City of Phoenix Employees' Retirement System

Actuarial Valuation Report
As of
June 30, 2013

Produced by Cheiron

November 2013

Classic Values, Innovative Advice

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LETTER OF TRANSMITTAL

November 20, 2013

Board of Retirement
City of Phoenix Employees' Retirement System
200 W. Washington Street, 10th Floor
Phoenix, Arizona 85003

Dear Members of the Board:

The purpose of this report is to present the June 30, 2013 actuarial valuation of the City of Phoenix Employees' Retirement System (COPERS). This report is for the use of the COPERS Board, its administrative staff, and its auditors in preparing financial reports in accordance with applicable laws and accounting requirements.

This valuation is the second valuation performed by Cheiron for COPERS. The demographic assumptions used in the valuation were adopted by the Board based on recommendations made by the prior actuary. The last experience study performed covered the period from July 1, 2004 through June 30, 2009. Experience studies are typically performed every three to five years, so we anticipate performing a study in 2014 and will evaluate the demographic assumptions at that time. In September 2013, the Board adopted new assumptions and methods, based upon our recommendations, for the purpose of determining contributions for the fiscal year ending June 30, 2015 and later. The Board and its auditor have determined that the prior assumptions (adopted by the Board based on the prior actuary's recommendations and not our best estimates) apply for financial reporting purposes as of June 30, 2013. As a result, this report presents information under GASB Statement No. 25 based on assumptions and methods in effect as of June 30, 2013, and develops contribution rates for the fiscal year ending June 30, 2015 based on assumptions and methods adopted by the Board in September 2013.

SUMMARY OF KEY VALUATION RESULTS

Before Assumption Changes

Valuation Date	**6/30/2013**	**6/30/2012**	**Increase / (Decrease)**
Actuarial Liability (AL)	$ 3,055.6	$ 2,939.4	$ 116.2
Funding Value of Assets (FVA)[1]	$ 1,961.9	$ 1,827.5	$ 134.4
Unfunded Actuarial Liability (UAL)	$ 1,093.7	$ 1,111.8	$ (18.2)
FVA Funded Ratio	64.2%	62.2%	2.0%
Market Value of Assets (MVA)	$ 1,965.6	$ 1,795.7	$ 169.9
MVA Funded Ratio	64.3%	61.1%	3.2%
Total Tier 1 Normal Cost Rate	13.23%	13.37%	(0.14%)
Projected Payroll	$ 533.6	$ 537.2	$ (3.6)

[1] Excludes Pension Equalization Reserve

Dollar amounts in millions

SUMMARY OF KEY VALUATION RESULTS June 30, 2013 Assumptions	September 2013 Assumptions	Prior Assumptions	Increase / (Decrease)
Actuarial Liability (AL)	$ 3,479.4	$ 3,055.6	$ 423.8
Actuarial Value of Assets (AVA)	$ 1,962.5	$ 1,961.9 [1]	$ 0.6
Unfunded Actuarial Liability (UAL)	$ 1,516.9	$ 1,093.7	$ 423.2
AVA Funded Ratio	56.4%	64.2%	(7.8%)
Market Value of Assets (MVA)	$ 1,965.6	$ 1,965.6	$ -
MVA Funded Ratio	56.5%	64.3%	(7.8%)
Total Tier 1 Normal Cost Rate	14.69%	13.23%	1.46%
Projected Payroll	$ 526.0	$ 533.6	$ (7.6)

[1] Excludes Pension Equalization Reserve

Dollar amounts in millions

In preparing our report, we relied on information (some oral and some written) supplied by the COPERS administrative staff. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice (ASOP) No. 23.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for COPERS for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

Sincerely,
Cheiron

William R. Hallmark, ASA, FCA, EA, MAAA
Consulting Actuary

Elizabeth Wiley, FSA, FCA, EA, MAAA
Consulting Actuary

SECTION I
BOARD SUMMARY

The primary purpose of this actuarial valuation is to report, as of the valuation date, on the:

- Financial condition of COPERS,
- Past and expected trends in the financial condition of COPERS,
- City and member contribution rates for the fiscal year ending (FYE) June 30, 2015,
- Information required by the Governmental Accounting Standards Board (GASB), and
- Impact of the revised assumptions adopted by the Board in September 2013.

The principal valuation results are summarized in this section, including a brief description of the basis upon which the contributions were determined and an examination of the current financial condition of COPERS. In addition, we reviewed the key historical trends and project the financial outlook for COPERS based on the assumptions.

Valuation Basis

The demographic assumptions used in the valuation were adopted by the Board based on recommendations made by the prior actuary. The last experience study performed covered the period from July 1, 2004 through June 30, 2009.

In September 2013, the Board adopted the following assumption changes for the purposes of financial reporting beginning with FYE 2014 and for determining contributions for FYE 2015 and later:

- Pension Equalization Reserve (PER) valued as a 1.50% compound annual cost-of-living adjustment (COLA)
- Investment return assumption reduced from 8.00% to 7.50% annual return net of investment and administrative expenses
- Price inflation was decreased from 4.50% to 3.00%
- Wage inflation was decreased from 5.00% to 3.50%

In addition to the above assumption changes, the Board changed the methodology for amortizing the unfunded actuarial liability (UAL). The existing UAL as of June 30, 2013 will be amortized over a closed 25-year period. The assumption changes listed above will also be amortized over a closed 25-year period as of June 30, 2013; however, the amortization payment for the UAL resulting from the above assumption changes will be phased in over four years. Finally, new gains or losses will be amortized over a closed 20-year period from the date they are first recognized in the valuation, with gains amortized over a period no shorter than the remaining period for the amortization of the existing UAL as of June 30, 2013.

COPERS' funding policy sets the total contribution rate equal to the sum of the total normal cost rate and the UAL rate.

SECTION I
BOARD SUMMARY

For Tier 1, members contribute 5.0% of payroll, and the City contributes the remainder of the total contribution rate. For Tier 2, members and the City each contribute half the total contribution rate.

SECTION I
BOARD SUMMARY

Current Financial Condition

This section summarizes the key results of the June 30, 2013 valuation compared to the results from the June 30, 2012 valuation.

1. Membership:

   As shown in Table I-1 below, total membership grew 0.6% from 2012 to 2013, but the changes between categories of membership were significant. Active membership decreased 2.8%, terminated vested membership increased 13.1%, and service retiree membership increased 4.4%. Total payroll decreased by 2.1%, and the average pay per active member increased by 3.3%.

TABLE I - 1
TOTAL MEMBERSHIP

Item	June 30, 2013	June 30, 2012	% Change
Active Members			
Vested	7,149	7,238	-1.2%
Non-vested	941	1,087	-13.4%
Total	8,090	8,325	-2.8%
Terminated Vesteds	788	697	13.1%
Service Retirees	4,653	4,455	4.4%
Disabled Retirees	246	248	-0.8%
Beneficiaries	925	886	4.4%
Total Members	14,702	14,611	0.6%
Active Member Payroll	$ 526.0	$ 537.2	-2.1%
Average Pay per Active Member			
Actual for Prior Year	$ 62,798	$ 60,783	3.3%
Projected for Upcoming Year	$ 65,014	$ 64,532	0.7%

Payroll amounts in millions

SECTION I
BOARD SUMMARY

2. Assets and Liabilities:

Table I-2 below compares the assets, liabilities, UAL, and funding ratios between June 30, 2013 and June 30, 2012, based on the assumptions in effect as of June 30, 2013. The total actuarial liability increased by 4.0%, and the market value of assets increased by 9.5%. The System employs an asset smoothing method that recognizes differences from the expected investment returns over a four-year period. For this year, the smoothed value of assets (called the actuarial value of assets) increased by 7.4%. The ratio of the actuarial value of assets to the market value of assets decreased from 102% to 100%, indicating that the deferred losses are about the same as the deferred gains. Finally, the unfunded actuarial liability (actuarial liability less actuarial value of assets) decreased from $1,111.8 million to $1,093.7 million, resulting in an increase in the funding ratio from 62.2% to 64.2%. Based on the market value of assets, the funding ratio increased from 61.1% to 64.3%.

TABLE I - 2
ASSETS AND LIABILITIES
Before Assumption Changes

Item	June 30, 2013	June 30, 2012	% Change
Actuarial Liability			
Actives	$ 1,409.1	$ 1,376.7	2.4%
Terminated Vesteds	43.5	37.5	15.8%
In Pay Status	1,603.0	1,525.2	5.1%
Total Actuarial Liability	$ 3,055.6	$ 2,939.4	4.0%
Market Value of Assets (MVA)	$ 1,965.6	$ 1,795.7	9.5%
Actuarial Value of Assets (AVA)	$ 1,961.9 [1]	$ 1,827.5 [1]	7.4%
Unfunded Actuarial Liability (UAL)	$ 1,093.7	$ 1,111.8	-1.6%
Funding Ratio - Market Value	64.3%	61.1%	5.3%
Funding Ratio - Actuarial Value	64.2%	62.2%	3.3%

[1] Excludes Pension Equalization Reserve

Dollar amounts in millions

SECTION I
BOARD SUMMARY

Table I-3 below compares the assets, liabilities, UAL, and funding ratios as of June 30, 2013 before and after accounting for the assumption changes adopted by the Board in September 2013. Note that the "Prior Assumption" column corresponds to the values shown in Table I-2 for 2013. The total actuarial liability increased by $423.8 million, or 13.9% due to the assumption changes. The assumption changes did not affect the market value of assets; however, the actuarial value of assets increased slightly due to recognizing the current balance in the PER. Finally, the UAL (actuarial liability less funding value of assets) increased from $1,093.7 million to $1,516.9 million, decreasing the funding ratio from 64.2% to 56.4%. Based on the market value of assets, the funding ratio decreased from 64.3% to 56.5%.

TABLE I - 3
ASSETS AND LIABILITIES
June 30, 2013

Item	September 2013 Assumptions	Prior Assumptions	% Change
Actuarial Liability			
Actives	$ 1,546.1	$ 1,409.1	9.7%
Terminated Vesteds	52.2	43.5	20.1%
In Pay Status	1,881.1	1,603.0	17.3%
Total Actuarial Liability	$ 3,479.4	$ 3,055.6	13.9%
Market Value of Assets (MVA)	$ 1,965.6	$ 1,965.6	0.0%
Actuarial Value of Assets (AVA)	$ 1,962.5	$ 1,961.9 [1]	0.0%
Unfunded Actuarial Liability (UAL)	$ 1,516.9	$ 1,093.7	38.7%
Funding Ratio - Market Value	56.5%	64.3%	-12.2%
Funding Ratio - Actuarial Value	56.4%	64.2%	-12.2%

1 Excludes Pension Equalization Reserve

Dollar amounts in millions

SECTION I
BOARD SUMMARY

3. Contributions:

Table I-4 shows sources for the change in the total contribution rate from the rate that was calculated in the prior report. COPERS' experience, the addition of Tier 2, and the assumption changes adopted in September increased the total contribution rate from 27.24% for FYE 2014 to 29.60% for FYE 2015.

The results shown below reflect the new assumptions and methods adopted by the Board in September 2013. Although there are no Tier 2 employees in the data as of June 30, 2013, we have included an estimate of the Tier 2 normal cost rate based on members hired in the last five years and applied that rate to the expected Tier 2 payroll for FYE 2015.

TABLE I - 4

RECONCILIATION OF CHANGES IN CONTRIBUTION RATE

	Total Normal Cost	UAL Rate	Total Contribution Rate
FYE 2014 Total Contribution Rate	13.37%	13.87%	27.24%
Expected FYE 2015 Total Contribution Rate	13.37%	13.38%	26.75%
Changes Due to:			
Reduction in total payroll	0.00%	0.97%	0.97%
Investment experience	0.00%	-0.18%	-0.18%
Demographic experience	-0.14%	-0.23%	-0.37%
Tier 2	0.75%	0.00%	0.75%
Assumption/Method Changes	1.26%	0.42%	1.68%
FYE 2015 Total Contribution Rate	15.24%	14.36%	29.60%

Dollar amounts in millions

For Tier 1, members will continue to contribute 5.0% of pay, but the City contribution will increase from 22.24% of pay in FYE 2014 to 24.60% of pay in FYE 2015. For Tier 2, members and the City will each contribute 14.80% of pay in FYE 2015.

