



**Cavanaugh Macdonald**  
CONSULTING, LLC  
*The experience and dedication you deserve*

# **Police Retirement System of Kansas City, Missouri**

## **Actuarial Valuation Report as of April 30, 2011**





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# Cavanaugh Macdonald

CONSULTING, LLC

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October 10, 2011

The Board of Trustees  
Police Retirement System of Kansas City, Missouri  
1328 Agnes Street  
Kansas City, MO 64127

Dear Members of the Board:

At your request, we have performed an annual actuarial valuation of the Police Retirement System of Kansas City, Missouri as of April 30, 2011 for the purpose of determining the actuarial contribution rate for fiscal year 2013. The major findings of the valuation are contained in this report. The valuation reflects the benefit provisions in effect as of April 30, 2011, which were unchanged from last year. However, there were two changes in the current year's valuation that impact the comparability of this year's valuation to the April 30, 2010 valuation. This valuation reflects the impact of a new employer policy that allows police officers to continue working until they have 32 years of service (previously there was a 30 year maximum), although benefit accruals and member contributions stop at 30 years of service. The report also reflects the decision by the Board of Trustees, upon the recommendation of the actuary, to adopt a new asset smoothing method and to implement it by resetting the current actuarial value of assets equal to the market value of assets.

This is the first valuation prepared by Cavanaugh Macdonald Consulting, LLC (CMC). As part of our transition work, we replicated the April 30, 2010 actuarial valuation. Results were well within acceptable limits, but there were differences in the key valuation results. The normal cost rate at April 30, 2010, as determined by CMC, was 25.95% versus 26.20% shown in the April 30, 2010 valuation report. The actuarial accrued liability, calculated by CMC, was \$922 million compared to \$916 million in the April 30, 2010 actuarial valuation report. These differences are neither unusual nor significant. It is very common for differences in valuation results to occur due to the use of different pension valuation software.

In preparing this report, we relied, without audit, on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, plan provisions, member data and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different and our calculations may need to be revised.

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## ACTUARIAL CERTIFICATION LETTER

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All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System.

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 or additional cost or contribution requirements based on the plan's funded status); and changes in plan provision or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

Actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. Actuarial computations presented in this report under GASB Statements No. 25 and 27 are for purposes of fulfilling financial accounting requirements. The computations prepared for these two purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the plan provisions described in Appendix B of this report, and of GASB Statements No. 25 and 27. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

We would like to express our appreciation to the System's staff, who gave substantial assistance in supplying the data on which this report is based.

We herewith submit the following report and look forward to discussing it with you.

Respectfully submitted,

A handwritten signature in blue ink that reads 'Patrice Beckham'.

Patrice A. Beckham, FSA, EA, FCA, MAAA  
Consulting Actuary

A handwritten signature in blue ink that reads 'Brent A. Banister'.

Brent A. Banister, PhD, FSA, EA, FCA, MAAA  
Senior Actuary



## SECTION 1 - BOARD SUMMARY

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### OVERVIEW

This report presents the results of the April 30, 2011 actuarial valuation of the Police Retirement System of Kansas City, Missouri. The primary purposes of performing a valuation are to:

- Determine the employer contribution rates required to fund the System on an actuarial basis,
- Disclose asset and liability measures as of the valuation date,
- Determine the experience of the System since the last valuation date, and
- Analyze and report on trends in System contributions, assets, and liabilities over the past several years

While there were no changes in the actuarial assumptions or benefit provisions used in the valuation, two changes are reflected in the valuation results: (1) a new employer policy allows police officers to continue working until they reach 32 years of service, although benefit accruals and member contributions end at 30 years, and (2) the Board of Trustees, upon the recommendation of the actuary, adopted a change in the asset smoothing method, which is implemented by setting the actuarial value of assets equal to the market value as of April 30, 2011.

This is the first valuation prepared by Cavanaugh Macdonald Consulting, LLC (CMC). As part of our transition work, we replicated the April 30, 2010 actuarial valuation. Results were well within acceptable limits, but there were differences in the key valuation results. The normal cost rate at April 30, 2010, as determined by CMC, was 25.95% versus 26.20% shown in the 2010 valuation report. The actuarial accrued liability, calculated by CMC, was \$922 million compared to \$916 million in the April 30, 2010 actuarial valuation report. These differences are neither unusual nor significant. It is very common for differences in valuation results to occur due to the use of different pension valuation software.

The valuation results provide a “snapshot” view of the System’s financial condition on April 30, 2011. The unfunded actuarial accrued liability increased from the last valuation by \$32 million, indicating experience for the year ended April 30, 2011 that was less favorable than expected based on the actuarial assumptions. A detailed analysis of the change in the unfunded actuarial accrued liability from April 30, 2010 to April 30, 2011 is shown on page 3.

### ASSETS

As of April 30, 2011, the System had total funds, when measured on a market value basis, of \$716 million. This was an increase of \$60 million from the April 30, 2010 figure of \$656 million. The market value of assets is not used directly in the calculation of the actuarial contribution rate. An asset valuation method which smoothes the effect of market fluctuations is used to determine the value of assets used in the valuation, call the “actuarial value of assets”. The new smoothing method, first adopted by the Board for the April 30, 2011 valuation, recognizes the difference between the actual and expected return on the market value of assets evenly over a five year period. The new asset smoothing method was implemented by setting the actuarial value of assets equal to the market value of assets at April 30, 2011. The smoothing of actual versus expected investment experience will begin in the next valuation. The prior asset smoothing method would have produced an actuarial value of assets of \$711 million. The actuarial value of assets as of April 30, 2011 was set equal to the market value of \$716 million so the unfunded actuarial accrued liability was \$5 million less due to the change in the asset smoothing method.

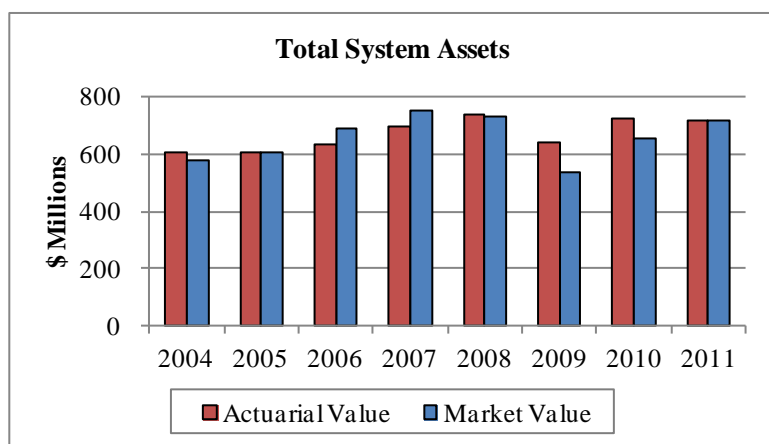


## SECTION 1 - BOARD SUMMARY

A summary of the asset experience follows:

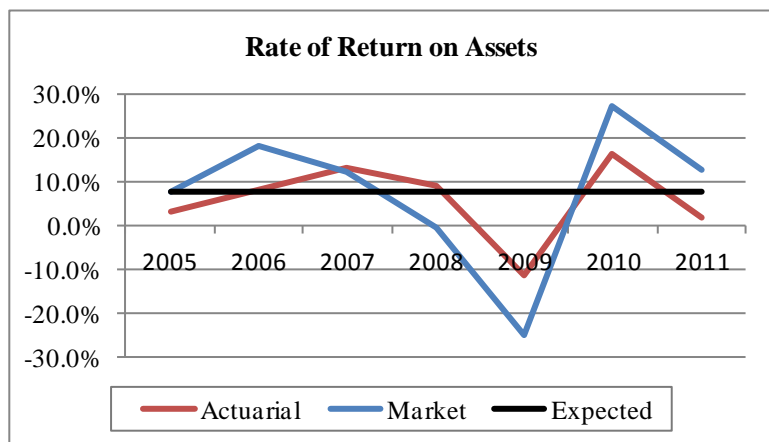
	Market Value (\$M)	Actuarial Value (\$M)
Assets, April 30, 2010	\$655.6	\$722.5
· City and Member Contributions	25.8	25.8
· Benefit Payments and Refunds	(46.9)	(46.9)
· Administrative Expenses	(0.6)	(0.6)
· Investment Income (net of expenses)	82.0	10.6
Preliminary Value, April 30, 2011	715.8	711.4
Implementation of new asset smoothing method	0.0	4.4
Final Assets, April 30, 2011	\$715.8	\$715.8

The annualized dollar-weighted rate of return measured on the actuarial value of assets, prior to the change in the asset smoothing method, was +2% and, measured on the market value of assets, was approximately +13%. The return on an actuarial basis of less than 7.75% resulted in an actuarial loss to the system of about \$44 million, which increased the unfunded actuarial accrued liability. Historical asset information is shown in the following two charts:



*The actuarial value of assets has been both above and below the market value during this period. This is to be expected when using an asset smoothing method.*

Note: Results for years before 2011 were prepared by the prior actuary.



*Rates of return on the market value of assets have been very volatile. The return on actuarial value of assets has lagged the 7.75% assumption in the last decade.*

Note: Results for years before 2011 were prepared by the prior actuary.



## SECTION 1 - BOARD SUMMARY

### LIABILITIES

The actuarial accrued liability is that portion of the present value of future benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the asset value at the same date is referred to as the unfunded actuarial accrued liability (UAAL) or (surplus) if the asset value exceeds the actuarial accrued liability. The unfunded actuarial accrued liability will be reduced if the employer's contributions exceed the employer's normal cost for the year, after allowing for interest on the previous balance of the unfunded actuarial accrued liability. Benefit improvements, experience gains and losses, and changes in actuarial assumptions and methods will also impact the total actuarial accrued liability and the unfunded portion thereof.

