).
- Lower expected returns result in greater likelihood of 4 years average returns below 6%.
- Median expected returns for Mercer Investment Consulting model were 6.94% at December 31, 2010 compared to 7.60% at December 31, 2008.

Non-Reduction Reserve Calculation Methodology

- Based on 1,000 simulations of projected future investment returns for 20 years.
- For each simulation, pensions are projected with and without non-reduction and the present value of projected non-reduction costs is expressed as a percentage of the present value of projected pensions (without non-reduction guarantee).
- Investment returns are simulated using the Mercer Investment Consulting model, reflecting the asset mix of the Plan. The model shows a median return of 6.94% with a one year standard deviation of 11.00% as of December 31, 2010.

Money Purchase Pension Calculations

- The actuarial factors used to establish money purchase pensions are required to take into account the non-reduction guarantee (for contributions from January 1, 1992).
- Costs for this purpose are assessed on the same basis as the valuation reserve, requiring an increase from 3.5% to 6.0%.
- University contributions of 3% of Member contributions (equal to 1.5% of matching Mercer and University contributions) partially offset the non-reduction charge.

UPDATE FOR 2011

Economic Conditions in 2011

- Pension fund return for the first 9 months of 2011 was -3.9% (before expenses)
- Long-term government of Canada bond yields dropped from 3.48% as at December 31, 2010 to 2.68% at September 30, 2011
- Negative investment return has caused a deterioration in the financial position of the plan as at September 30, 2011
- Reduction in interest rates has led to further deterioration in the hypothetical wind-up/solvency funded position
- Filing with FSCO was required as of September 30 regarding reduction in transfer ratio and payout of commuted values

Estimated Funded Status as at September 30, 2011

	Deficit (\$Million)	
	September 30, 2011	December 31, 2010
Going-concern basis	\$325.9	\$217.2
Hypothetical wind-up basis	\$482.5	\$198.8
Transfer Ratio	0.73	0.87

Note: Assumes experience per assumptions except for actual investment return from December 31, 2010 to September 30, 2011. Assumptions unchanged except for applicable hypothetical wind-up interest rates (annuity proxy interest rate of 3.58% at September 30, 2011 vs. 4.48% at December 31, 2010)

Mortality Experience Update

- GAM 1994 table with projection scale AA with mortality improvements limited to 1% per annum starting in 2000 with a 70% experience load factor was used for going-concern valuation purposes as at December 31, 2010
- The same assumption is used in calculating money purchase pensions for retiring members
- Mortality study update prepared in 2011 covering 2007-2010 experience confirmed that 70% experience load factor remains appropriate

2007-2010 Experience	Male	Female	Total
Actual Deaths	110	81	191
Expected Deaths*	121	95	216
Ratio based on number of deaths	91%	85%	88%
Ratio weighted by liability	70%	70%	70%

* Expected based on average over period 2007 to 2010 based on 100% experience load factor