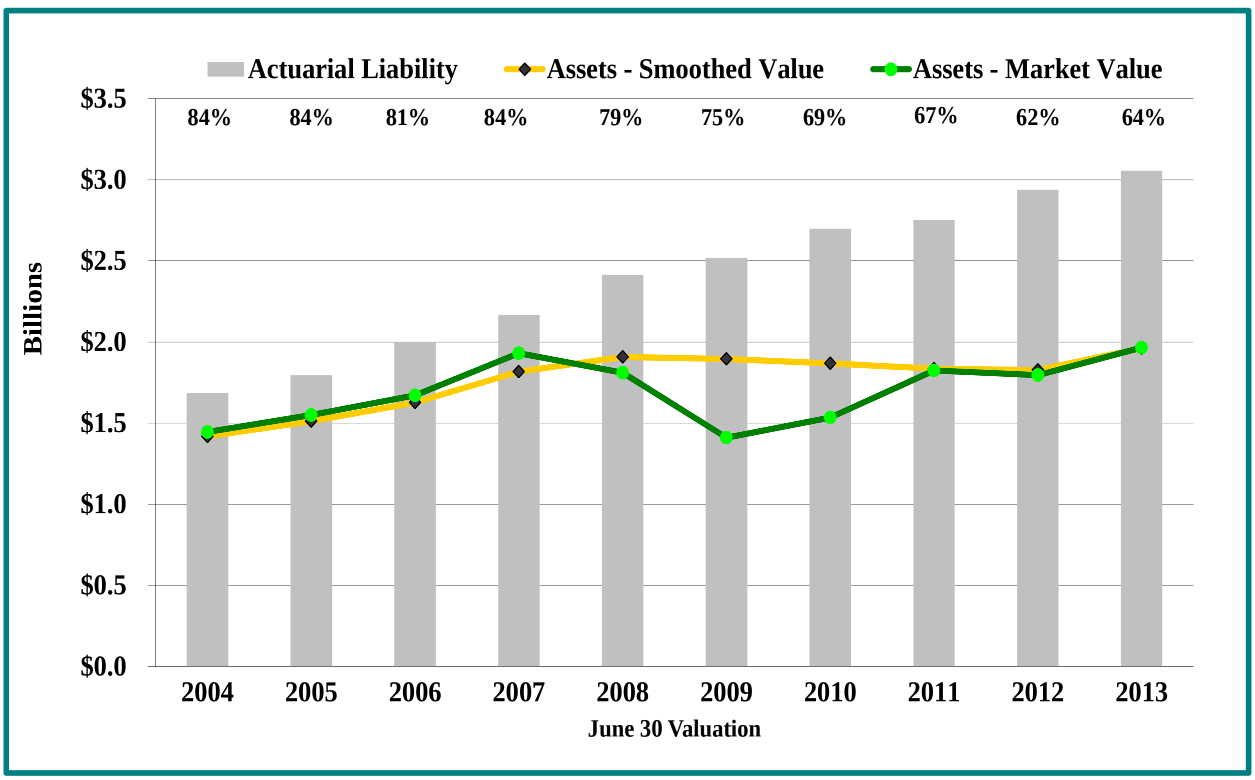
SECTION I
BOARD SUMMARY

Historical Trends

Despite the fact that most of the attention given to the valuation is with respect to the most recently computed unfunded actuarial liability, funding ratio, and contribution rates, it is important to remember that each valuation is merely a snapshot of the long-term progress of a pension fund. The results of the current year's valuation should be evaluated in the context of historical trends, as well as trends expected in the future. In the charts below, all information shown prior to the June 30, 2012 actuarial valuation (prior to contribution rates for FYE 2014) was calculated by the prior actuary.

The chart below shows the historical trends for assets (both market and smoothed) compared to the actuarial liability, and also shows the progress of the funding ratios, on the basis of the smoothed asset values, since 2004. From 2004 to 2013, the funding ratio has declined with most of the decrease attributable to the decline in the assets since 2008. The smoothed value of assets spread the investment losses from 2008-09 over four years, but now those losses have been fully recognized and the market value of assets and smoothed value of assets are nearly the same.

Chart I-1: COPERS Assets and Liabilities 2004-2013



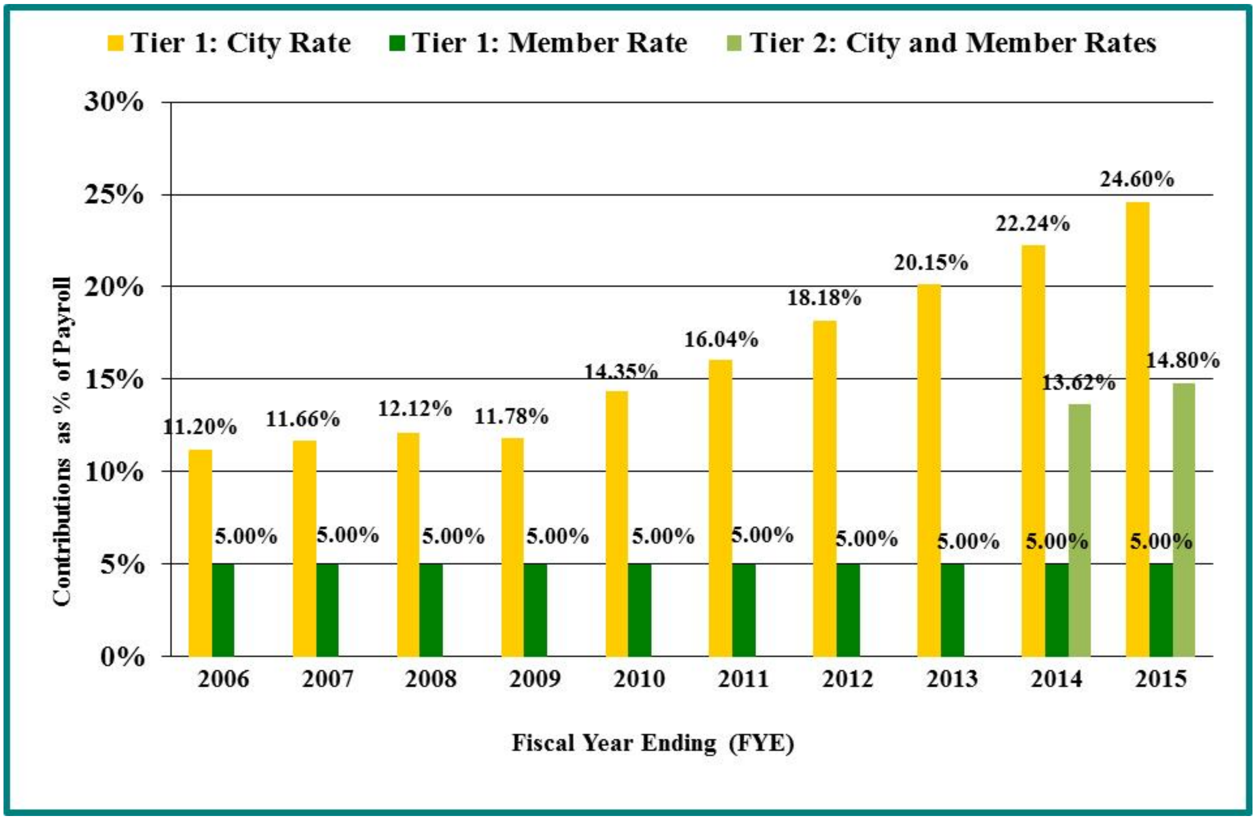
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Funded Ratio	84.2%	84.2%	81.3%	83.9%	79.1%	75.3%	69.3%	66.6%	62.2%	64.2%
UAL/(Surplus)	$ 267.0	$ 284.0	$ 373.6	$ 349.6	$ 505.0	$ 622.9	$ 829.2	$ 918.3	$ 1,111.8	$ 1,093.7

(in millions)

SECTION I
BOARD SUMMARY

The chart below shows the historical trends for the COPERS' contribution rates since the FYE June 30, 2006.

Chart I-2: City and Member Contribution Rates for FYE 2006 –FYE 2015

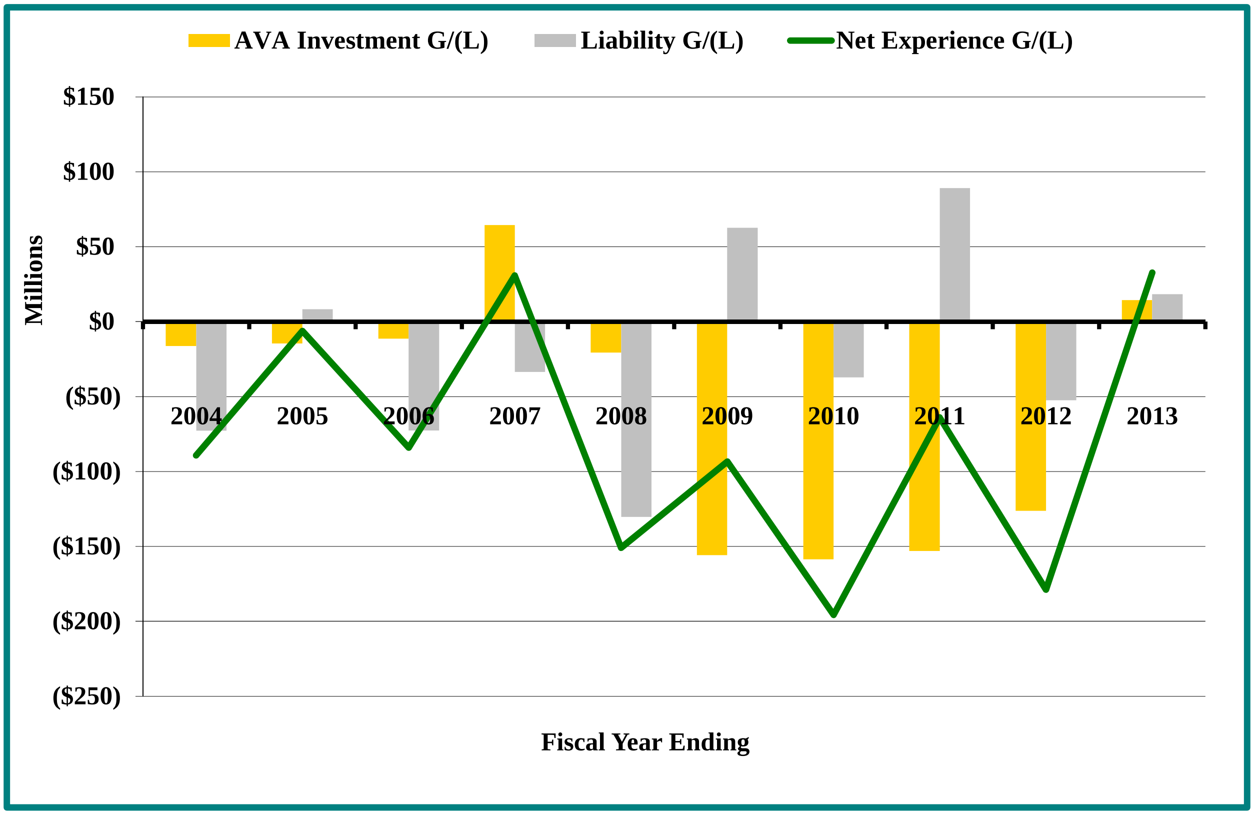


Reflecting the declining funded status since 2008, the City's contribution rate has steadily increased from the FYE 2010 through the FYE 2015.

The chart on the following page shows COPERS' actuarial gains and losses, broken into the investment and liability components. The chart does not include any changes in the COPERS' assets and liabilities attributable to changes in methods, procedures or assumptions.

SECTION I
BOARD SUMMARY

Chart I-3: COPERS Historical Gain/(Loss) 2004-2013



The key insights from this chart are:

- The investment losses (gold bars) from 2009 have been recognized in the succeeding four years. Because the funding value of assets and market value of assets are now relatively close, future investment gains and losses will largely reflect future investment performance.

- On the liability side, experience since 2009 has been relatively balanced between gains and losses while experience prior to 2009 appears to have been dominated by losses.

Projected Financial Trends

This section shows projections based on the June 30, 2013 valuation results of the future outlook for COPERS in terms of projected assets and liabilities and future expected contribution rates.

In the charts that follow, projections of assets and liabilities, the pay down of UAL, and City contribution rates are shown on two different bases:

1) Assuming no gains or losses compared to the assumptions (i.e., 7.50% return for 2013-14 and each and every year that follows), and

2) Assuming returns shown in the table below. These are rates of return that vary each year, but over the projection period, average the assumed 7.50% return. The purpose of this set of returns is not to predict the future, but to illustrate the impact of investment volatility on future contribution rates as investment returns will never be level each and every year. This set of returns is used solely to generate the results shown in Charts I-5 and I-7.