The Actuarial Accrued Liability and Unfunded Actuarial Accrued Liability for the System as of April 30, 2011 are:

Actuarial Accrued Liability	\$940,609,092
Actuarial Value of Assets	<u>715,764,084</u>
Unfunded Actuarial Accrued Liability/(Surplus)	\$224,845,008

Between April 20, 2010 and April 30, 2011, the change in the unfunded actuarial accrued liability for the System was as follows (in millions):

	\$(M)*
UAAL, April 30, 2010	193.0
+ Normal cost for year	22.0
+ Assumed investment return for year	16.6
- Actual contributions (member + city)	25.8
- Assumed investment return on contributions	1.0
= Expected UAAL, April 30, 2011	204.8
+ Change from amendments	(6.9)
+ Change from change in actuary	6.7
+ Change in asset smoothing method	(4.4)
= Expected UAAL after changes	200.2
Actual UAAL, April 30, 2011	224.8
Experience gain/(loss)	(24.6)
(Expected UAAL - Actual UAAL)	

\*May not add due to rounding

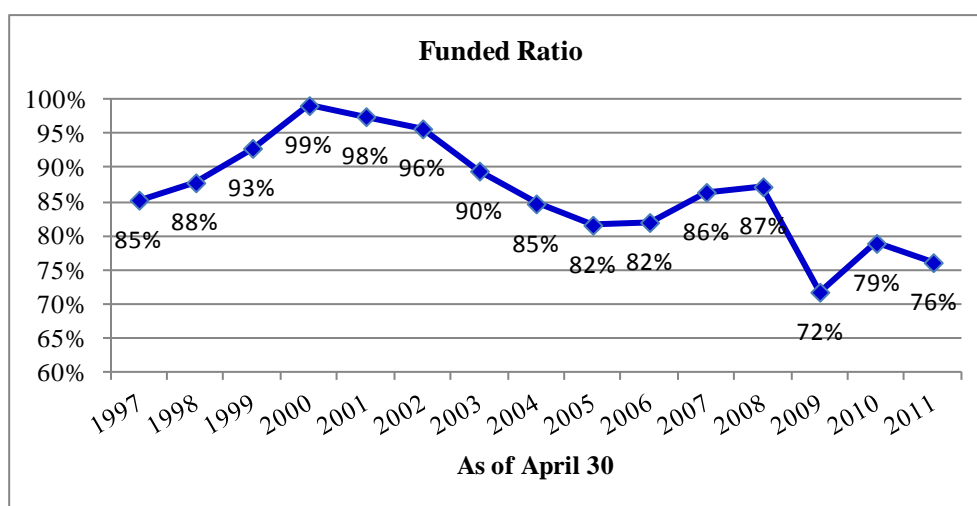
The experience loss for the last plan year of \$24.6 million was the result of an actuarial loss of \$44.5 million on System assets (actuarial value) and a liability gain of \$19.9 million. The liability gain was primarily the result of salaries in the 2011 valuation that were lower than expected, based on the actuarial assumptions.



## SECTION 1 - BOARD SUMMARY

Analysis of the unfunded actuarial accrued liability strictly as a dollar amount can be misleading. Another way to evaluate the unfunded actuarial accrued liability and the progress made in its funding is to track the funded status, the ratio of the actuarial value of assets to the actuarial accrued liability. This information for recent years is shown below (in millions). Historical information is shown in the graph following the chart.

	4/30/2007	4/30/2008	4/30/2009	4/30/2010	4/30/2011
Actuarial Value of Assets (\$M)	\$698.1	\$742.1	\$641.2	\$722.5	\$715.8
Actuarial Accrued Liability (\$M)	\$807.9	\$850.8	\$893.6	\$915.5	\$940.6
Funded Ratio (Assets/Liability)	86%	87%	72%	79%	76%



Much of the decline in the funded ratio over the last three years is attributable to the sharp decline in the market for FY2009. The broader decline over the last decade is a reflection of actual contribution rates significantly below the actuarial contribution rate coupled with investment returns less than the actuarial assumed rate. The System's funded status will continue to be heavily dependent on investment returns as well as the City's contribution policy.

### CONTRIBUTION RATES

Generally, contributions to the System consist of:

- A "normal cost" for the portion of projected liabilities allocated to service of members during the year following the valuation date, by the actuarial cost method,
- An "unfunded actuarial accrued liability or (surplus) contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

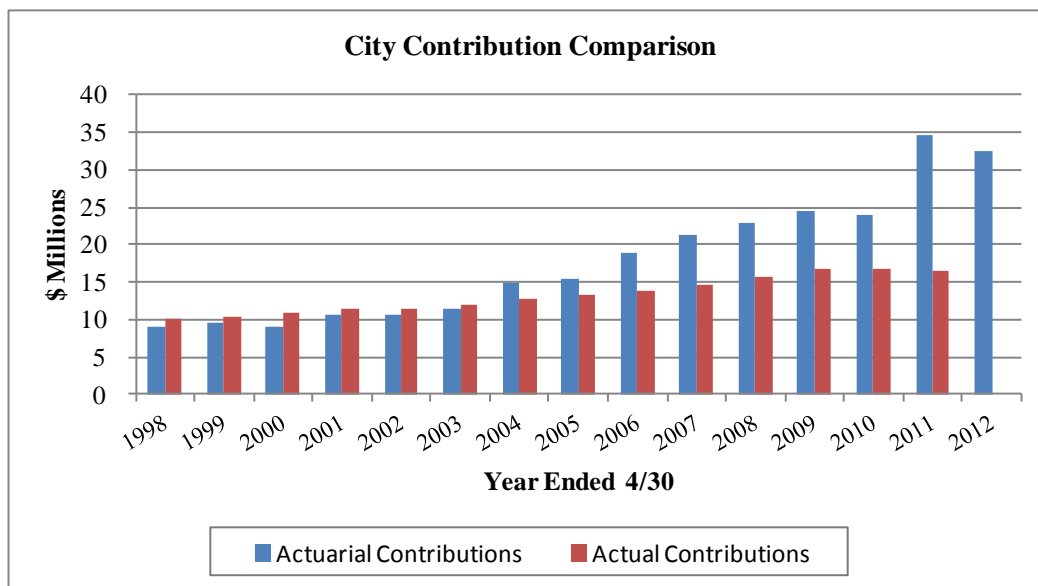
Contribution rates are computed with the objective of developing costs that are level as a percentage of covered payroll. The contribution rate for fiscal year 2013 is computed based on the April 30, 2011 actuarial valuation. The graph below shows the actuarial contribution rate for the City compared to the





## SECTION 1 - BOARD SUMMARY

amount actually received in the year. The actuarial contribution rate equals the System's normal cost, budgeted expenses and an amortization of the unfunded actuarial accrued liability.



### COMMENTS

As of April 30, 2011, the actuarial accrued liability was \$941 million and the actuarial value of assets was \$716 million, resulting in a funded ratio of 76%, slightly lower than the funded ratio of 79% last year. The return on actuarial value of assets was one contributing factor, but actual contributions below the actuarial contribution rate also reduced the funded ratio. Currently the UAAL is \$225 million. As a result of the overall unfavorable experience for FYE 2011, the City's actuarial contribution rate increased from 33.75% in last year's valuation to 36.79% in the 2011 valuation.

Retirement plans use several mechanisms to provide more stability in the contribution levels. These mechanisms include an asset smoothing method, which smoothes out the peaks and valleys of investment returns and amortization of any actuarial gains or losses associated with investment experience. The System utilizes an asset smoothing method that spreads the difference between expected and actual return evenly over a five-year period. This year, as a result of adopting a new asset smoothing method, the actuarial value was reset to market value. This had a minimal impact, however, because the actuarial value of assets computed under the prior smoothing method was only \$4 million less than market value.

The normal cost rate remained fairly stable as a percentage of payroll, but the System's unfunded actuarial accrued liability increased from \$193 million last year to \$225 million this year. As a result, the City's actuarial contribution rate increased from 33.75% in last year's valuation to 36.79% of pay in this year's valuation.



## SECTION 1 - BOARD SUMMARY

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The actuarial contribution rate for the City for fiscal year end April 30, 2011 was 36.76%. The City actually contributed at a rate of 19.70% of covered payroll. This difference between the actual and actuarial contribution rate increased the unfunded actuarial accrued liability by about \$18 million. To the extent the System does not have investment returns above the assumed rate of 7.75% or other favorable experience sufficient to offset the contribution shortfall, the unfunded actuarial accrued liability will increase. The long-term financial health of the System is dependent on the systematic funding of the Plan, based on the results of the actuarial valuation. Assuming all actuarial assumptions are met in the future and the City continues to contribute at the scheduled rate of 19.70%, the funded status of the System is expected to continue to decline and the actuarial contribution rate is expected to increase. The longer it takes for the City's contributions to increase to the actuarial contribution rate, the higher the ultimate contribution rate will be.

The actual contribution made by the City in the last eight years has been significantly lower than the actuarial contribution rate. The long-term financial health of this retirement system is heavily dependent on two key items: (1) investment returns and (2) contributions to the System. Given the System's funded status and the City's scheduled contribution rate, the System's funding is a concern. To the extent the City continues to contribute below the actuarial contribution rate the funding of the System is expected to deteriorate even further. If, as expected, the funded status continues to decline it will impact the payment of ad hoc COLAs and whether the current benefit structure can be sustained over the long term. We strongly recommend the City develop a plan to address the System's long term funding. If the move to the full actuarial contribution rate in future years cannot be accomplished at one time, a plan to systematically increase the rate until it reaches the actuarial rate may be another alternative to consider.

Based on the Board's policy, an ad hoc cost of living adjustment may be granted if the definition of "actuarial soundness", which requires at least one of the three following conditions, is met:

- 1) The plan's funded ratio (actuarial value of assets/actuarial accrued liability) measured in accordance with GASB 25, rounded to the nearest whole percentage, is 75% or greater.
- 2) For each of the three most recently completed plan years, the plan has received a combination of employer and employee contributions that in total is, rounded to the nearest whole percentage, 90% or greater of the plan's required contributions (defined to be the sum of the Annual Required Contribution as defined by GASB Statement 25 and any required employee contributions).
- 3) For at least three out of the last five completed plan years, the plan has received employer contributions that equal or exceed the plan's Annual Required contribution as defined by GASB Statement 25.

Based upon the results of the April 30, 2011 valuation, and the Board's policy, an ad hoc COLA can be granted. However, the Board may want to consider the following facts in making their decision:

- 1) The funded ratio of the system, using the market value of assets, is 76%. This does not leave much margin above the 75% target should markets decline.
- 2) The City has been contributing less than the actuarial contribution rate and this practice is expected to continue.



## SECTION 1 - BOARD SUMMARY

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- 3) Based on advice from the investment consultant for the system, asset returns in the short term (the next 5 to 10 years) are expected to be less than the assumed rate of return of 7.75%. If this occurs, the funded ratio will decline, perhaps significantly.

We have not reviewed any legal aspects related to granting the ad hoc COLA. We are not attorneys and cannot give legal advice on such issues. We suggest that you review this policy with your legal counsel.

We conclude this Board Summary with the following exhibit which compares the principal results of the current and prior actuarial valuation.



## SECTION 1 - BOARD SUMMARY

### SUMMARY OF PRINCIPAL RESULTS

<b>1. Participation Data</b>	<u>4/30/2011</u> Valuation	<u>4/30/2010</u> Valuation	<u>%</u> Change
Number of:			
Active members	1,391	1,418	(1.9)
Retired Members and Beneficiaries	1,202	1,201	0.1
Inactive Vested Members, including officers past 30 years of service	20	11	81.8
Total Members	2,613	2,630	(0.6)
Annual Projected Salaries of Active Members	\$ 88,444,971	\$ 90,475,241	(2.2)
Annual Retirement Payments for Retired Members and Beneficiaries*	\$ 40,616,224	\$ 39,272,337	3.4
*Does not include supplemental benefits			
<b>2. ASSETS AND LIABILITIES</b>			
Total Actuarial Accrued Liability	\$ 940,609,092	\$ 915,463,037	2.7
Market Value of Assets	715,764,084	655,571,619	9.2
Actuarial Value of Assets	715,764,084	722,464,003	(0.9)
Unfunded Actuarial Accrued Liability	\$ 224,845,008	\$ 192,999,034	16.5
Funded Ratio	76%	79%	(3.6)
<b>3. EMPLOYER CONTRIBUTION RATES AS A PERCENT OF PAYROLL</b>			
Normal Cost	25.57%	26.20%	(2.4)
Member Financed	10.55%	10.55%	0.0
Employer Normal Cost	15.02%	15.65%	(4.0)
Amortization of Unfunded Actuarial Accrued Liability	21.77%	18.10%	20.3
Employer Contribution Rate	36.79%	33.75%	9.0



## SECTION 2 – SCOPE OF THE REPORT

---

This report presents the actuarial valuation of the Police Retirement System of Kansas City, Missouri as of April 30, 2011. This valuation was prepared at the request of the System's Board of Trustees. There was no change in the benefit structure from the prior valuation, but there were changes in the actuarial assumptions and methods. The retirement assumption was changed as a result of a new employer policy that permits police officers to remain in active employment until they reach 32 years of service (previously officers were required to retire at 30 years of service). In addition, the Board of Trustees, upon the recommendation of the actuary, adopted a new asset smoothing method. The new method was implemented by setting the actuarial value of assets as of April 30, 2011 equal to the market value in this valuation.

Please pay particular attention to our cover letter, where the guidelines employed in the preparation of this report are outlined. We also comment on the sources and reliability of both the data and the actuarial assumptions upon which our findings are based. Those comments are the basis for our certification that this report is complete and accurate to the best of our knowledge and belief.

A summary of the findings which result from this valuation is presented in the previous section. Section 3 describes the assets and investment experience of the System. Sections 4 and 5 describe how the obligations of the System are to be met under the actuarial cost method in use. Section 6 includes the information required for the financial reporting standards established by the Governmental Accounting Standards Board (GASB).

This report includes several appendices:

- Appendix A Schedules of valuation data classified by various categories of members.
- Appendix B A summary of the current benefit structure, as determined by the provisions of governing law on April 30, 2011.
- Appendix C A summary of the actuarial methods and assumptions used to estimate liabilities and determine contribution rates.
- Appendix D A glossary of actuarial terms.



## SECTION 3 - ASSETS

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In many respects, an actuarial valuation can be thought of as an inventory process. The inventory is taken as of the actuarial valuation date, which for this valuation is April 30, 2011. On that date, the assets available for the payment of benefits are appraised. The assets are compared with the liabilities of the System, which are generally in excess of assets. The actuarial process then leads to a method of determining the contributions needed by members and the employer in the future to balance the System assets and liabilities.

### **Market Value of Assets**

The current market value represents the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a basis for measuring investment performance from time to time. Table 1 is a comparison, at market values, of System assets as of April 30, 2011, and April 30, 2010, in total and by investment category. Table 2 summarizes the change in the market value of assets from April 30, 2010 to April 30, 2011.

### **Actuarial Value of Assets**

Neither the market value of assets, representing a "cash-out" value of System assets, nor the book values of assets, representing the cost of investments, may be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value of assets for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens swings in the market value while still indirectly recognizing market values. The Board adopted a new asset smoothing method effective with the April 30, 2011 valuation. Under the new methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five year period. The new method was implemented by resetting the actuarial value of assets at April 30, 2011 equal to the market value of assets. The prior method smoothed the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets.



**SECTION 3 - ASSETS**

**TABLE 1**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**STATEMENT OF NET PLAN ASSETS AT MARKET VALUE**

	<b>Market Value</b>	
	<b>April 30, 2011</b>	<b>April 30, 2010</b>
Cash & Equivalents	\$29,404,495	\$53,220,431
Receivables	2,098,612	1,703,669
Stocks:		
Common & Preferred Corporate	333,722,866	283,465,591
Foreign	49,468,960	59,792,202
Bonds:		
U.S. Government	123,343,191	100,449,809
Corporate	63,808,560	72,090,112
Exchange traded fixed income funds	18,526,117	0
Asset Backed Securities	19,622,286	26,819,162
Real Estate	20,082,869	14,818,922
Commodities, including futures account	25,061,861	18,660,786
Partnerships	31,508,953	25,587,975
Building and Other Property Used in Plan Operations	1,606	1,883
Total Assets	\$716,650,376	\$656,610,542
Accounts Payable	(886,292)	(1,038,923)
Net Assets Available for Benefits	\$715,764,084	\$655,571,619



**SECTION 3 - ASSETS**

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**TABLE 2**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**STATEMENT OF CHANGES IN NET ASSETS  
DURING YEAR ENDED APRIL 30, 2011**

(Market Value)

1. Market Value of Assets as of April 30, 2010	\$	655,571,619
2. Contributions:		
a. Members	\$	9,223,994
b. City		16,532,015
c. Miscellaneous		0
d. Total	\$	<u>25,756,009</u>
[2a] + [2b] + [2c]		
3. Investment Income		
a. Interest and Dividends	\$	14,265,550
b. Net Securities Lending Income		193,726
c. Investment Expenses		(3,278,858)
d. Net Appreciation in Fair Value		70,821,668
e. Net Investment Income	\$	<u>82,002,086</u>
[3a] + [3b] + [3c] + [3d]		
4. Deductions		
a. Refunds of Member Contributions	\$	557,214
b. Benefits Paid:		
(1) Retirement Benefits		45,462,183
(2) Death Benefits		25,000
(3) Partial Lump Sums		889,952
c. Administrative Expenses		631,281
d. Total	\$	<u>47,565,630</u>
[4a] + [4b] + [4c]		
5. Net Change	\$	60,192,465
[2d] + [3e] - [4d]		
6. Market Value of Assets as of April 30, 2011	\$	715,764,084
[1] + [5]		





**TABLE 3**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS**

The Board adopted a new asset smoothing method effective with the April 30, 2011 valuation. Under the new methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five year period. The new method was implemented by resetting the actuarial value of assets at April 30, 2011 equal to the market value of assets.

1. Market Value of Assets as of April 30, 2011	\$ 715,764,084
2. Actuarial Value of Assets as of April 30, 2011	\$ 715,764,084



## SECTION 4 – SYSTEM LIABILITIES

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In the previous section, an actuarial valuation was compared with an inventory process, and an analysis was given of the inventory of assets of the System as of the valuation date, April 30, 2011. In this section, the discussion will focus on the commitments (future benefit payments) of the System, which are referred to as its liabilities.

Table 4 contains an analysis of the actuarial present value of all future benefits (PVFB) for contributing members, inactive members, retirees and their beneficiaries.

The liabilities summarized in Table 4 include the actuarial present value of all future benefits expected to be paid with respect to each member. For an active member, this value includes the measurement of both benefits already earned and future benefits to be earned. For all members, active and retired, the value extends over benefits earnable and payable for the rest of their lives and for the lives of the surviving beneficiaries.

All liabilities reflect the benefit provisions in place as of April 30, 2011, with one exception. When certain funding ratio and contribution criteria are met, the Board has discretion to grant a COLA (it is not part of the statutory benefit structure). Even though the COLA is not guaranteed to be paid, the liabilities reflect a 3% annual cost of living adjustment for all future years as it better reflects the long-term liabilities.

### **Actuarial Accrued Liability**

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. An actuarial cost method is a mathematical technique that allocates the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to "breakdown" the present value of future benefits into two components:

- (1) that which is attributable to the past and
- (2) that which is attributable to the future.

Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial accrued liability". The portion allocated to the future is known as the present value of future normal costs, with the specific piece of it allocated to the current year being called the "normal cost". Table 5 contains the calculation of actuarial accrued liability for the System. The Entry Age Normal actuarial cost method is used to develop the actuarial accrued liability.