FYE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Return	18.0%	7.0%	4.0%	18.0%	-4.0%	15.0%	11.0%	8.0%	-9.0%	20.0%
FYE	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Return	9.0%	-6.0%	8.0%	14.0%	17.0%	-7.0%	-15.0%	30.0%	25.0%	0.0%

Please note that the investment returns shown above were selected solely to illustrate the impact of investment volatility on the pattern of funded status and City contribution rates. They are not intended to be predictive of actual future contribution rates or funded status or to represent a realistic pattern of investment returns.

Projected Assets and Liabilities

The charts below show the projected actuarial liability (gray bars) as well as the smoothed actuarial value of assets (orange line) and the market value of assets (green line). The projected funded ratio, on an actuarial value of assets basis, is shown at the top of each gray bar. Note that the projections reflect the assumptions and methods adopted by the Board in September 2013. Chart I-4 shows that if all assumptions are met each and every year, the funded ratio is expected to steadily increase from 56% to 88% over the 20-year period. Chart I-5 shows how variable investment returns can impact the progression of funding ratios even if the average return is the same as the assumed return. It also illustrates that the impact of negative cash flows in the down markets results in a lower funded status even though the average return during the period is the assumed rate of 7.50%.

Chart I-4: Projection of Assets and Liabilities, 7.50% return each year

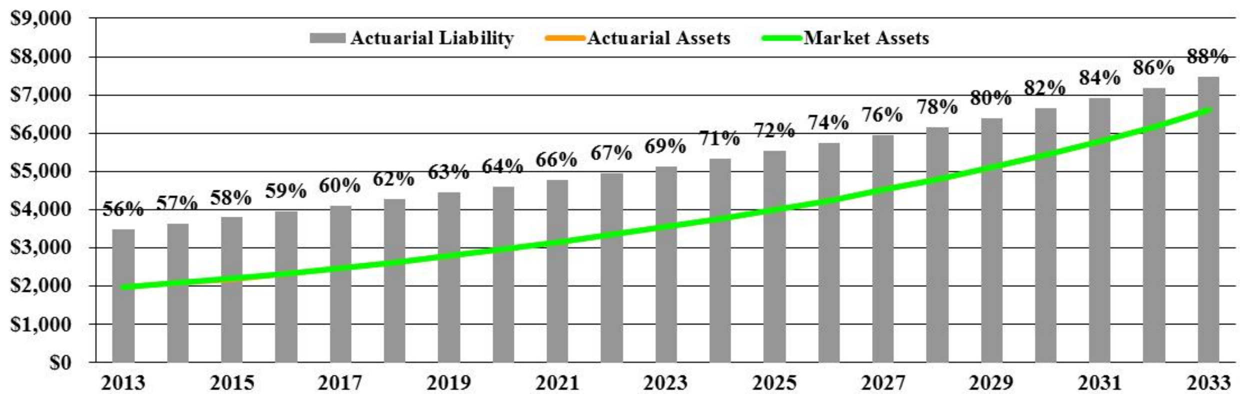
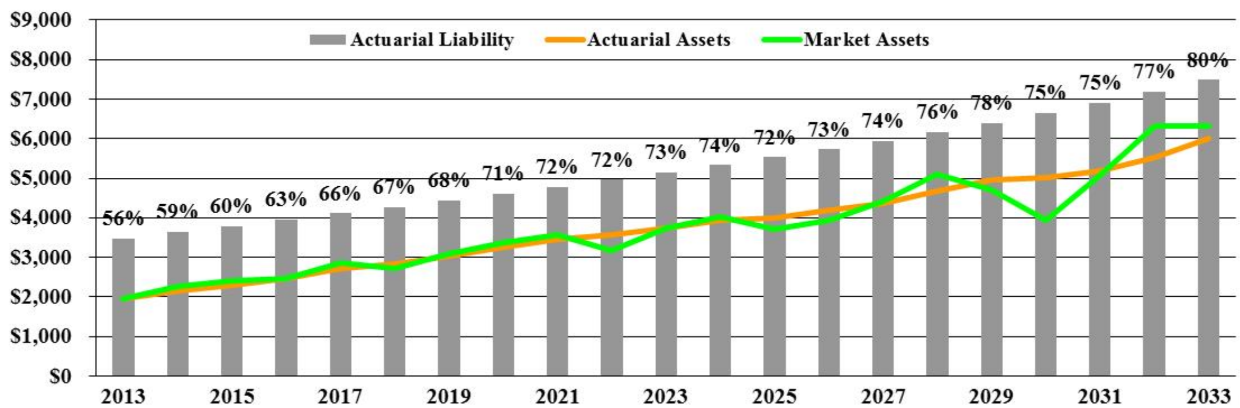


Chart I-5: Projection of Assets and Liabilities, varying returns averaging 7.50% over time



Projected Contribution Rates

The charts below show projected member contribution rates (green bars) and City contribution rates (gold bars). The projected contribution rates reported below reflect the assumptions and methods adopted by the Board in September 2013. Chart I-6 shows that if all assumptions are met each and every year, City contribution rates are expected to increase from approximately 21.8% in the FYE 2015 to approximately 26.0% in FYE 2019 as the impact of the assumption changes is phased in. Then, City contribution rates are expected to decline steadily to 20.1% in the FYE 2035. Member contribution rates are projected to increase steadily over the entire period as Tier 1 members who contribute 5% leave the workforce and are replaced by Tier 2 members who contribute 50% of the total contribution rate. Chart I-7 illustrates the sensitivity of these projected contribution rates to variable investment returns, even if the average return is the same as the assumed return.

Chart I-6: Projected Contribution Rates, 7.50% return each year

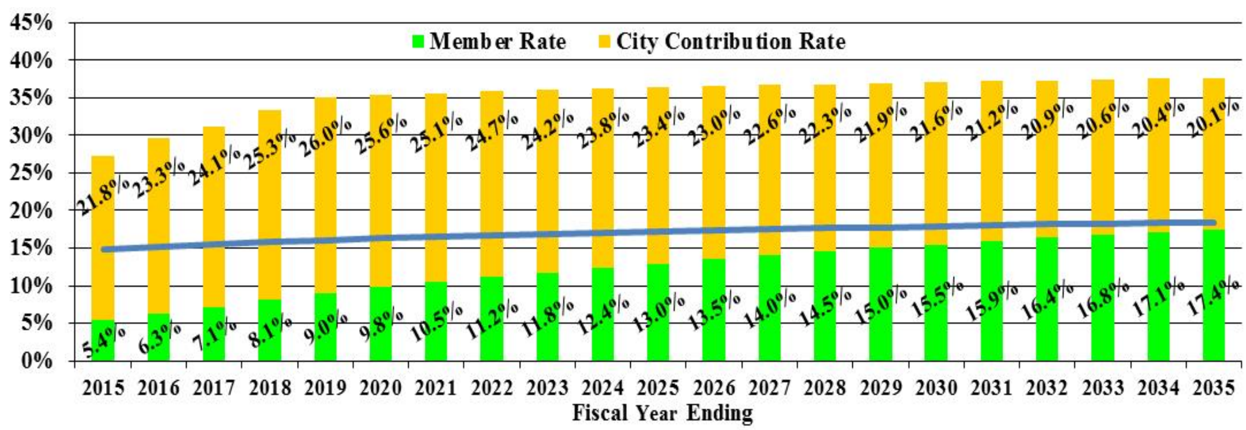
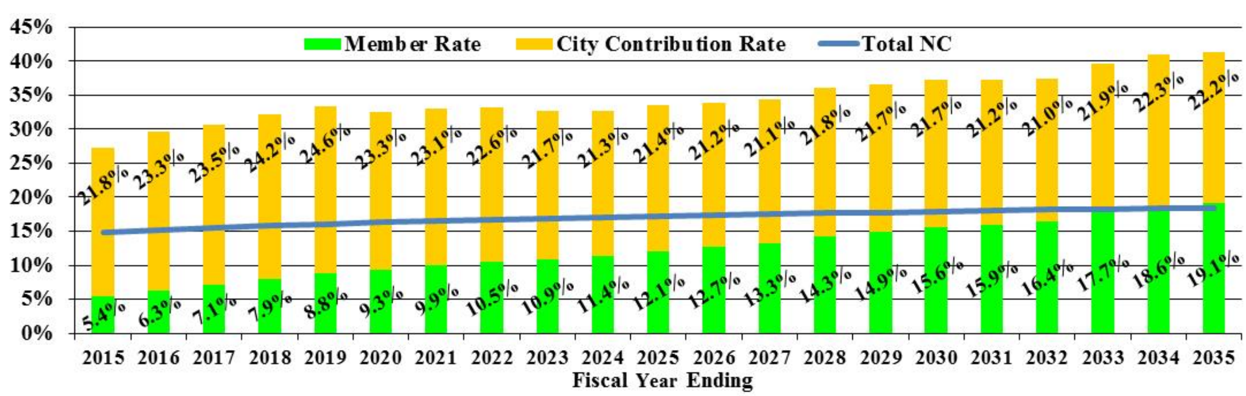


Chart I-7: Projected Contribution Rates, varying returns averaging 7.50% over time



SECTION II
ASSETS

COPERS uses and discloses three different asset measurements that are presented in this section of the report: market value, actuarial value and funding value of assets. The market value represents, as of the valuation date, the value of the assets if they were liquidated on that date. The actuarial value of assets is a value that smoothes annual investment returns over multiple years to reduce the impact of short-term investment volatility on contribution rates. The funding value of assets equals the actuarial value of assets, but excludes amounts that have been transferred to the Pension Equalization Reserve (PER).

This section shows the changes in the market value of assets and develops the actuarial and funding value of assets.

Statement of Changes in the Market Value of Assets

Table II-1 shows sources for the change in the market value of assets for the current and prior years.

TABLE II - 1

CHANGES IN MARKET VALUE OF ASSETS

	June 30, 2013	June 30, 2012
Market Value, Beginning of Year	$ 1,795,690,300	$ 1,824,206,986
Contributions		
Member	$ 28,792,813	$ 28,139,617
City	114,709,207	105,682,325
Inter-System Transfers	105,347	4,029,574
Total	$ 143,607,367	$ 137,851,516
Net Investment Earnings	$ 194,915,860	$ (5,991,491)
Disbursements	$ (168,591,849)	$ (160,376,711)
Market Value, End of Year	$ 1,965,621,678	$ 1,795,690,300

The net investment earnings for the year ended June 30, 2013 represent approximately a 10.9% return on the market value of assets compared to an assumed return of 8.0%. For the year ended June 30, 2012, the net investment return was approximately -0.3%.

SECTION II
ASSETS

Actuarial and Funding Value of Assets

To determine on-going contribution amounts, most pension funds use an actuarial value of assets that smoothes year-to-year market value returns in order to reduce the volatility of contribution rates.

The actuarial value of assets for COPERS is calculated by recognizing the deviation of actual investment returns compared to the expected return (8.00%) on the prior year's actuarial value of assets over a four-year period. The dollar amount of the expected return on the actuarial value of assets is determined using the actual contributions and benefit payments during the year. Any difference between this amount and the actual net investment earnings is considered a gain or loss. Table II-2 below shows the gains and losses for the last four years and the portion of each gain or loss that is not recognized in the current actuarial value of assets. These deferred amounts will be recognized in future years.

Prior to the Board's adoption of assumption and method changes in September 2013, there was no liability measured for the Pension Equalization Reserve (PER). Consequently, for determining the funding value of assets, the assets in the PER are subtracted from the actuarial value of assets. The funding value of assets is used for financial disclosures under GASB Statements 25 and 27 and to determine contribution rates for periods prior to the effective date of the Board's assumption and method changes.