**SECTION 4 – SYSTEM LIABILITIES**

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**TABLE 4**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**PRESENT VALUE OF FUTURE BENEFITS (PVFB)  
AS OF APRIL 30, 2011**

1. Active employees	
a. Retirement Benefit	\$ 487,660,270
b. Pre-Retirement Death Benefit	5,616,102
c. Withdrawal Benefit	20,020,381
d. Disability Benefit	57,204,786
e. Supplemental Benefit	32,857,852
f. Total	<u>\$ 603,359,391</u>
2. Inactive Vested Members	
a. Retirement Benefit	\$ 10,166,138
b. Supplemental Benefit	872,719
c. Total	<u>\$ 11,038,857</u>
3. Inactive Nonvested Members	\$ 0
4. In Pay Members	
a. Retirees	\$ 367,113,447
b. Disabled Members	66,528,868
c. Beneficiaries	44,816,305
d. Supplemental Benefit	59,211,757
e. Total	<u>\$ 537,670,377</u>
5. Total Present Value of Future Benefits	
[1f] + [2c] + [3] + [4e]	\$ 1,152,068,625



**SECTION 4 – SYSTEM LIABILITIES**

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**TABLE 5**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**ACTUARIAL ACCRUED LIABILITY  
AS OF APRIL 30, 2011**

1. Active employees	
a. Present Value of Future Benefits	\$ 603,359,391
b. Present Value of Future Normal Costs	211,459,533
c. Actuarial Accrued Liability [1a] - [1b]	\$ <u>391,899,858</u>
2. Inactive Vested Members	\$ 11,038,857
3. Inactive Nonvested Members	\$ 0
4. In Pay Members	
a. Retirees	\$ 367,113,447
b. Disabled Members	66,528,868
c. Beneficiaries	44,816,305
d. Supplemental Benefit	59,211,757
e. Total	\$ <u>537,670,377</u>
5. Total Actuarial Accrued Liability [1c] + [2] + [3] + [4e]	\$ 940,609,092
6. Actuarial Value of Assets	\$ 715,764,084
7. Unfunded Actuarial Accrued Liability [5] - [6]	\$ 224,845,008



**SECTION 4 – SYSTEM LIABILITIES**

**TABLE 6**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
AMORTIZATION SCHEDULE FOR THE UNFUNDED ACTUARIAL ACCRUED LIABILITY**

Base	Date Created	Last Payment	Balances		2011/2012 Amortization	2012/2013 Amortization
			Initial	Outstanding		
5/1/1998 Base	5/1/1998	FY 2022	\$ 60,092,542	\$ 57,982,057	\$ 6,515,624	\$ 6,776,249
5/1/1999 Base	5/1/1999	FY 2023	(23,794,584)	(23,624,111)	(2,473,914)	(2,572,870)
5/1/2000 Base	5/1/2000	FY 2024	(15,860,433)	(16,091,628)	(1,581,181)	(1,644,428)
5/1/2001 Base	5/1/2001	FY 2025	(6,685,610)	(6,891,067)	(639,082)	(664,645)
5/1/2002 Base	5/1/2002	FY 2026	12,470,529	12,992,727	1,142,977	1,188,696
5/1/2003 Base	5/1/2003	FY 2027	43,654,725	45,773,450	3,836,278	3,989,729
5/1/2004 Base	5/1/2004	FY 2029	36,731,553	41,752,362	3,211,238	3,339,688
5/1/2005 Base	5/1/2005	FY 2030	24,225,252	27,144,113	2,009,300	2,089,672
5/1/2006 Base	5/1/2006	FY 2031	391,606	447,343	33,867	35,221
5/1/2007 Base	5/1/2007	FY 2032	(30,886,670)	(32,189,802)	(2,205,542)	(2,293,763)
5/1/2008 Base	5/1/2008	FY 2033	(1,504,998)	(1,422,932)	(148,127)	(154,052)
5/1/2009 Base	5/1/2009	FY 2034	144,208,694	146,209,650	10,439,470	10,857,049
5/1/2010 Base	5/1/2010	FY 2035	(59,608,724)	(64,643,225)	(4,190,870)	(4,358,505)
5/1/2011 Base	5/1/2011	FY 2036	45,929,232	37,406,071	1,084,048	2,540,055
<b>Total Unfunded Actuarial Accrued Liability</b>				\$ 224,845,008	\$ 17,034,086	\$ 19,128,095
Expected Contribution Shortfall in FY 2012						
	5/1/2011		13,220,242	13,220,242	0	898,652
<b>Total Amortization Payment Including Shortfall</b>					\$ 17,034,086	\$ 20,026,747
<b>Equivalent Single Amortization Period</b>						14.69

*Note: Years prior to 2011 are from prior actuary's report*



**SECTION 4 – SYSTEM LIABILITIES**

**TABLE 7**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**DERIVATION OF SYSTEM EXPERIENCE GAIN/(LOSS)**

		(\$M)	
		<u>Year Ended</u> <u>4/30/2011</u>	<u>Year Ended</u> <u>4/30/2010</u>
[1]	UAAL* at start of year	193.0	252.4
[2]	+ Normal cost for year	22.0	22.2
[3]	+ Assumed investment return on [1] & [2]	16.6	21.3
[4]	- Actual contributions (member + city)	25.8	25.6
[5]	- Assumed investment return on [4]	1.0	1.0
[6]	= Expected UAAL at end of year [1] + [2] + [3] - [4] - [5]	204.8	269.3
[7]	+ Increase (decr.) from assumption change	(6.9)	0.0
[8]	+ Increase (decr.) from change in actuary	6.7	0.0
[9]	+ Increase (decr.) from change in asset smoothing	(4.4)	0.0
[10]	= Expected UAAL after changes [6] + [7] + [8] + [9]	200.2	269.3
[11]	= Actual UAAL at year end	224.8	193.0
[12]	= Experience gain (loss) [10] - [11]	(24.6)	76.3
[13]	= Percent of beginning of year AAL	(2.7%)	8.5%

\* *Unfunded Actuarial Accrued Liability/ (Surplus)*

<b>Year Ended</b> <b><u>April 30</u></b>	<b>Actuarial Gain/(Loss)</b> <b><u>As % of Actuarial Accrued Liability</u></b>
2006	0.5%
2007	5.4%
2008	1.1%
2009	(16.2%)
2010	8.5%
2011	(2.7%)



**SECTION 4 – SYSTEM LIABILITIES**

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**TABLE 8**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**GAIN/(LOSS) ANALYSIS BY SOURCE**

Source of Gain/(Loss)	Gain/(Loss) (\$M)
Retiree Mortality	0.4
Withdrawal	0.5
Retirement	0.2
Death	0.2
Disability	(0.5)
Salary	19.4
New actives	(0.3)
	<hr/>
Total Liability Gain/(Loss)	19.9
Asset Gain/(Loss)	(44.5)
Total Gain/(Loss)	(24.6)



TABLE 9

POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI

PROJECTED BENEFIT PAYMENTS

The chart below shows estimated benefits expected to be paid over the next twenty years, based on the assumptions used in this valuation. The "Actives" column shows benefits expected to be paid to members currently active on April 30, 2011. The "Retirees" column shows benefits expected to be paid to all other members. This includes those who, as of April 30, 2011, are receiving benefit payments or who are inactive vested and are entitled to a benefit in the future (including officers past 30 years of service). No future members are reflected.

Retirement, Survivor, Withdrawal and Supplemental Benefits

<b>Year Ending April 30</b>	<b>Actives</b>	<b>Retirees</b>	<b>Total</b>
2012	\$ 2,022,000	\$ 46,410,000	\$ 48,432,000
2013	3,998,000	47,348,000	51,346,000
2014	6,234,000	47,653,000	53,887,000
2015	8,899,000	47,875,000	56,774,000
2016	11,833,000	47,983,000	59,816,000
2017	14,801,000	48,115,000	62,916,000
2018	17,803,000	48,134,000	65,937,000
2019	21,058,000	48,051,000	69,109,000
2020	24,643,000	47,966,000	72,609,000
2021	28,410,000	47,776,000	76,186,000
2022	32,572,000	47,437,000	80,009,000
2023	37,324,000	47,034,000	84,358,000
2024	42,374,000	46,490,000	88,864,000
2025	47,913,000	45,851,000	93,764,000
2026	53,673,000	45,105,000	98,778,000
2027	59,582,000	44,251,000	103,833,000
2028	65,563,000	43,316,000	108,879,000
2029	71,706,000	42,248,000	113,954,000
2030	78,032,000	41,075,000	119,107,000
2031	84,078,000	39,804,000	123,882,000





## SECTION 5 – EMPLOYER CONTRIBUTIONS

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The previous two sections were devoted to a discussion of the assets and liabilities of the System. A comparison of Tables 3 and 4 indicates that current assets fall short of meeting the present value of future benefits (total liability). This is expected in all but a completely closed fund, where no further contributions are anticipated. In an active system, there will almost always be a difference between the actuarial value of assets and total liabilities. This deficiency has to be made up by future contributions and investment returns. An actuarial valuation sets out a schedule of future contributions that will deal with this deficiency in an orderly fashion.

The method used to determine the incidence of the contributions in various years is called the actuarial cost method. Under an actuarial cost method, the contributions required to meet the difference between current assets and current liabilities are allocated each year between two elements: (1) the normal cost rate and (2) the unfunded actuarial accrued liability contribution rate.

The term "fully funded" is often applied to a system in which contributions at the normal cost rate are sufficient to pay for the benefits of existing employees as well as for those of new employees. More often than not, systems are not fully funded, either because of past benefit improvements that have not been completely funded or because of actuarial deficiencies that have occurred because experience has not been as favorable as anticipated. Under these circumstances, an unfunded actuarial accrued liability (UAAL) exists. Likewise, when the actuarial value of assets is greater than the actuarial accrued liability, a surplus exists.

### **Description of Contribution Rate Components**

The Entry Age Normal (EAN) actuarial cost method is used for the valuation. Under that method, the normal cost for each year from entry age to assumed exit age is a constant percentage of the member's year by year projected compensation. The portion of the present value of future benefits not provided by the present value of future normal costs is the actuarial accrued liability. The unfunded actuarial accrued liability/ (surplus) represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses.

In general, contributions are computed in accordance with a level percent-of-payroll funding objective. The contribution rate based on the April 30, 2011 actuarial valuation will be used to determine the actuarial required employer contribution rate to the Police Retirement System of Kansas City, Missouri for fiscal year end 2013. In this context, the term "contribution rate" means the percentage, which is applied to a particular active member payroll to determine the actual employer contribution amount (i.e., in dollars) for the group.

As of April 30, 2011, the actuarial accrued liability was greater than the valuation assets so an unfunded actuarial accrued liability (UAAL) exists. The Board elected to amortize the UAAL as a level percent of payroll over a closed initial period of 24 years beginning in 1998. A new amortization base is established each valuation date with a new 24-year amortization period. Effective with the 2008 valuation, active member payroll is assumed to increase 4.0% per year (previously 4.5%).



## SECTION 5 – EMPLOYER CONTRIBUTIONS

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### **Contribution Rate Summary**

In Table 10 the amortization payment related to the unfunded actuarial accrued liability/(surplus), as of April 30, 2011, is developed. Table 11 develops the actuarial contribution rate for the System. A historical summary of the actual and actuarial contribution rates for the City is shown in Table 12.

The contribution rates shown in this report are based on the actuarial assumptions and cost methods described in Appendix C.