SECTION II
ASSETS

TABLE II - 2
DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

	June 30, 2013	June 30, 2012
1. Actuarial Value of Assets, Beginning of Year (includes PER)	$ 1,828,104,723	$ 1,835,185,304
2. Net Cash Flow	(24,984,482)	(22,525,195)
3. Expected Return	145,268,225	145,931,150
4. Actual Return	194,915,860	(5,991,491)
5. Current Year Gain / (Loss) [4. - 3.]	49,647,635	(151,922,641)
6. Gains / (Losses)		
a. Current Year	$ 49,647,635	$ (151,922,641)
b. Prior Year	(151,922,641)	167,258,865
c. 2nd Prior Year	167,258,865	(8,407,500)
d. 3rd Prior Year	(8,407,500)	(528,874,868)
7. Phase-In Amounts		
a. Current Year [25% of 6.a.]	$ 12,411,909	$ (37,980,660)
b. Prior Year [25% of 6.b.]	(37,980,660)	41,814,716
c. 2nd Prior Year [25% of 6.c.]	41,814,716	(2,101,875)
d. 3rd Prior Year [25% of 6.d.]	(2,101,875)	(132,218,717)
e. Total [7.a. + 7.b. + 7.c. + 7.d.]	$ 14,144,090	$ (130,486,536)
8. Actuarial Value of Assets, End of Year [1. + 2. + 3. + 7.e.]	$ 1,962,532,556	$ 1,828,104,723
9. Pension Equalization Reserve	$ 593,870	$ 576,321
10. Funding Value of Assets [8. - 9.]	$ 1,961,938,686	$ 1,827,528,402

On the basis of the smoothed actuarial value of assets, the return for the year ending June 30, 2013 was approximately 8.78%, slightly more than the assumed return of 8.0%, but less than the return on the market value of assets.

SECTION III
LIABILITIES (ASSUMPTIONS AS OF JUNE 30, 2013)

This section presents detailed information on measures of COPERS' liability based on assumptions in effect as of June 30, 2013. These measures do not reflect the assumptions and methods adopted by the Board in September 2013. The information presented includes:

- Present value of future benefits,
- Actuarial liability,
- Normal cost, and
- Analysis of changes in the unfunded actuarial liability during the year.

Present Value of Future Benefits

The present value of future benefits represents the expected amount of money needed today to fully pay off all benefits both earned as of the valuation date and those to be earned in the future by current plan members under the current plan provisions. Table III-1 below shows the present value of future benefits as of June 30, 2013 and June 30, 2012.

The amounts as of June 30, 2013 are based on the assumptions in effect as of June 30, 2013 and do not reflect the assumptions and methods adopted by the Board in September 2013.

TABLE III - 1

PRESENT VALUE OF FUTURE BENEFITS

	June 30, 2013	June 30, 2012
Actives		
Retirement	$ 1,683,237,648	$ 1,665,522,908
Termination	104,320,628	106,706,284
Death	42,539,012	42,397,766
Disability	77,772,026	77,820,723
Total Actives	$ 1,907,869,314	$ 1,892,447,681
In Pay Status		
Service Retirees	$ 1,441,550,329	$ 1,369,744,522
Disabled Retirees	36,792,695	37,228,384
Beneficiaries	124,666,915	118,178,945
Total	$ 1,603,009,939	$ 1,525,151,851
Deferred Vested	$ 43,475,139	$ 37,543,513
Total	$ 3,554,354,392	$ 3,455,143,045

SECTION III
LIABILITIES (ASSUMPTIONS AS OF JUNE 30, 2013)

Normal Cost

Under the Entry Age (EA) actuarial cost method, the present value of future benefits for each individual is spread over the individual's expected working career under the System as a level percentage of the individual's expected pay. The normal cost rate is determined by dividing the value, as of entry age into the System, of each member's projected future benefits by the value, also at entry age, of the member's expected future salary. The normal cost rate is multiplied by the member's current salary to determine each member's normal cost. The normal cost of the System is the sum of the normal costs for each individual in the System. The normal cost represents the expected amount of money needed to fund the benefits attributed to the next year of service under the EA method. Table III-2 below shows the EA normal cost as of June 30, 2013 and June 30, 2012.

The amounts as of June 30, 2013 are based on the assumptions in effect as of June 30, 2013 and do not reflect the assumptions and methods adopted by the Board in September 2013.

TABLE III - 2
TIER 1 ENTRY AGE NORMAL COST

	June 30, 2013	June 30, 2012
Tier 1 Actives		
Retirement	$ 51,933,767	$ 52,842,498
Termination	7,064,084	7,342,276
Death	2,032,885	2,073,176
Disability	3,585,566	3,657,237
Total Tier 1 Normal Cost	$ 64,616,302	$ 65,915,187
Expected Tier 1 active payroll	$ 488,331,420	$ 493,064,039
Tier 1 Normal Cost Rates	13.23%	13.37%

SECTION III
LIABILITIES (ASSUMPTIONS AS OF JUNE 30, 2013)

Actuarial Liability

The actuarial liability represents the expected amount of money needed today to pay for benefits attributed to service prior to the valuation date under the Entry Age (EA) actuarial cost method. It is essentially a funding target. The difference between the actuarial liability and the funding value of assets is the unfunded actuarial liability. Table III-3 below shows the actuarial liability as of June 30, 2013 and June 30, 2012.

The amounts as of June 30, 2013 are based on the assumptions in effect as of June 30, 2013 and do not reflect the assumptions and methods adopted by the Board in September 2013.

TABLE III - 3
ACTUARIAL LIABLITY

	June 30, 2013	June 30, 2012
Actives		
Retirement	$ 1,276,747,126	$ 1,245,668,343
Termination	54,126,472	54,358,725
Death	27,501,484	26,814,432
Disability	50,746,247	49,836,854
Total Actives	$ 1,409,121,329	$ 1,376,678,354
In Pay Status		
Service Retirees	$ 1,441,550,329	$ 1,369,744,522
Disabled Retirees	36,792,695	37,228,384
Beneficiaries	124,666,915	118,178,945
Total	$ 1,603,009,939	$ 1,525,151,851
Deferred Vested	$ 43,475,139	$ 37,543,513
Total Actuarial Liability	$ 3,055,606,407	$ 2,939,373,718

Analysis of Change in Unfunded Actuarial Liability (UAL)

The UAL of any retirement plan is expected to change at each subsequent valuation for a variety of reasons. Table III-4 below develops the expected UAL and identifies the primary sources for changes in the UAL since the last valuation.

TABLE III - 4

DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS

Item		Amount
1. Unfunded actuarial liability, June 30, 2012	$	1,111,845,315
2. Normal cost for year		71,827,590
3. City and member contributions		143,502,020
4. Interest		86,135,803
5. Assumption Changes		-
6. Expected Unfunded Actuarial Liability, June 30, 2013 [1. + 2. - 3. + 4. + 5.]	$	1,126,306,688
7. Actual Unfunded Actuarial Liability, June 30, 2013	$	1,093,667,721
8. (Gain) or Loss [7. - 6.]	$	(32,638,967)
Difference portion due to:		
Asset experience	$	(14,282,127)
Salary experience		(34,004,865)
Termination experience		8,560,618
Retirement, disability and mortality experience		4,941,576
Other experience		2,145,831
Total	$	(32,638,967)

SECTION IV
ACCOUNTING STATEMENT INFORMATION

Statement No. 25 of the Governmental Accounting Standards Board (GASB) establishes standards for accounting and financial reporting of pension information by public employee retirement systems. We understand that COPERS and its auditors have determined that the disclosures under Statement No. 25 as of June 30, 2013 should not reflect the assumption and method changes adopted by the Board in September 2013. Consequently, the amounts and other information shown in these exhibits as of June 30, 2013 are based on the assumptions in effect as of June 30, 2013.

The basic GASB No. 25 disclosure compares the actuarial liability to the funding value of assets to determine the unfunded actuarial liability and the funded ratio. The relevant amounts as of June 30, 2013 and June 30, 2012 are presented in Table IV-1.

TABLE IV - 1

GASB No. 25 LIABILITY

Item	June 30, 2013	June 30, 2012	% Change
1. Actuarial liability			
a. Members currently receiving payments	$ 1,603,009,939	$ 1,525,151,851	23.3%
b. Vested terminated and inactive members	43,475,139	37,543,513	39.1%
c. Active members	1,409,121,329	1,376,678,354	12.3%
d. Total actuarial liability	$ 3,055,606,407	$ 2,939,373,718	18.4%
2. Funding value of assets	$ 1,961,938,686	$ 1,827,528,402	7.4%
3. Unfunded actuarial liability	$ 1,093,667,721	$ 1,111,845,315	36.4%
4. Ratio of funding value of assets to actuarial liability [2 ÷ 1.d.]	64.2%	62.2%	-9.3%

Tables IV-2 through IV-5 are exhibits for use in COPERS' Comprehensive Annual Financial Report (CAFR). The Government Finance Officers Association (GFOA) recommends showing at least 6 years of experience in each of these exhibits. Table IV-2 shows the Notes to Required Supplementary Information; Table IV-3 presents an analysis of financial experience for the valuation year; Table IV-4 presents the Solvency Test, which shows the portion of actuarial liability covered by assets; and Table IV-5 presents the Schedule of Funding Progress.

SECTION IV
ACCOUNTING STATEMENT INFORMATION

TABLE IV - 2
NOTES AND REQUIRED SUPPLEMENTARY INFORMATION

The information presented in the required supplementary schedules to the Financial Section of the CAFR was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	June 30, 2013
Actuarial funding method	Individual Entry Age Normal
Amortization method	Level percent of payroll, open
Amortization period	20 Years
Asset valuation method	Four-year smoothed market value

<u>Actuarial assumptions:</u>

Investment rate of return	8.00%
Wage inflation	5.00%
Projected salary increases including wage inflation	5.0% - 8.8%
Postretirement benefit increases	0.00%

The demographic assumptions were adopted by the COPERS Board based on recommendations made by the prior actuary. These recommendations were based on an experience study covering the period July 1, 2004 through June 30, 2009. Cheiron recommended changes to the economic assumptions that were adopted in September 2013 for FYE 2014 financial reporting.

SECTION IV
ACCOUNTING STATEMENT INFORMATION

TABLE IV - 3
ANALYSIS OF FINANCIAL EXPERIENCE

	2013	2012	2011	2010	2009	2008
1. UAAL at Start of Year	$ 1,111,845	$ 918,289	$ 829,195	$ 622,946	$ 504,950	$ 349,611
2. Normal Cost for year	71,828	77,366	80,099	78,731	83,089	72,806
3. Contributions	(143,502)	(133,822)	(119,613)	(116,482)	(98,157)	(95,435)
4. Assumed Investment Income Accrual on (1), (2) and (3)	86,136	71,248	64,652	48,228	39,755	27,005
5. Expected UAAL Before Changes	$ 1,126,307	$ 933,081	$ 854,333	$ 633,424	$ 529,637	$ 353,987
6. Effect of Assumption Changes	-	-	-	-	-	-
7. Effect of Method Changes	-	-	-	-	-	74,539
8. Effect of Benefit Changes	-	-	-	-	-	-
9. Expected UAAL After Changes	$ 1,126,307	$ 933,081	$ 854,333	$ 633,424	$ 529,637	$ 428,526
10. Actual UAAL	1,093,668	1,111,845	918,289	829,195	622,946	504,950
11. Gain / (Loss) [9. - 10.]	$ 32,639	$ (178,764)	$ (63,956)	$ (195,771)	$ (93,309)	$ (76,424)
12. As % of AAL at Start of Year	1.1%	(6.5)%	(2.4)%	(7.8)%	(3.9)%	(3.5)%

Dollar amounts in thousands

TABLE IV - 4
SOLVENCY TEST

	Aggregate Accrued Liabilities for				Portion of Accrued Liabilities Covered by Assets		
Valuation Date	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Members Employer Portion	Valuation Assets	(1)	(2)	(3)
6/30/2013	$396,583	$1,603,010	$1,056,013	$1,961,939	100%	98%	0%
6/30/2012	443,964	1,525,152	970,258	1,827,528	100	91	0
6/30/2011	446,456	1,431,877	874,576	1,834,620	100	97	0
6/30/2010	445,141	1,311,929	940,217	1,868,093	100	100	12
6/30/2009	446,039	1,193,391	878,664	1,895,148	100	100	29
6/30/2008	433,742	1,066,886	912,737	1,908,414	100	100	45
6/30/2007	403,819	964,006	798,294	1,816,509	100	100	56
6/30/2006	374,091	892,123	734,131	1,626,741	100	100	49
6/30/2005	354,438	798,414	642,663	1,511,553	100	100	56
6/30/2004	334,535	737,684	612,577	1,417,774	100	100	56

SECTION IV
ACCOUNTING STATEMENT INFORMATION

TABLE IV - 5

SCHEDULE OF FUNDING PROGRESS

Valuation Date June 30,	(1) Actuarial Value of Assets	(2) Actuarial Liability (AL)	(3) Percent Funded (1) / (2)	(4) Unfunded AL (UAL) (2) - (1)	(5) Annual Covered Payroll	(6) UAL as a % of Covered Payroll (4) / (5)
2013	$ 1,961,939	$ 3,055,606	64.2%	$ 1,093,668	$ 508,032	215.3%
2012	1,827,528	2,939,374	62.2	1,111,845	506,017	219.7
2011	1,834,620	2,752,909	66.7	918,289	513,322	178.9
2010	1,868,093	2,697,288	69.3	829,195	550,175	150.7
2009	1,895,148	2,518,094	75.3	622,946	539,468	115.5
2008	1,908,414	2,413,365	79.1	504,951	566,512	89.1
2007	1,816,508	2,166,119	83.9	349,611	535,079	65.3
2006	1,626,741	2,000,346	81.3	373,605	497,105	75.2
2005	1,511,553	1,795,514	84.2	283,962	467,998	60.7
2004	1,417,774	1,684,795	84.2	267,021	445,348	60.0
2003	1,330,584	1,504,125	88.5	173,541	416,472	41.7
2002	1,273,731	1,390,273	91.6	116,542	404,414	28.8
2001	1,291,338	1,259,564	102.5	(31,774)	376,913	-
2000	1,219,892	1,199,871	101.7	(20,021)	360,654	-
1999	1,117,497	1,044,425	107.0	(73,072)	336,153	-
1998	984,501	973,048	101.2	(11,453)	322,475	-

Dollar amounts in thousands

SECTION V
LIABILITIES (SEPTEMBER ASSUMPTIONS)

This section presents detailed information on measures of COPERS' liability, reflecting the assumptions adopted by the Board in September 2013, including:

- Reducing the discount rate from 8.0% to 7.5%,
- Reducing wage inflation from 5.0% to 3.5%, and
- Valuing the Pension Equalization Reserve (PER) as an annual 1.5% compound COLA.

Present Value of Future Benefits

The present value of future benefits represents the expected amount of money needed today to fully pay off all benefits both earned as of the valuation date and those to be earned in the future by current plan members under the current plan provisions. Table V-1 below shows the present value of future benefits as of June 30, 2013 before and after accounting for the assumption changes adopted by the Board in September 2013.

TABLE V - 1
PRESENT VALUE OF FUTURE BENEFITS
June 30, 2013

	September 2013 Assumptions	Prior Assumptions
Actives		
Retirement	$ 1,822,363,855	$ 1,683,237,648
Termination	120,179,728	104,320,628
Death	46,723,104	42,539,012
Disability	85,280,518	77,772,026
Total Actives	$ 2,074,547,205	$ 1,907,869,314
In Pay Status		
Service Retirees	$ 1,694,533,205	$ 1,441,550,329
Disabled Retirees	43,974,804	36,792,695
Beneficiaries	142,614,982	124,666,915
Total	$ 1,881,122,991	$ 1,603,009,939
Deferred Vested	$ 52,209,125	$ 43,475,139
Total	$ 4,007,879,321	$ 3,554,354,392

SECTION V
LIABILITIES (SEPTEMBER ASSUMPTIONS)

Normal Cost

Under the Entry Age (EA) actuarial cost method, the present value of future benefits for each individual is spread over the individual's expected working career under the System as a level percentage of the individual's expected pay. The normal cost rate is determined by dividing the value, as of entry age into the System, of each member's projected future benefits by the value, also at entry age, of the member's expected future salary. The normal cost rate is multiplied by the member's current salary to determine each member's normal cost. The normal cost of the System is the sum of the normal costs for each individual in the System. The normal cost represents the expected amount of money needed to fund the benefits attributed to the next year of service under the EA method. Table V-2 below shows the EA normal cost as of June 30, 2013 before and after accounting for the assumption changes adopted by the Board in September 2013.

TABLE V - 2
TIER 1 ENTRY AGE NORMAL COST
June 30, 2013

	September 2013 Assumptions	Prior Assumptions
Tier 1 Actives		
Retirement	$ 53,118,753	$ 51,933,767
Termination	11,314,184	7,064,084
Death	2,355,284	2,032,885
Disability	4,063,880	3,585,566
Total Tier 1 Normal Cost	$ 70,852,101	$ 64,616,302
Expected Tier 1 active payroll	$ 482,473,389	$ 488,331,420
Tier 1 Normal Cost Rates	14.69%	13.23%

SECTION V
LIABILITIES (SEPTEMBER ASSUMPTIONS)

As of the June 30, 2013 valuation, there are no actual Tier 2 employees in the data. In order to estimate the Tier 2 normal cost rate, Tier 1 employees hired since June 30, 2008 were valued as if they were Tier 2 employees. Table V-3 below shows the EA normal cost as of June 30, 2013 for these employees as both Tier 1 members and as if they were Tier 2 members. The higher normal cost rate as Tier 2 members is primarily due to the higher employee contribution rates for Tier 2 and the resulting higher refund benefits.

TABLE V - 3

ENTRY AGE NORMAL COST RATE COMPARISON

	Tier 1	Tier 2
Retirement	11.01%	11.30%
Termination	2.35%	5.74%
Death	0.49%	0.70%
Disability	0.84%	1.10%
Total Normal Cost Rate	14.69%	18.84%

SECTION V
LIABILITIES (SEPTEMBER ASSUMPTIONS)

Actuarial Liability

The actuarial liability represents the expected amount of money needed today to pay for benefits attributed to service prior to the valuation date under the Entry Age (EA) actuarial cost method. It is essentially a funding target. Table V-4 below shows the actuarial liability as of June 30, 2013 before and after accounting for the assumption changes adopted by the Board in September 2013.

TABLE V - 4
ACTUARIAL LIABLITY
June 30, 2013

	September 2013 Assumptions	Prior Assumptions
Actives		
Retirement	$ 1,429,274,675	$ 1,276,747,126
Termination	31,594,870	54,126,472
Death	29,514,994	27,501,484
Disability	55,730,594	50,746,247
Total Actives	$ 1,546,115,133	$ 1,409,121,329
In Pay Status		
Service Retirees	$ 1,694,533,205	$ 1,441,550,329
Disabled Retirees	43,974,804	36,792,695
Beneficiaries	142,614,982	124,666,915
Total	$ 1,881,122,991	$ 1,603,009,939
Deferred Vested	$ 52,209,125	$ 43,475,139
Total Actuarial Liability	$ 3,479,447,249	$ 3,055,606,407

SECTION V
LIABILITIES (SEPTEMBER ASSUMPTIONS)

Unfunded Actuarial Liability (UAL)

With the adoption of an assumption to value the PER as a 1.5% annual compound COLA, the assets in the PER are no longer excluded for purposes of reporting the UAL or for calculating contribution rates. Table V-5 shows the development of the UAL as of June 30, 2013 before and after accounting for the assumption changes adopted by the Board in September 2013.

TABLE V - 5
UNFUNDED ACTUARIAL LIABLITY (UAL)
June 30, 2013

	September 2013 Assumptions	Prior Assumptions
Actuarial Liability	$ 3,479,447,249	$ 3,055,606,407
Actuarial Value of Assets (AVA)	$ 1,962,532,556	$ 1,961,938,686 [1]
Unfunded Actuarial Liability (UAL)	$ 1,516,914,693	$ 1,093,667,721
AVA Funded Ratio	56.4%	64.2%

[1] Excludes Pension Equalization Reserve

SECTION VI
CONTRIBUTIONS

Under the method employed by COPERS, there are two components to the contribution: the normal cost and an amortization payment on the unfunded actuarial liability. The normal cost rate was developed in Section III. This section develops the UAL contribution rate.

The UAL is composed of experience gains and losses, assumption changes and plan provision changes. In September 2013, the Board adopted amortization methods that:

1. Amortize the UAL measured before the assumption changes over a closed 25-year period as a level percentage of payroll,
2. Amortize the change in UAL due to the assumption changes over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the ultimate rate, and
3. Amortize future gains and losses over closed 20-year periods from the date in which they are first recognized as a level percent of payroll (except future gains cannot be amortized over a period shorter than the period remaining on the 25-year amortizations described above).

Table VI-1 shows the amortization payment for each of the two components of the UAL rate. The amortization payment for the assumption changes this year represents one-fourth of the regularly calculated amortization payment. In the second year, the outstanding balance is re-amortized over the remaining 24 years and the second year payment is one-half of the regularly calculated amortization payment. The process is repeated until the regularly calculated amortization payment is made after four years.

TABLE VI - 1

DEVELOPMENT OF UAL CONTRIBUTION RATE

Amortization Base	Outstanding Balance	Remaining Period	Amortization Payment	Amortization % of Pay
2013 UAL	$ 1,093,667,721	25	$ 68,889,201	13.10%
2013 Assumption Changes[1]	423,246,972	25	6,664,992	1.27%
Total	$ 1,516,914,693		$ 75,554,193	14.36%

[1] The amortization of the 2013 assumption changes is phased in over four years. The first year payment is one-fourth of the regularly calculated amortization payment. In the second year, the outstanding balance is re-amortized over the remaining 24 years and the second year payment is one-half of the regularly calculated amortization payment. The process is repeated until the regularly calculated amortization payment is made after four years.

SECTION VI
CONTRIBUTIONS

The total contribution rate consists of the normal cost rate plus the UAL rate. For Tier 1, members contribute 5 percent of pay and the City contributes the balance. For Tier 2, the members and City each contribute half of the total rate. These contribution rates are applied to the actual payroll for the applicable fiscal year. Table VI-2 below summarizes the contribution rates and estimated contribution amounts for the fiscal years ending June 30, 2015 and June 30, 2014.

TABLE VI - 2

SUMMARY OF CONTRIBUTION RATES AND ESTIMATED AMOUNTS

Fiscal Year Ending	**June 30, 2015**	**June 30, 2014**
Total normal cost rate	15.24%	13.37%
Total UAL contribution rate	14.36%	13.87%
Total contribution rate	29.60%	27.24%
Member Contribution Rates		
Tier 1	5.00%	5.00%
Tier 2	14.80%	13.62%
City Contribution Rates		
Tier 1	24.60%	22.24%
Tier 2	14.80%	13.62%
Projected Payroll (based on 2013 valuation)		
Tier 1	$ 471,927,971	500,239,057
Tier 2	72,442,418	25,722,671
Total	$ 544,370,388	$ 525,961,728
Estimated contribution amounts		
Members	$ 34,317,876	$ 28,515,381
City	126,815,759	114,756,594 [1]
Total	$ 161,133,635	$ 143,271,975

[1] City contributions for the FYE 2014 had been estimated to be $125 million based on the 2012 valuation, including an expected payroll of $564 million for the FYE 2014 and no Tier 2 members.

APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 1
ACTIVE MEMBER DATA

	June 30, 2013	June 30, 2012	% Change
Total			
Count	8,090	8,325	-2.8%
Average Current Age	46.8	46.5	0.7%
Average Vesting Service	12.8	12.5	2.8%
Prior Year Actual Annualized Pensionable Earnings			
Total	$ 508,031,593	$ 506,016,928	0.4%
Average	$ 62,798	$ 60,783	3.3%

TABLE A - 2
NON-ACTIVE MEMBER DATA

	Count			Average Age		
	June 30, 2013	June 30, 2012	% Change	June 30, 2013	June 30, 2012	% Change
Total						
Retireds	4,653	4,455	4.4%	68.6	68.6	0.1%
Disableds	246	248	-0.8%	62.5	62.0	0.9%
Beneficiaries & QDROs	925	886	4.4%	72.1	71.9	0.3%
Payee Total	5,824	5,589	4.2%	68.9	68.8	0.2%
Deferred Vested	788	697	13.1%	48.5	48.6	-0.2%

TABLE A - 3
NON-ACTIVE MEMBER DATA

	Total Annual Benefit*			Average Annual Benefit*		
	June 30, 2013	June 30, 2012	% Change	June 30, 2013	June 30, 2012	% Change
Total						
Retireds	$ 150,600,135	$ 142,722,085	5.5%	$ 32,366	$ 32,036	1.0%
Disableds	3,557,536	3,570,997	-0.4%	14,462	14,399	0.4%
Beneficiaries & QDROs	16,199,651	15,295,172	5.9%	17,513	17,263	1.4%
Payee Total	$ 170,357,322	$ 161,588,254	5.4%	$ 29,251	$ 28,912	1.2%
Deferred Vested	$ 9,526,523	$ 8,158,009	16.8%	$ 12,089	$ 11,704	3.3%

* Benefits provided in June 30 valuation data

APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 4
DISTRIBUTION OF ACTIVE MEMBERS AS OF JUNE 30, 2013

	Years of Vesting Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	31	36	16	0	0	0	0	0	0	0	83
25 to 29	56	99	232	2	0	0	0	0	0	0	389
30 to 34	61	101	410	124	5	0	0	0	0	0	701
35 to 39	39	108	378	311	104	5	0	0	0	0	945
41 to 44	33	83	399	345	248	87	4	0	0	0	1,199
45 to 49	43	81	297	302	305	236	168	13	0	0	1,445
50 to 54	20	57	298	272	258	229	273	55	2	0	1,464
55 to 59	19	47	185	215	223	192	183	66	14	1	1,145
60 to 64	7	18	117	129	97	93	69	22	10	1	563
65 to 69	0	1	46	29	23	21	13	4	2	0	139
70 & up	1	0	4	4	3	1	2	2	0	0	17
Total	310	631	2,382	1,733	1,266	864	712	162	28	2	8,090

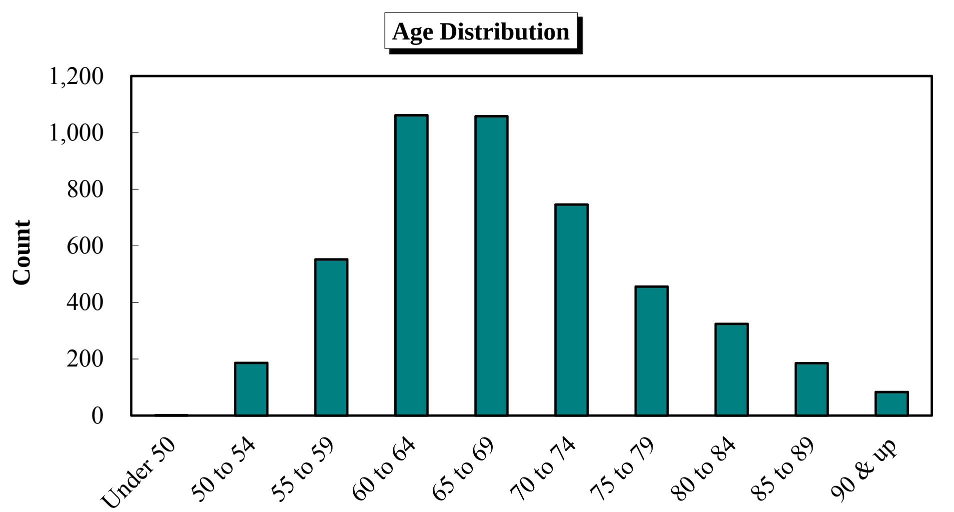
TABLE A - 5
DISTRIBUTION OF AVERAGE EXPECTED SALARY FOR ACTIVE MEMBERS AS OF JUNE 30, 2013

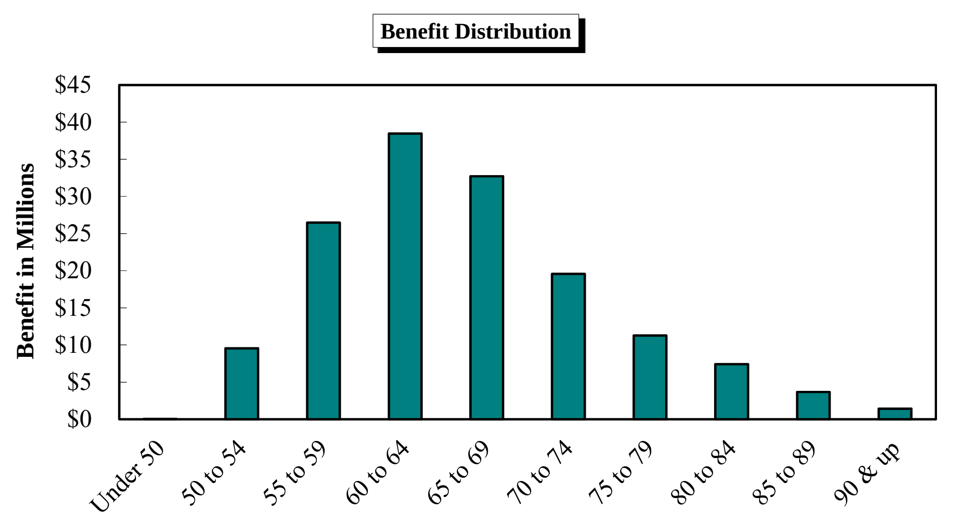
	Years of Vesting Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	$ 36,573	$ 45,603	$ 41,475	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,435
25 to 29	39,735	49,925	49,456	47,603	-	-	-	-	-	-	48,166
30 to 34	41,840	54,385	56,116	59,267	66,969	-	-	-	-	-	55,259
35 to 39	40,660	52,509	61,315	68,051	68,231	83,753	-	-	-	-	62,553
41 to 44	48,799	53,951	62,158	69,257	79,059	76,558	66,990	-	-	-	67,822
45 to 49	48,637	53,938	60,536	66,252	73,745	82,895	79,534	77,995	-	-	69,812
50 to 54	49,198	58,510	58,322	68,958	71,097	77,977	84,035	86,828	59,790	-	71,374
55 to 59	48,482	58,904	62,106	66,177	74,209	75,476	81,002	81,492	69,454	89,482	71,363
60 to 64	58,650	59,528	56,630	65,197	68,043	73,214	84,646	97,441	76,938	63,481	68,818
65 to 69	-	52,160	58,062	69,007	68,735	87,244	75,867	88,034	125,171	-	69,971
70 & up	28,599	-	49,008	77,814	42,410	75,217	105,306	75,027	-	-	64,647
Total	$ 43,687	$ 53,601	$ 58,549	$ 67,061	$ 73,246	$ 78,364	$ 82,067	$ 85,271	$ 75,416	$ 76,482	$ 66,501

APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 6
DISTRIBUTION OF RETIREES AS OF JUNE 30, 2013

Age	Count	Annual Benefit
Under 50	1	$ 39,249
50 to 54	186	9,549,324
55 to 59	552	26,474,552
60 to 64	1,062	38,469,010
65 to 69	1,058	32,710,950
70 to 74	746	19,570,019
75 to 79	456	11,271,747
80 to 84	324	7,422,644
85 to 89	185	3,667,861
90 & up	83	1,424,779
Total	4,653	$ 150,600,135

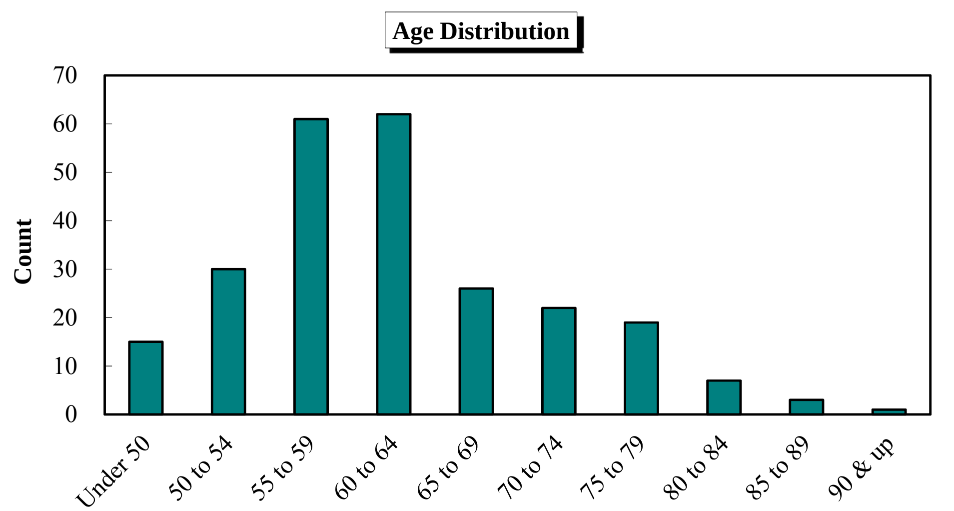


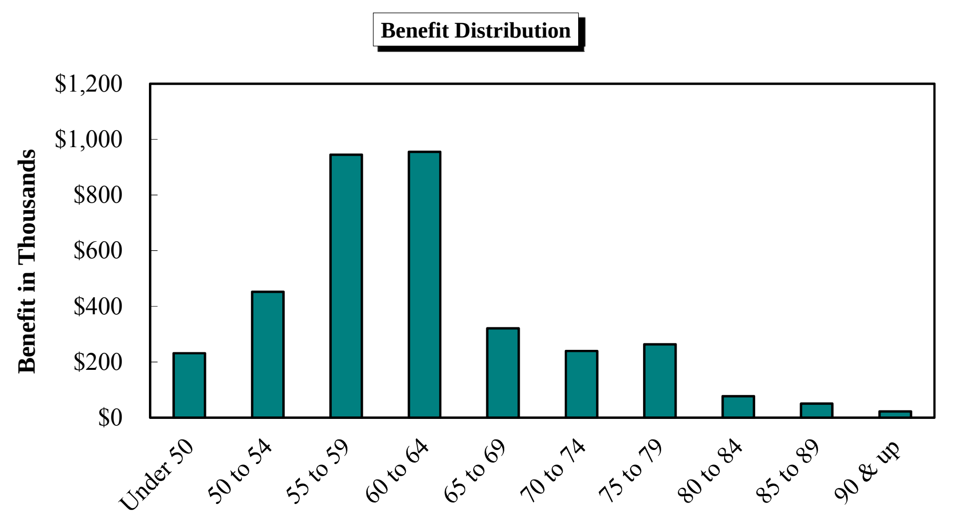


APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 7
DISTRIBUTION OF DISABLEDS AS OF JUNE 30, 2013

Age	Count	Annual Benefit
Under 50	15	$ 231,684
50 to 54	30	452,390
55 to 59	61	945,094
60 to 64	62	955,427
65 to 69	26	320,469
70 to 74	22	239,232
75 to 79	19	263,548
80 to 84	7	77,074
85 to 89	3	50,342
90 & up	1	22,278
Total	246	$ 3,557,536

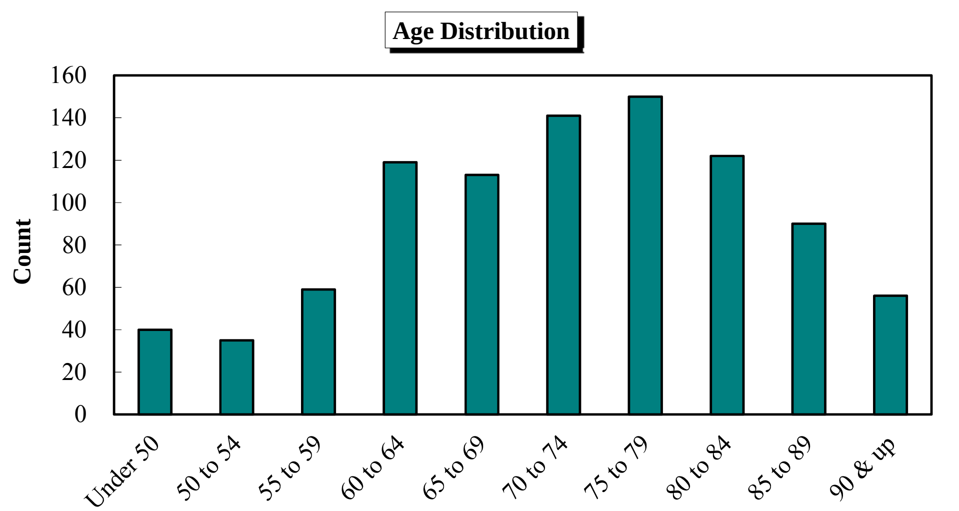


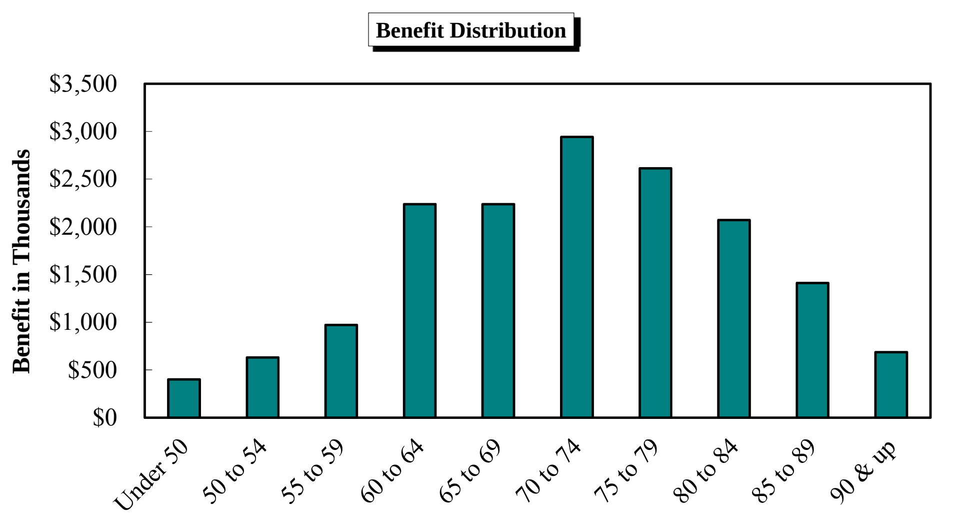


APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 8
DISTRIBUTION OF BENEFICIARIES & QDROS AS OF JUNE 30, 2013

Age	Count	Annual Benefit
Under 50	40	$ 400,116
50 to 54	35	630,421
55 to 59	59	971,528
60 to 64	119	2,236,844
65 to 69	113	2,237,609
70 to 74	141	2,941,696
75 to 79	150	2,613,573
80 to 84	122	2,070,228
85 to 89	90	1,411,549
90 & up	56	686,086
Total	925	$ 16,199,651