**SECTION 5 – EMPLOYER CONTRIBUTIONS**

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**TABLE 10**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**APRIL 30, 2011 VALUATION**

**DERIVATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY  
CONTRIBUTION RATE**

1. Actuarial Accrued Liability	\$	940,609,092
2. Actuarial Value of Assets	\$	715,764,084
3. Unfunded Actuarial Accrued Liability/ (Surplus)	\$	224,845,008
4. Amortization Payment Including Expected Shortfall	\$	20,026,747
5. Total Projected Payroll for FY 2013	\$	91,982,770
6. Amortization Payment as a Percent of Payroll		21.77%



**SECTION 5 – EMPLOYER CONTRIBUTIONS**

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**TABLE 11**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**EMPLOYER CONTRIBUTION RATES**

	Valuation Date	
	4/30/2011	4/30/2010
Normal Cost		
Service pensions	17.93%	18.56%
Pre-retirement death pensions	0.49%	0.54%
Disability pensions	3.74%	3.84%
Termination benefits	1.93%	1.94%
Supplemental retirement benefit	1.07%	0.92%
Administrative expenses	0.40%	0.40%
Total Normal Cost	25.57%	26.20%
Total UAAL Amortization payment	21.77%	18.10%
Total Actuarial Contribution Rate	47.34%	44.30%
Member Portion	10.55%	10.55%
City Portion	36.79%	33.75%



**TABLE 12**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**COMPUTED AND ACTUAL CITY CONTRIBUTIONS COMPARATIVE STATEMENT**

Fiscal Year Beginning <u>May 1</u>	Valuation Date <u>April 30</u>	Projected Annual Payroll	Fiscal Year Contributions				
			As a % of Projected Pay		\$ Contributions		
			<u>Annual Required Contribution</u>	<u>Reported FY City Contribution</u>	<u>Annual Required Contribution</u>	<u>Projected FY City Contribution</u>	<u>Actual Dollar Contribution</u>
1998	1998	\$49,872,090	19.81 %	20.60 %	9,880,286	10,273,651	\$10,318,583
1999	1999	51,963,858	17.65	20.60	9,172,029	10,704,555	10,789,963
2000	2000	57,791,028	18.66	20.60	10,785,784	11,904,952	11,392,871
2001	2001	57,505,238	18.85	19.70	10,837,294	11,328,532	11,312,754
2002	2002	59,228,848	19.55	19.70	11,579,240	11,668,083	12,017,801
2003 *	2003	65,234,614	23.14	19.70	15,095,290	12,851,219	12,817,176
2004	2003	68,170,172	23.14	19.70	15,774,578	13,429,524	13,297,605
2005	2004	72,325,478	26.26	19.70	18,992,671	14,248,119	13,729,225
2006	2005	73,794,574	29.06	19.70	21,444,703	14,537,531	14,526,734
2007	2006	78,446,156	29.00	19.70	22,749,385	15,453,893	15,747,111
2008	2007	83,716,533	29.04	19.70	24,311,281	16,492,157	16,700,688
2009	2008	90,168,869	26.22	19.70	23,642,278	17,763,267	16,645,229
2010	2009	93,479,787	36.76	19.70	34,363,170	18,415,518	16,532,015
2011	2010	94,094,251	33.75	19.70	31,756,810	18,536,567	
2012 *	2011	91,982,770	36.79		33,840,461		

\*After changes in actuarial assumptions or methods.

Note: For years prior to 2011, information is shown from the prior actuary's report.



## SECTION 6 – ACCOUNTING INFORMATION

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The actuarial accrued liability is a measure intended to help the reader assess (i) a retirement system's funded status on a going concern basis, and (ii) progress being made toward accumulating the assets needed to pay benefits as due. Allocation of the actuarial present value of projected benefits between past and future service was based on service using the Entry Age Normal actuarial cost method. Assumptions, including projected pay increases, were the same as used to determine the System's level percent of payroll annual required contribution between entry age and assumed exit age. Entry age was established by subtracting credited service from current age on the valuation date.

The preceding methods comply with the financial reporting standards established by the Governmental Accounting Standards Board.

The Entry Age Normal actuarial accrued liability was determined as part of an actuarial valuation of the plan as of April 30, 2011. The actuarial assumptions used in determining the actuarial accrued liability can be found in Appendix C.



**SECTION 6 – ACCOUNTING INFORMATION**

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**TABLE 13**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**NOTES TO FINANCIAL STATEMENTS  
SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS**

Valuation Date	April 30, 2011
Actuarial cost method	Individual entry age
Amortization method for unfunded actuarial accrued liabilities	Level percent closed
Equivalent single amortization period	15 years
Asset valuation method	5-year smoothing of actual vs expected return on market value
Actuarial assumptions:	
Investment rate of return	7.75%
Projected salary increases including wage inflation at 4.0%	4.25% to 9.75%
Cost-of-living adjustments	3.0% simple

Membership of the plan consisted of the following at April 30, 2011, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	1,202
Inactive vested members entitled to but not yet receiving benefits*	20
Active plan members	<u>1,391</u>
Total	2,613

\*Note: Officers who are actively working and have 30 or more years of service are included with the inactive vested members entitled to a future benefit since they are currently not accruing benefits nor contributing to the system, but are entitled to a benefit in the future.



**SECTION 6 – ACCOUNTING INFORMATION**

**TABLE 14**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**

**REQUIRED SUPPLEMENTARY INFORMATION  
SCHEDULE OF FUNDING PROGRESS**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Accrued Liability (AAL) (b)</b>	<b>Unfunded AAL (UAAL) (b) - (a)</b>	<b>Funde d Ratio (a) / (b)</b>	<b>Active Member Covered Payroll** (c)</b>	<b>UAAAL as a Percentage of Active Member Covered Payroll [(b) - (a)] / (c)</b>
4/30/1998	\$433,090,523	\$493,183,065	\$60,092,542	88%	\$49,872,090	120%
4/30/1999	484,396,958	521,600,003	37,203,045	93%	\$51,963,858	72%
4/30/2000	584,514,972	589,566,248	5,051,276	99%	\$57,791,028	9%
4/30/2001	600,051,893	615,291,156	15,239,263	98%	\$57,505,238	27%
4/30/2002	620,948,986	648,632,789	27,683,803	96%	\$56,678,323	49%
4/30/2003 *	611,246,928	682,690,968	71,444,040	90%	\$62,425,468	114%
4/30/2004	603,418,620	712,273,616	108,854,996	85%	\$66,230,606	164%
4/30/2005	604,560,607	741,001,020	136,440,413	82%	\$67,575,902	202%
4/30/2006	635,621,582	775,271,985	139,650,403	82%	\$71,835,495	194%
4/30/2007	698,078,688	807,902,176	109,823,488	86%	\$80,111,515	137%
4/30/2008	742,060,223	850,763,745	108,703,522	87%	\$86,700,836	125%
4/30/2009	641,176,940	893,559,090	252,382,150	72%	\$89,884,411	281%
4/30/2010	722,464,003	915,463,037	192,999,034	79%	\$90,475,241	213%
4/30/2011 *	715,764,084	940,609,092	224,845,008	76%	\$88,444,971	254%

\* After changes in actuarial assumptions or methods.

\*\*For valuation years 2001 and prior, and 2007 and later, valuation payroll includes projected increases for year following valuation. For valuation years 2002 through 2006, valuation payroll is payroll reported in data after annualization of pays for new hires.

Note: Results for years prior to 2011 were taken from the prior actuary's report.

Analysis of the dollar amounts of actuarial value of assets, actuarial accrued liability, or unfunded actuarial accrued liability in isolation can be misleading. Expressing the actuarial value of assets as a percentage of the actuarial accrued liability provides one indication of the System's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the System is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan's funding. The unfunded actuarial accrued liability and annual covered payroll are both affected by inflation. Expressing the unfunded actuarial accrued liability as a percentage of covered payroll approximately adjusts for the





## SECTION 6 – ACCOUNTING INFORMATION

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effects of inflation and aids analysis of the progress being made in accumulating sufficient assets to pay benefits when due. Generally, the smaller this percentage, the stronger the plan's funding.



**TABLE 15**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**REQUIRED SUPPLEMENTARY INFORMATION**  
**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

<b>Fiscal Year Ending April 30</b>	<b>Annual Required Contribution</b>	<b>Percent Contribution</b>
1997	\$8,716,539	112%
1998	9,355,956	107%
1999	9,880,286	104%
2000	9,172,029	118%
2001	10,785,784	106%
2002	10,837,294	104%
2003	11,579,240	104%
2004 *	15,095,290	85%
2005	15,774,578	84%
2006	18,992,671	72%
2007	21,444,703	68%
2008	22,749,385	69%
2009	24,311,281	69%
2010	23,642,278	70%
2011	34,363,170	48%

\* After change in actuarial assumptions or methods.

Note: For years prior to 2011, information shown is from the prior actuary's report



SECTION 6 – ACCOUNTING INFORMATION

**TABLE 16**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**DEVELOPMENT OF ANNUAL PENSION COST AND NET PENSION OBLIGATION**  
**UNDER GASB STATEMENT NUMBER 27**

<b>Fiscal Year End</b>	<b>Annual Required Contribution (ARC) (a)</b>	<b>Interest on NPO (b)</b>	<b>ARC Adjustment (c)</b>	<b>Annual Pension Cost (APC) (d) = (a) + (b) - (c)</b>	<b>Annual Actual Contribution (e)</b>	<b>Change in NPO (f) = (d) - (e)</b>	<b>Net Pension Obligation (NPO) at End of Year (g) = sum of (f)</b>
1999	\$9,880,286	(\$828,641)	(\$619,583)	\$9,671,228	\$10,318,583	(\$647,355)	(\$11,339,498)
2000	9,172,029	(878,811)	(657,096)	8,950,314	10,789,963	(1,839,649)	(13,179,147)
2001	10,785,784	(1,021,384)	(763,699)	10,528,099	11,392,871	(864,772)	(14,043,919)
2002	10,837,294	(1,088,404)	(813,810)	10,562,700	11,312,754	(750,054)	(14,793,973)
2003	11,579,240	(1,146,533)	(889,665)	11,322,372	12,017,801	(695,429)	(15,489,402)
2004	15,095,290	(1,200,429)	(931,486)	14,826,347	12,817,176	2,009,171	(13,480,231)
2005	15,774,578	(1,044,718)	(810,661)	15,540,521	13,297,605	2,242,916	(11,237,315)
2006	18,992,671	(870,892)	(675,778)	18,797,557	13,729,225	5,068,332	(6,168,983)
2007	21,444,703	(478,096)	(370,984)	21,337,591	14,526,734	6,810,857	641,874
2008	22,749,385	49,745	38,609	22,760,521	15,747,111	7,013,410	7,655,284
2009	24,311,281	593,285	460,473	24,444,093	16,700,688	7,743,405	15,398,689
2010	23,642,278	1,193,398	971,445	23,864,231	16,645,229	7,219,002	22,617,691
2011	34,363,170	1,752,871	1,426,865	34,689,176	16,532,015	18,157,161	40,774,852
2012	31,756,810	3,160,051	2,572,332	32,344,529			

*Note: Results for years prior to FY 2012 were prepared by the prior actuary*



**SECTION 6 – ACCOUNTING INFORMATION**

**TABLE 17**  
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI**  
**SOLVENCY TEST**

Valuation Date	Entry Age Actuarial Accrued Liabilities			Valuation Assets	Portion of Actuarial Accrued Liabilities Covered by Reported Assets					
	(1)	(2)	(3)		(1)		(2)		(3)	
	Active Member Contributions	Retirees and Beneficiaries	Active Members (Employer Financed Portion)			%	%	%	%	%
2003*	\$46,015,271	\$436,805,624	\$199,870,073	\$611,246,928	100	%	100	%	64	%
2004	50,340,747	448,521,694	213,411,175	603,418,620	100		100		49	
2005	55,220,395	460,235,649	225,544,976	604,560,607	100		100		40	
2006	59,717,930	476,677,326	238,876,729	635,621,582	100		100		42	
2007	64,314,276	487,633,976	255,953,924	698,078,688	100		100		57	
2008	70,012,081	511,571,757	269,179,907	742,060,223	100		100		60	
2009	76,321,890	521,607,916	295,629,284	641,176,940	100		100		15	
2010	81,310,956	526,521,860	307,630,221	722,464,003	100		100		37	
2011	86,306,128	537,670,377	316,632,587	715,764,084	100		100		29	

\* After changes in actuarial assumptions or methods.

Note: Results for years before 2011 were prepared by the prior actuary.



**APPENDIX A – SUMMARY OF MEMBERSHIP DATA**

**MEMBER DATA RECONCILIATION**

April 30, 2010 to April 30, 2011

*The number of members included in the valuation, as summarized in the table below, is in accordance with the data submitted by the System for members as of the valuation date.*

	<b>Active Participants</b>	<b>Retirees</b>	<b>Disableds</b>	<b>Beneficiaries</b>	<b>Inactive Vested</b>	<b>Total</b>
Members as of 04/30/2010	1,418	803	164	234	11	2,630
New Members	26	0	0	2	0	28
Rehires	0	0	0	0	0	0
Terminations						
Refunded	(23)	0	0	0	0	(23)
Inactive Vested	(9)	0	0	0	9	0
Retirements						
Service	(16)	16	0	0	0	0
Disability	(3)	0	3	0	0	0
Deaths						
Cashed Out/Payments Ended	0	0	0	(3)	0	(3)
With Beneficiary	(2)	(7)	(3)	12	0	0
Without Beneficiary	0	(11)	(2)	(6)	0	(19)
Data Adjustments						
<b>Members as of 04/30/2011</b>	<b>1,391</b>	<b>801</b>	<b>162</b>	<b>239</b>	<b>20</b>	<b>2,613</b>

*Note: Officers who have continued employment past 30 years of service are counted with the Inactive Vested members.*



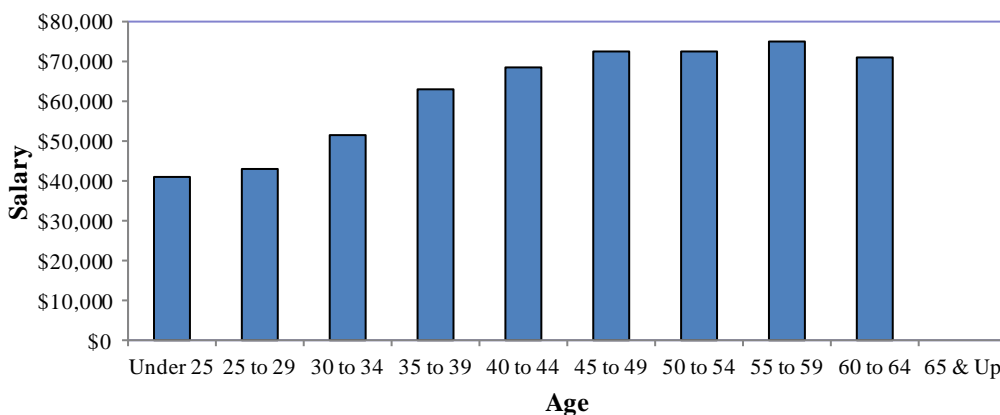
**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
SUMMARY OF ACTIVE MEMBERS  
as of April 30, 2011**

Age	Number			Annual Reported Compensation*		
	Male	Female	Total	Male	Female	Total
Under 25	10	1	11	\$ 409,159	\$ 40,522	\$ 449,682
25 to 29	133	22	155	5,703,493	951,071	6,654,565
30 to 34	216	32	248	11,134,844	1,627,049	12,761,893
35 to 39	238	46	284	14,991,936	2,878,114	17,870,050
40 to 44	281	33	314	19,309,034	2,147,771	21,456,805
45 to 49	201	29	230	14,530,230	2,119,490	16,649,720
50 to 54	78	22	100	5,658,638	1,611,757	7,270,395
55 to 59	35	6	41	2,592,591	487,545	3,080,136
60 to 64	6	2	8	425,823	143,420	569,243
65 & Up	0	0	0	0	0	0
<b>Total</b>	<b>1,198</b>	<b>193</b>	<b>1,391</b>	<b>\$ 74,755,748</b>	<b>\$ 12,006,739</b>	<b>\$ 86,762,488</b>

\* Compensation reported in the valuation data for the prior plan year with annualization of pay for new hires.

**Average Salary by Age**



Average age: 39.42  
 Average service: 12.66  
 Average salary: \$62,374

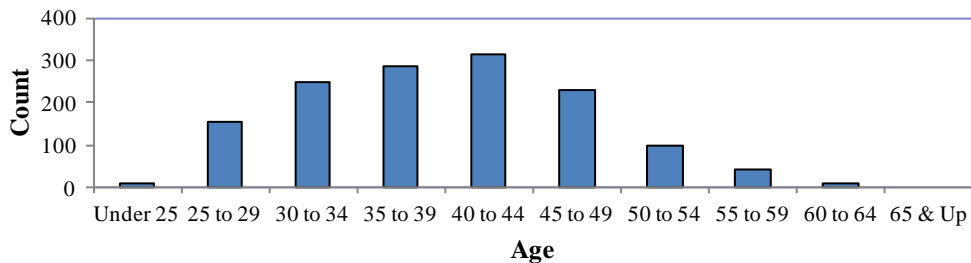


**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

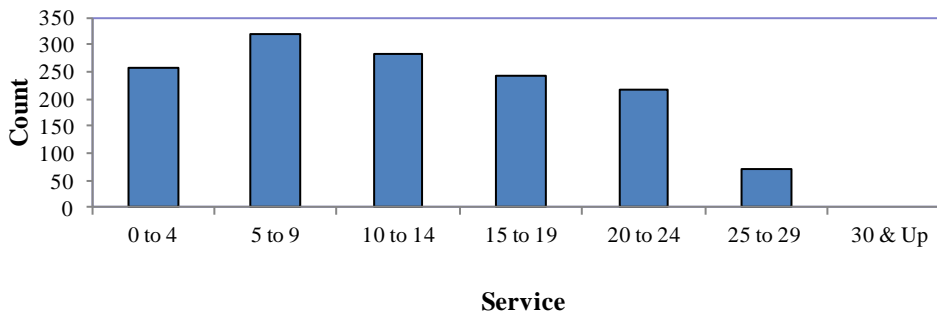
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
DISTRIBUTION OF ACTIVE MEMBERS  
as of April 30, 2011**

Age	Years of Service							Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 & Up	
Under 25	11	0	0	0	0	0	0	11
25 to 29	125	30	0	0	0	0	0	155
30 to 34	72	158	18	0	0	0	0	248
35 to 39	29	81	144	30	0	0	0	284
40 to 44	14	38	88	144	30	0	0	314
45 to 49	5	12	23	55	116	19	0	230
50 to 54	1	2	6	9	50	32	0	100
55 to 59	1	0	3	1	19	17	0	41
60 to 64	0	0	0	2	2	4	0	8
65 & Up	0	0	0	0	0	0	0	0
<b>Total</b>	<b>258</b>	<b>321</b>	<b>282</b>	<b>241</b>	<b>217</b>	<b>72</b>	<b>0</b>	<b>1,391</b>

**Age Distribution**



**Service Distribution**



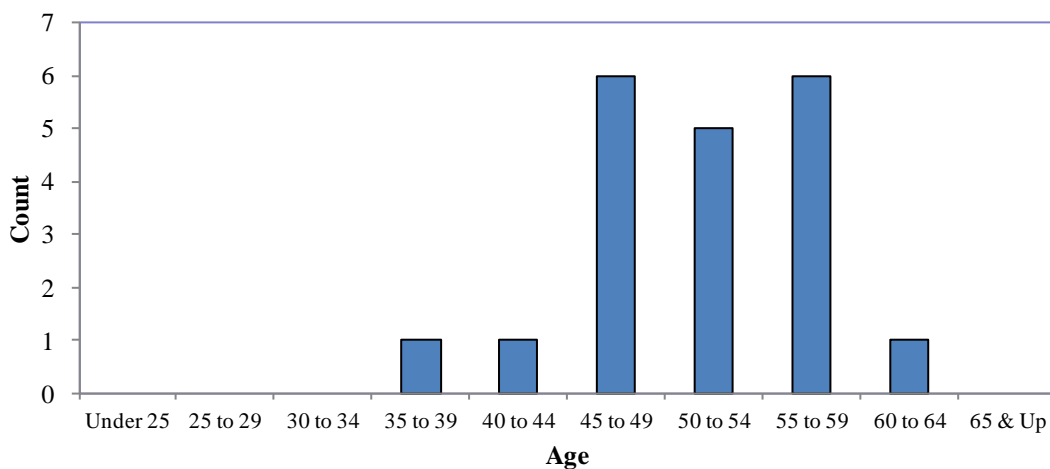


**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
SUMMARY OF INACTIVE VESTED MEMBERS  
as of April 30, 2011**

Age	Number			Current Monthly Benefit at Retirement		
	Male	Female	Total	Male	Female	Total
Under 25	0	0	0	\$ 0	\$ 0	\$ 0
25 to 29	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0
35 to 39	1	0	1	1,898	0	1,898
40 to 44	0	1	1	0	2,244	2,244
45 to 49	4	2	6	9,208	4,456	13,664
50 to 54	3	2	5	12,340	6,691	19,031
55 to 59	6	0	6	28,341	0	28,341
60 to 64	0	1	1	0	4,585	4,585
65 & Up	0	0	0	0	0	0
<b>Total</b>	<b>14</b>	<b>6</b>	<b>20</b>	<b>\$ 51,788</b>	<b>\$ 17,976</b>	<b>\$ 69,764</b>