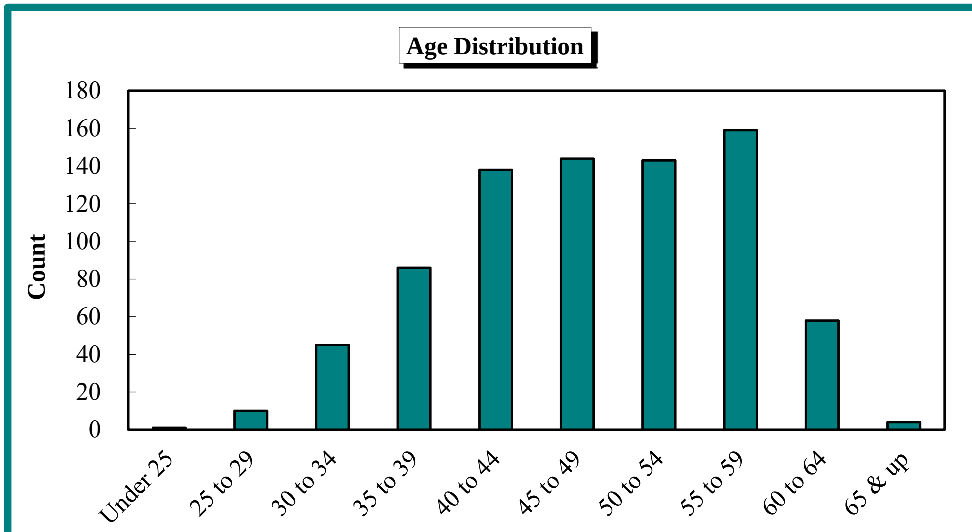


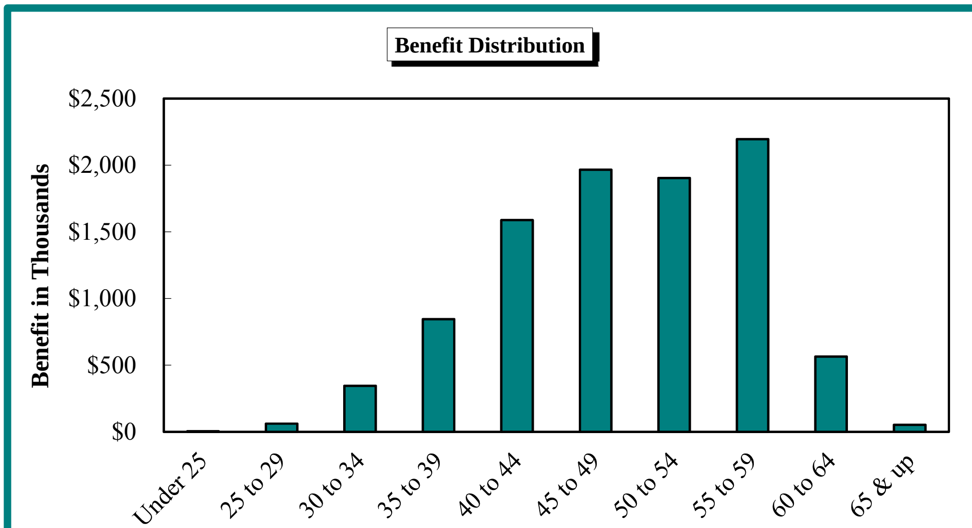


APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 9
DISTRIBUTION OF TERMINATED VESTEDS AS OF JUNE 30, 2013

Age	Count	Annual Benefit
Under 25	1	$ 4,365
25 to 29	10	61,443
30 to 34	45	345,058
35 to 39	86	845,630
40 to 44	138	1,588,301
45 to 49	144	1,966,403
50 to 54	143	1,904,071
55 to 59	159	2,195,326
60 to 64	58	564,108
65 & up	4	51,820
Total	788	$ 9,526,523





APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 10
DATA RECONCILIATION FROM JUNE 30, 2012 TO JUNE 30, 2013

		Actives	Terminated Vested	Retired	QDROs	Disabled	Spouses	Total
1.	**June 30, 2012 valuation**	**8,325**	**697**	**4,455**	**112**	**248**	**774**	**14,611**
2.	Additions							
	a. New entrants	326		1				327
	b. New Beneficiary/QDRO				13		63	76
	c. Total	326		1	13		63	403
3.	Reductions							
	a. Terminated - not vested	(107)						(107)
	b. Paid Out		(18)					(18)
	c. Benefits expired						(3)	(3)
	d. Deaths	(17)	(6)	(117)	(2)	(14)	(31)	(187)
	e. Total	(124)	(24)	(117)	(2)	(14)	(34)	(315)
4.	Changes in status							
	a. Terminated - vested	(150)	150					
	b. Returned to work	7	(7)					
	c. Retired	(289)	(22)	311				
	d. Disabled	(5)	(6)			11		
	e. Data corrections			3	(2)	1	1	3
	f. Total	(437)	115	314	(2)	12	1	3
5.	**June 30, 2013 valuation**	**8,090**	**788**	**4,653**	**121**	**246**	**804**	**14,702**

TABLE A - 11
SCHEDULE OF RETIREES ADDED TO AND REMOVED FROM ROLLS

	Added to Rolls			Removed		Total		Average	% Increase
		Annual Pensions			Annual		Annual	Annual	in Annual
Year Ended	Count	New	PER (a)	Count	Pensions	Count	Pensions	Pensions	Pensions
6/30/2013	426	$12,574	-	201	$3,996	5,703	$168,843	$29,606	5.4%
6/30/2012	448	14,488	-	161	4,174	5,478	160,264	29,256	6.9
6/30/2011	444	15,251	-	184	3,574	5,191	149,950	28,887	8.4
6/30/2010	432	15,139	120	170	3,206	4,931	138,273	28,042	9.5
6/30/2009	426	14,195	1,594	174	3,002	4,669	126,220	27,034	11.3
6/30/2008	348	10,935	2,874	148	2,732	4,417	113,433	25,681	10.8
6/30/2007	290	8,205	1,519	142	2,165	4,217	102,356	24,272	8.0
6/30/2006	309	9,247	1,976	147	2,144	4,069	94,797	23,297	9.0
6/30/2005	314	7,795	1,159	150	2,554	3,907	85,718	21,940	8.1
6/30/2004	296	7,610	1,727	145	2,122	3,743	79,318	21,191	9.1

(a) Pension Equalization Increases

Note: The dollar amounts of the pensions added to and removed from the rolls for years prior to June 30, 2011 were determined by the prior actuary. The amounts added to the rolls includes additions and deletions due to PER increases, in addition to the annual pensions for new retirees.

APPENDIX A
MEMBERSHIP INFORMATION

TABLE A - 12
SCHEDULE OF RETIRED MEMBERS BY TYPE OF BENEFIT

		Type of Retirement						
Monthly Benefit	Number of Retirees	Deferred	Normal or Voluntary	Duty Disability	Non-Duty Disability	Survivor Payment	Death Benefit	Alternate Payee
Deferred	788	788	-	-	-	-	-	-
$1 - $300	85	-	48	1	-	11	12	13
301 - 400	153	-	96	7	2	38	3	7
401 - 500	129	-	82	10	4	23	2	8
501 - 600	135	-	86	4	10	24	6	5
601 - 700	155	-	85	4	11	46	5	4
701 - 800	173	-	91	3	14	38	13	14
801 - 900	170	-	99	5	20	37	7	2
901 - 1,000	167	-	89	3	15	44	8	8
1,001 - 1,100	195	-	120	4	14	39	9	9
1,101 - 1,200	166	-	102	1	17	29	7	10
1,201 - 1,300	164	-	110	1	12	26	5	10
1,301 - 1,400	162	-	113	1	10	26	9	3
1,401 - 1,500	168	-	118	4	4	25	10	7
1,501 - 2,000	713	-	563	13	25	76	21	15
2,001 - 2,500	762	-	658	1	14	74	11	4
2,501 - 3,000	587	-	534	-	7	33	12	1
3,001 - 4,000	834	-	784	-	3	37	10	-
4,001 - 5,000	462	-	446	-	2	13	1	-
Over 5,001	444	-	429	-	-	11	3	1
Totals	6,612	788	4,653	62	184	650	154	121

TABLE A - 13
SCHEDULE OF RETIRED MEMBERS BY BENEFIT OPTION

		Option Selected						
			Option A		Option B			
Monthly Benefit	Total	Life	Standard	Pop-Up	Standard	Pop-Up	Option C	Child Benefit
$1 - $300	85	43	20	7	-	-	3	12
301 - 400	153	99	29	8	2	5	10	-
401 - 500	129	78	36	8	-	-	7	-
501 - 600	135	76	24	20	3	1	11	-
601 - 700	155	94	31	17	2	3	8	-
701 - 800	173	111	27	19	3	4	9	-
801 - 900	170	90	29	21	6	10	14	-
901 - 1,000	167	109	30	16	5	5	2	-
1,001 - 1,100	195	122	40	17	3	4	9	-
1,101 - 1,200	166	80	52	15	2	11	6	-
1,201 - 1,300	164	83	40	21	6	11	3	-
1,301 - 1,400	162	85	38	13	5	13	8	-
1,401 - 1,500	168	99	28	19	6	13	3	-
1,501 - 2,000	713	310	206	88	29	46	34	-
2,001 - 2,500	762	332	217	88	28	70	27	-
2,501 - 3,000	587	239	146	81	38	55	28	-
3,001 - 4,000	834	327	255	96	31	85	40	-
4,001 - 5,000	462	182	131	56	23	55	15	-
Over 5,001	444	180	137	50	21	37	19	-
Totals	5,824	2,739	1,516	660	213	428	256	12
Deferred	788							
Total	6,612							

** Beneficiaries of members who selected Option C are listed under the Option C column. All other beneficiaries are listed under the Life column.*

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions

As the new actuaries to the Board, we reviewed some of the key assumptions with the Board. In our review, we recommended some significant changes that were adopted by the Board in September 2013. The prior assumptions, adopted by the Board based on the prior actuary's recommendations, do not fall within our best estimate range of future experience. Results based on the prior assumptions are included in this report to the extent applicable due to the effective date of the assumption changes adopted by the Board.

1. Discount Rate

The discount rate is based on the expected return on assets. As of June 30, 2013, the discount rate was 8.0%. In September 2013, the Board adopted a discount rate of 7.50%.

2. Salary Increase Rate

Individual salary increases are composed of a price inflation component, a real wage growth component, and a merit or longevity component that varies by age. In September 2013, the Board adopted a reduced price inflation component.

Component	FYE 2013 and Prior	September 2013
Price inflation:	4.50%	3.00%
Real wage growth	0.50%	0.50%
Wage inflation	5.00%	3.50%

The table below combines the various components of salary increases for sample ages based on the September 2013 assumptions.