**Age Distribution**







**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

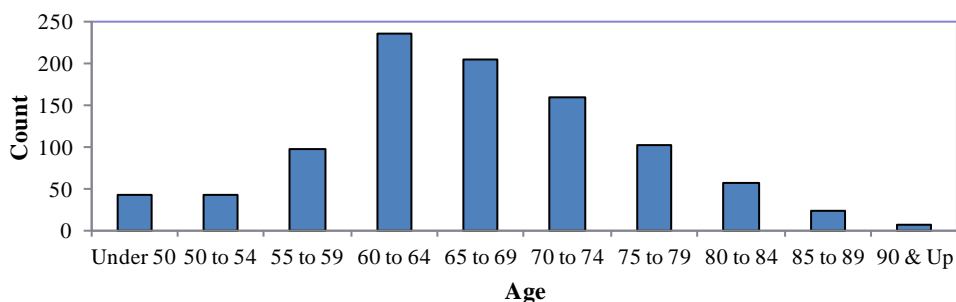
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
SUMMARY OF RETIRED MEMBERS  
as of April 30, 2011**

**Healthy & Disabled Retirees**

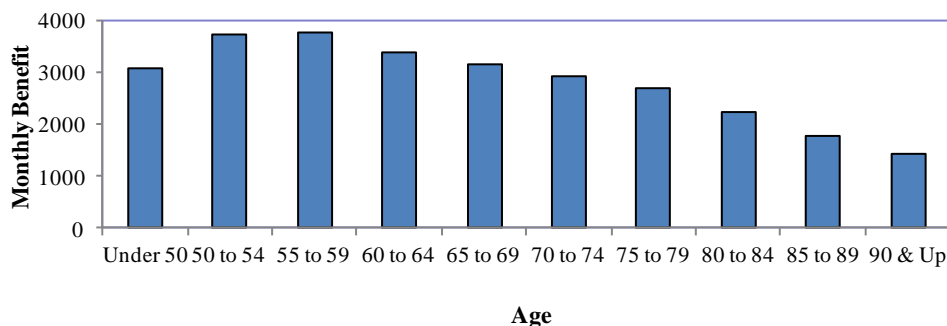
Age	Number			Monthly Benefit*		
	Male	Female	Total	Male	Female	Total
Under 50	31	10	41	\$ 94,492	\$ 32,141	\$ 126,633
50 to 54	32	10	42	123,099	32,813	155,912
55 to 59	72	24	96	279,781	83,851	363,632
60 to 64	220	16	236	747,468	55,216	802,684
65 to 69	199	4	203	629,192	14,434	643,626
70 to 74	157	1	158	457,752	2,663	460,414
75 to 79	101	0	101	270,651	0	270,651
80 to 84	56	0	56	125,467	0	125,467
85 to 89	24	0	24	42,749	0	42,749
90 & Up	5	1	6	7,185	1,433	8,619
<b>Total</b>	<b>897</b>	<b>66</b>	<b>963</b>	<b>\$ 2,777,836</b>	<b>\$ 222,551</b>	<b>\$ 3,000,387</b>

\*Does not include supplemental benefits

**Age Distribution**



**Average Benefit**





**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

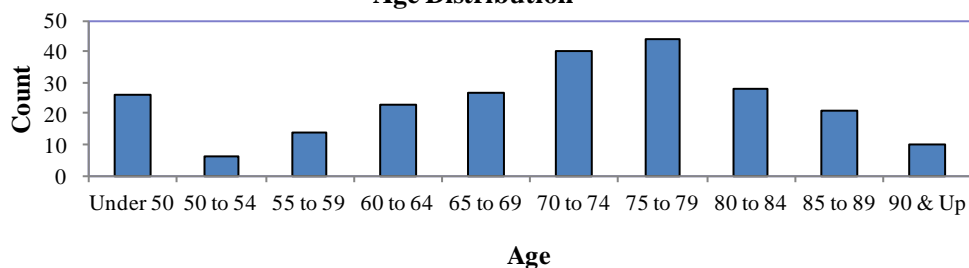
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
SUMMARY OF RETIRED MEMBERS  
as of April 30, 2011**

**Beneficiaries**

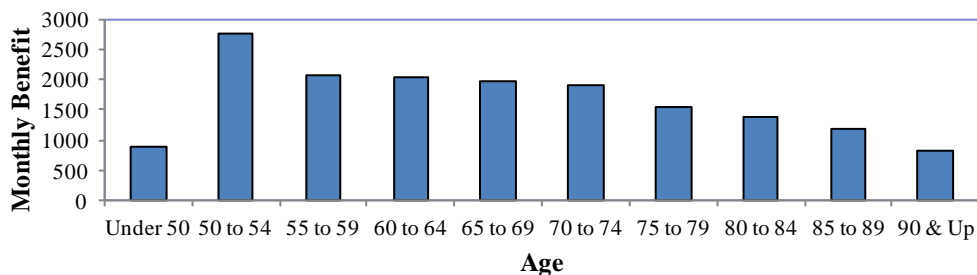
Age	Number			Monthly Benefit*		
	Male	Female	Total	Male	Female	Total
Under 50	11	15	26	\$ 6,189	\$ 17,071	\$ 23,260
50 to 54	0	6	6	0	16,578	16,578
55 to 59	1	13	14	600	28,268	28,868
60 to 64	1	22	23	1,505	45,043	46,548
65 to 69	0	27	27	0	53,224	53,224
70 to 74	0	40	40	0	75,965	75,965
75 to 79	0	44	44	0	68,212	68,212
80 to 84	0	28	28	0	38,751	38,751
85 to 89	0	21	21	0	24,518	24,518
90 & Up	0	10	10	0	8,376	8,376
<b>Total</b>	<b>13</b>	<b>226</b>	<b>239</b>	<b>\$ 8,293</b>	<b>\$ 376,005</b>	<b>\$ 384,299</b>

\*Does not include supplemental benefits

**Age Distribution**



**Average Benefit**





**APPENDIX A – SUMMARY OF MEMBERSHIP DATA (CONTINUED)**

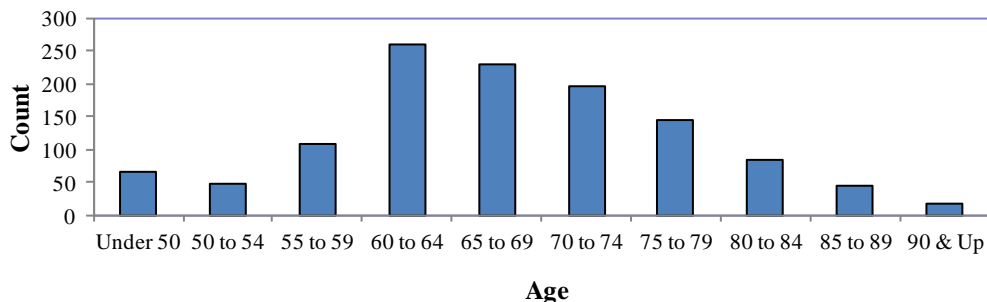
**POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI  
SUMMARY OF RETIRED MEMBERS  
as of April 30, 2011**

**Combined Retirees & Beneficiaries**

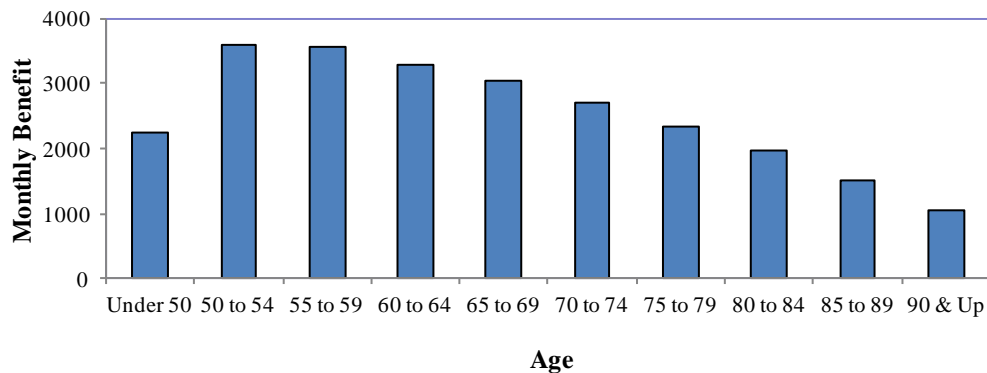
Age	Number			Monthly Benefit*		
	Male	Female	Total	Male	Female	Total
Under 50	42	25	67	\$ 100,681	\$ 49,212	\$ 149,893
50 to 54	32	16	48	123,099	49,390	172,490
55 to 59	73	37	110	280,381	112,119	392,500
60 to 64	221	38	259	748,973	100,259	849,232
65 to 69	199	31	230	629,192	67,659	696,851
70 to 74	157	41	198	457,752	78,628	536,380
75 to 79	101	44	145	270,651	68,212	338,862
80 to 84	56	28	84	125,467	38,751	164,218
85 to 89	24	21	45	42,749	24,518	67,267
90 & Up	5	11	16	7,185	9,809	16,995
<b>Total</b>	<b>910</b>	<b>292</b>	<b>1,202</b>	<b>\$ 2,786,129</b>	<b>\$ 598,556</b>	<b>\$ 3,384,685</b>

\*Does not include supplemental benefits

**Age Distribution**



**Average Benefit**





## APPENDIX B

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### POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI

#### SUMMARY OF BENEFIT PROVISIONS

##### **Membership**

All police officers who serve as law enforcement officers for compensation. Does not include police commissioners, reserve officers or civilian employees.