Age	Price Inflation	Real Wage Growth	Merit or Longevity	Total
20	3.00%	0.50%	3.80%	7.30%
25	3.00%	0.50%	3.10%	6.60%
30	3.00%	0.50%	2.70%	6.20%
35	3.00%	0.50%	2.40%	5.90%
40	3.00%	0.50%	2.20%	5.70%
45	3.00%	0.50%	1.60%	5.10%
50	3.00%	0.50%	1.10%	4.60%
55	3.00%	0.50%	0.60%	4.10%
60	3.00%	0.50%	0.10%	3.60%
65	3.00%	0.50%	0.00%	3.50%

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

3. Rates of Mortality for Healthy and Disabled Lives

Mortality rates for actives, retirees, beneficiaries, and terminated vested members are based on the male and female RP-2000 combined employee and annuitant mortality tables. While there is no explicit adjustment to the table to reflect expected future mortality improvements, the latest experience study (2009) showed actual to expected ratios of 113% for males and 119% for females, indicating some margin for future mortality improvements. Sample rates of mortality are shown in the table below. These rates were adopted November 17, 2005 and first used for the June 30, 2006 valuation.

Rates of Mortality for Active and Retired Healthy and Disabled Lives at Selected Ages

Age	Male	Female
25	0.0376%	0.0207%
30	0.0444	0.0264
35	0.0773	0.0475
40	0.1079	0.0706
45	0.1508	0.1124
50	0.2138	0.1676
55	0.3624	0.2717
60	0.6747	0.5055
65	1.2737	0.9706
70	2.2206	1.6742
75	3.7834	2.8106
80	6.4368	4.5879
85	11.0757	7.7446
90	18.3408	13.1682
95	26.7491	19.4509

4. Family Composition

Percentage married is shown in the following table. Females are assumed to be three years younger than males.

Percentage Married

Gender	Percentage
Males	90%
Females	90%

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

5. Rates of Termination

Sample rates of termination are shown below. These rates were adopted November 17, 2005 and first used for the June 30, 2006 valuation.

Rates of Termination*

Age	Years of Service	Termination
All	0	20.0%
All	1	18.0
All	2	12.0
All	3	9.0
All	4	8.0
25	5+	7.0
30	5+	6.0
35	5+	5.0
40	5+	3.0
45	5+	3.0
50+	5+	2.5

** Termination rates do not apply once a member is eligible for retirement*

6. Rates of Disability

Sample disability rates of active members are provided in the table below. These rates were first used for the June 30, 2006 valuation.

Rates of Disability

Age	Disability
20	0.03%
25	0.03
30	0.04
35	0.05
40	0.12
45	0.20
50	0.40
55	0.80
60	1.00

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

7. Rates of Retirement

Rates of retirement are based on age according to the following table. Tier 1 rates were adopted November 17, 2005 and first used for the June 30, 2006 valuation. Tier 2 rates were adopted October 17, 2013 and first used for the June 30, 2013 valuation.

Rates of Retirement

Age	All Tier 1 and Tier 2 (except Rule of 87)	Tier 2 Rule of 87
50 – 54	25%	35%
55	35	35
56 – 60	25	35
61	20	30
62	35	50
63	30	40
64	25	35
65	45	60
66 – 69	30	40
70+	100	100

8. Unused Vacation and Compensatory Time

Compensatory service credits and lump sum payments for unused vacation and compensatory time were assumed to increase the present value of normal retirement benefits by 9.0%.

9. Pension Equalization Reserve

No future benefits were assumed to be payable through the Pension Equalization Reserve (PER) under the assumptions for FYE 2013 and prior. In September 2013, the Board adopted an assumption valuing future benefits payable through the PER as a 1.5% annual compound cost-of-living adjustment (COLA).

10. Changes Since Last Valuation

In September 2013, the Board adopted assumption changes to value benefits paid through the PER as a 1.5% COLA, reduced the discount rate from 8.0% to 7.5%, reduced the price inflation assumption from 4.5% to 3.0%, and reduced the wage inflation assumption from 5.0% to 3.5%.

The retirement assumptions for Tier 2 members were added in this valuation.

Contribution Allocation Procedure

The contribution allocation procedure primarily consists of an actuarial cost method, an asset smoothing method, and an amortization method as described below.

1. **Actuarial Cost Method**

   The entry age (EA) actuarial cost method was used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each member's date of entry and assumed retirement. The actuarial liability is the difference between the present value of future benefits and the present value of future normal cost. Or, equivalently, it is the accumulation of normal costs for all periods prior to the valuation date. The normal cost and actuarial liability are calculated on an individual basis. The sum of the individual amounts is the normal cost and actuarial liability for the System.

2. **Asset Valuation Method**

   For the purposes of determining contribution rates, an actuarial value of assets is used that dampens the volatility in market values that occur because of the fluctuations in market conditions. Use of an asset smoothing method reduces the volatility of contribution rates and is consistent with the long-term process of funding a pension plan.

   The actuarial value of assets is calculated by recognizing the deviation of actual investment returns compared to the expected return on the actuarial value of assets over a four-year period. The dollar amount of the expected return on the actuarial value of assets is determined using the actual contributions and benefit payments during the year. Any difference between this amount and the actual net investment earnings is considered a gain or loss.

   Prior to the assumption changes adopted in September 2013, any amounts in the Pension Equalization Reserve were subtracted from the actuarial value of assets to determine the funding value of assets.

3. **Amortization Method**

   The unfunded actuarial liability (UAL) is the difference between the actuarial liability and the actuarial value of assets. The UAL is amortized over periods in accordance with the following amortization methods.

   - The UAL as of June 30, 2013 (before the September 2013 assumption changes) is amortized over a closed 25-year period as a level percentage of payroll.

APPENDIX B
ACTUARIAL ASSUMPTIONS AND METHODS

- The impact of the September 2013 assumption changes on the UAL is amortized over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 24-year period. The calculated amortization payment is multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 25-year period.
- Future gains and losses are amortized over a closed 20-year period as a level percentage of payroll from the valuation date in which they are first recognized. However, gains will not be amortized over a shorter period than the remaining period on the amortization of the 2013 UAL.

The total contribution rate is the sum of the normal cost rate and the UAL rate. The normal cost rate is determined by dividing the total normal cost determined under the actuarial cost method by the payroll expected for members active on the valuation date. The UAL rate is determined by dividing the UAL payments determined under the amortization method described above by the total expected payroll for the year (including members active on the valuation date and new entrants expected to replace active members who are expected to leave employment). These rates are determined for the fiscal year immediately following the valuation date, but are applied one year later without adjustment.

For Tier 1, members contribute 5 percent of pay and the City contributes the remainder of the total contribution rate. For Tier 2, the members and the City each pay half of the total contribution rate.

Changes Since Last Valuation

The amortization method described above was adopted by the Board in September 2013. The prior method was to amortize the entire UAL over an open 20-year period.

Tier 2 and the associated cost-sharing between the members and the City was added for this valuation.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

1. Membership

Full time employees of the City of Phoenix other than police officers or firefighters who are covered by another retirement system to which the City contributes.

2. Final Average Compensation (FAC)

The average of annual compensation for the period of 3 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement.

3. Credited Service

A member is credited with a month of service for each calendar month in which the member performs at least 10 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 10 months of credited service.

4. Voluntary Retirement (no reduction for age)

Tier 1
Eligibility:
Sum of age and credited service equals 80 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:
Unused sick leave service multiplied by 2% of FAC plus 2% of FAC times credited service up to 32.5 years plus 1% of FAC times service in excess of 32.5 years plus 0.5% of FAC times service in excess of 35.5 years. Minimum monthly pension is $250 ($500 if member has 15 or more years of service).

Tier 2
Eligibility:
Sum of age and credited service equals 87 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:
Unused sick leave service multiplied by 2% of FAC plus FAC times credited service times the corresponding accrual rate:

Years of Service	Accrual Rate
0 < Service ≤ 20	2.10%
20 < Service ≤ 25	2.15%
25 < Service ≤ 30	2.20%
Service > 30	2.30%

Minimum monthly pension is $250 ($500 if member has 15 or more years of service).

APPENDIX C
SUMMARY OF PLAN PROVISIONS

5. Deferred Retirement

Eligibility:
Termination of City employment prior to age 62 with 5 or more years of credited service.

Annual Benefit:
Accrued regular retirement amount based on credited services, unused sick leave service, and FAC at time of termination, payable beginning at age 62.

6. Duty Disability Retirement

Eligibility:
Total and permanent disability incurred in line of duty with the City.

Annual Benefit:
Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement. Minimum is 15% of FAC. Maximum during worker's compensation period is difference between final compensation and annualized workers compensation. At expiration of worker's compensation period, amount is recomputed to include years during which worker's compensation was paid.

7. Non-Duty Disability

Eligibility:
Total and permanent disability after 10 or more years of credited service.

Annual Benefit:
Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement.

8. Duty Death Before Retirement

Eligibility:
Death in line of duty with the City and compensable under worker's compensation.

Annual Benefit:
To the spouse: Joint and 100% survivor actuarial equivalent of accrued regular retirement amount based on FAC and credited service and unused sick leave service at time of death. Minimum of 10 years of service is credited. To the children of a deceased member with 10 or more years of credited service: each child shall receive a monthly pension of $200 until adoption, marriage, death or attainment of age 18.

APPENDIX C
SUMMARY OF PLAN PROVISIONS

9. Non-Duty Death Before Retirement

Eligibility:
10 or more years of credited service.

Annual Benefit:
Same as Duty Death Before Retirement.

10. Pension Equalization Reserve (PER)

The PER is credited with Excess Earnings, if any, each calendar year. Excess Earnings are defined as the excess over 8.0% of the annual average of the time-weighted rates of return for the immediately preceding five calendar years. The amounts credited to the PER are either used to fund percentage increases to pension amounts or one-time post retirement distribution benefits (13th checks).

On January 1 of each year, persons in receipt of a pension for at least 36 months receive a percentage increase based on the lesser of:

i. Phoenix area Consumer Price Index (CPI) and

ii. The amount the balance in the PER can fully fund.

The increase, subject to the availability of funds in the PER, is payable beginning with the April 1 payment each year, retroactive to January 1 of the same year.

Also, after each plan year's return is known, all pensioners (excluding minors) as of the end of the plan year are eligible to receive a one-time post retirement distribution (13th check). The 13th check is a percentage of the pensioner's annual benefits based on the lesser of:

i. One half of the Phoenix area Consumer Price Index (CPI) and

ii. The excess of the rate of return over the assumed interest rate

The percentage cannot be more than three percent, but must at least be one percent and is subject to the availability of funds in the PER. The 13th check is payable on December 1.

11. Total Required Annual Contribution

Actuarially determined normal cost plus an amortization payment on the unfunded actuarial liability stated as a percentage of projected member compensation

12. Member Contributions

Tier 1: 5% of pay
Tier 2: 50% of total contribution rate

APPENDIX C
SUMMARY OF PLAN PROVISIONS

13. **City Contributions**
Total Required Annual Contribution less Member Contributions

Note: The summary of plan provisions is designed to outline principal plan benefits. If COPERS should find the plan summary not in accordance with the actual provisions, the actuary should immediately be alerted so the proper provisions are valued.

APPENDIX D
GLOSSARY OF TERMS

1. Actuarial Liability

The Actuarial Liability is the difference between the present value of all future plan benefits and the present value of total future normal costs. It represents the amount of assets the System should have today according to the allocation of costs in the actuarial cost method. It is also referred to by some actuaries as the "accrued liability" or "actuarial accrued liability".

2. Actuarial Assumptions

Estimates of future experience with respect to rates of mortality, disability, turnover, retirement rate or rates of investment income and salary increases. Actuarial assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

3. Actuarial Equivalent

A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

4. Actuarial Cost Method

A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of a retirement Plan benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

5. Actuarial Gain or Loss

The difference between actual experience and assumed experience.

6. Actuarial Present Value

The amount of funds currently estimated to be required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

APPENDIX D
GLOSSARY OF TERMS

7. Amortization

Paying off an interest-discounted amount with periodic payments of interest and principal—as opposed to paying off with a lump sum payment.

8. Normal Cost

The actuarial present value of retirement Plan benefits allocated to the current year by the actuarial cost method.

9. Unfunded Actuarial Liability (UAL)

The unfunded actuarial liability represents the difference between the actuarial liability and the assets. It can be measured either based on the actuarial value of assets or the market value of assets. This value is sometimes referred to as the "unfunded actuarial accrued liability."