##### **Service Retirement**

***Eligibility*** - Age 60 with 10 or more years of service or 25 years of service, without regard to age. Members must retire at the completion of 32 years of service, or after attaining age 60, whichever occurs first. The Board of Police Commissioners may, however, with the recommendation of the Chief of Police, permit a member to continue in service until age 65, at which time the member must retire.

***Amount of Pension*** - For a member retiring prior to August 28, 2000, benefit equal to 2.0% of Final Compensation times years of creditable service, subject to a maximum benefit of 60% of final compensation.

For a member retiring on or after August 28, 2000, benefit equal to 2.5% of Final Compensation times years of creditable service, subject to a maximum benefit of 75% of Final Compensation.

***Final Compensation*** - Average annual compensation during the two years of service with the highest salary, whether consecutive or otherwise, or during the entire period of service if less than two years. No compensation for service after the thirtieth full year of membership service shall be included.

##### **Deferred Retirement (Vested Termination)**

***Eligibility*** - 15 years of creditable service.

***Amount of Pension*** - Computed as service retirement but based upon service, Final Compensation and benefit formula in effect at termination of employment. Benefit begins at age 55, (unreduced).

##### **Duty Disability**

***Eligibility*** - Payable to an active member, as the exclusive result of an accident or disease occurring in the line of duty, who has become permanently unable to perform the full and unrestricted duties of a police officer as established by the Board of Police Commissioners.

***Amount of Pension*** - 75% of Final Compensation payable for the remainder of the officer's life, or as long as the permanent disability continues. The pension may be subject to offset or reduction by amounts paid or payable under any Workers' Compensation law.



## **APPENDIX B (CONTINUED)**

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### **Non-Duty Disability**

***Eligibility*** - Payable to an active member who has 10 years of service and who has become permanently unable to perform the full and unrestricted duties of a police officer as established by the Board of Police Commissioners. Disability is not exclusively caused by the actual performance of official duties.

***Amount of Pension*** - 2.5% of Final Compensation multiplied by years of creditable service payable for the officer's lifetime or as long as the permanent disability continues.

### **Non-Duty Death in Service**

***Eligibility*** - Death while an active Police Officer but not resulting from the performance of duties as a police officer; no service requirement.

***Amount of Pension*** - 40% of Final Compensation payable to surviving spouse, if any, for their lifetime. If there is no surviving spouse, payable to an eligible child or children in equal shares until age 18. Children: \$600 annually for each child under age 18 years, if any, until the child reaches age 18 or age 21 if a full time student or if mentally or physically incapacitated from earning wages until incapacity no longer exists.

***Funeral Benefit*** - of \$1,000 is payable upon the death of the active member.

### **Duty Death in Service**

***Eligibility*** - Payable to surviving spouse, if any, or if no surviving spouse, to children under age 21 or children over age 21 if mentally or physically incapacitated. Death resulting from performance of duty as a Police Officer; no service requirement.

***Amount of Pension*** - In addition to benefits payable under non-duty death, a lump sum of \$50,000.

### **Death After Retirement**

***Eligibility*** - Payable to an eligible surviving spouse, if any, upon the death of a retired member. Benefit is payable until death of surviving spouse.

***Amount of Pension*** - Spouse's pension equals 80% of the straight life pension the deceased retirant was receiving. The 80% benefit amount calculated under this provision is in addition to the Supplemental Retirement Benefit.

***Funeral Benefit*** - of \$1,000 is payable upon the death of the retired member.



## **APPENDIX B (CONTINUED)**

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### **Non-Vested Termination**

*Eligibility* - termination of employment and no pension is or will become payable.

*Amount of Benefit* - refund of member's contributions without interest.

### **Minimum Pension Benefit**

*Eligibility* - Any member who retired entitled to a pension benefit and who either has at least 25 years of creditable service or is retired as a result of an injury or illness. A surviving spouse qualifies for the minimum monthly benefit if the officer had at least 25 years of creditable service, died in service, or was retired as a result of an injury or illness.

*Amount of Benefit* - Minimum monthly benefit of not less than \$600 in combined pension benefit and cost-of-living adjustments. The minimum monthly pension benefit is in addition to the Supplemental Retirement Benefit.

### **Post-Retirement Benefit Increases**

Dependent on the actuarial condition of the System, a member may receive during each year, in addition to the officer's base pension, a cost of living adjustment in an amount not to exceed 3% of the officer's base pension. Base pension is the pension computed under the provisions of the law at the date of retirement, without regard to the cost of living adjustment. The cost of living adjustment also applies to benefits being paid to a surviving spouse. The adjustment is normally effective with the May 31st benefit payment. The liabilities in this report assume a 3% ad hoc COLA will be granted in each future year.

### **Member Contributions**

10.55% of base pay. No contributions are required for members after they retire or complete 30 years of service.

### **Supplemental Retirement Benefit**

Current and future retired and disabled members and their surviving spouses are eligible to receive \$420 per month in addition to pension benefits.

### **Optional Form of Benefit Payment**

Members retiring with at least 26 or more years of service may elect to take a portion of their benefit as a lump-sum distribution (PLOP). Members electing PLOP will receive an actuarially reduced monthly benefit for their lifetime.



## POLICE RETIREMENT SYSTEM OF KANSAS CITY, MISSOURI

### ACTUARIAL COST METHOD AND ASSUMPTIONS

#### Actuarial Cost Method

The actuarial cost method is a procedure for allocating the actuarial present value of pension benefits and expenses to time periods. The method used for the valuation is known as the Entry Age Normal actuarial cost method, and has the following characteristics.

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered compensation.

The Entry Age Normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's assumed pensionable compensation rates between the entry age of the member and the assumed exit ages. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called actuarial accrued liability. Deducting actuarial assets from the actuarial accrued liability determines the unfunded actuarial accrued liability or (surplus). The difference in the actual and expected UAAL is set up as a separate base each year, which is amortized over a closed 24 year period.

#### Asset Valuation Method

The Board adopted a new asset smoothing method effective with the April 30, 2011 valuation. Under the new methodology, the difference between the actual and assumed investment return on the market value of assets is recognized evenly over a five year period. No corridor is used with the new method. The change to a new asset smoothing method was implemented by resetting the actuarial value of assets at April 30, 2011 equal to the market value of assets. The prior method smoothed the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets and applied a corridor of 80% to 120% of market value.

#### Actuarial Assumptions

The assumptions and the methods comply with the requirements of Statement No. 25 of the Governmental Accounting Standards Board. Valuations beginning with the April 30, 2008 actuarial valuation include assumptions and methods resulting from the experience study covering the 5-year period from May 1, 2002 to April 30, 2007.



**APPENDIX C (CONTINUED)**

**ECONOMIC ASSUMPTIONS**

*Investment return:* 7.75% per year, compounded annually.

*Pay increase assumption:* Rates for sample years of service are shown below.

<u>Years of Service</u>	<u>Annual Rate of Pay Increase</u>		
	<u>General Wage Growth</u>	<u>Merit and Longevity</u>	<u>Total</u>
0	4.0%	5.75%	9.75%
1	4.0%	5.50%	9.50%
2	4.0%	4.50%	8.50%
3	4.0%	4.00%	8.00%
4	4.0%	4.00%	8.00%
5	4.0%	4.00%	8.00%
10	4.0%	3.50%	7.50%
15	4.0%	0.00%	4.00%
20	4.0%	0.00%	4.00%
25	4.0%	0.00%	4.00%

*Price inflation:* 3.0% per year, compounded annually.

*Active member payroll growth:* 4.0% per year, compounded annually.

***Mortality Tables:***

Healthy Retirees: RP-2000 Healthy Annuitant Table using Scale AA to model future mortality improvement.

Disabled Retirees: RP-2000 Healthy Annuitant Table set forward 5 years using Scale AA to model future mortality improvement.

Actives: RP-2000 Employee Table using Scale AA to model future mortality improvement.

***Rates of termination from active membership:***

<u>Sample Ages</u>	<u>% of Active Members Terminating Within Next Year</u>	
	<u>Male</u>	<u>Female</u>
25	5.8%	6.3%
30	3.8%	5.0%
35	2.4%	3.5%
40	1.6%	1.6%
45	1.1%	0.5%
50	0.6%	0.0%





**APPENDIX C (CONTINUED)**

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The rates do not apply to members eligible to retire and do not include separation on account of death or disability. All vested members are assumed to leave their contribution with the System and receive a deferred benefit.

***Rates of Disability:***

<u>Sample Ages</u>	<u>% of Active Members Becoming Disabled Within Next Year</u>	
	<u>Male</u>	<u>Female</u>
30	0.062%	0.134%
35	0.312%	0.672%
40	0.416%	0.896%
45	0.437%	0.941%
50	0.759%	1.635%
55	1.456%	3.136%
60	2.579%	5.555%

55% of disabilities are assumed to be duty related

***Rates of Retirement:***

<u>Active Members Retiring Within Next Year</u>	
<u>Years of Service</u>	<u>Percent Retiring</u>
25	25%
26	25%
27	25%
28	25%
29	25%
30	35%
31	55%
32	100%

Members actively working with more than 30 years of service are assumed to retire in one year or at attainment of 32 years of service, if sooner.

Inactive vested members are assumed to retire at age 55.



## APPENDIX C (CONTINUED)

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### Miscellaneous and Technical Assumptions

<i>Marriage Assumption:</i>	85% of males and 55% of females are assumed to be married for purposes of death-in-service benefits and death-after-retirement benefits. Males are assumed to be 3 years older than their spouses. Actual reported data is utilized for retirees and beneficiaries.
<i>Pay Increase Timing:</i>	Assumed to occur at the start of the fiscal year.
<i>Pay Annualization:</i>	Reported pays for members with less than 1 year of service were annualized for valuation purposes.
<i>Decrement Timing:</i>	Decrements of all types are assumed to occur mid-year.
<i>Eligibility Testing:</i>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year at the start of the year in which the decrement is assumed to occur.
<i>Benefit Service:</i>	Service calculated to the nearest month, as of the decrement date, is used to determine the amount of benefit payable.
<i>Child Beneficiaries:</i>	None assumed.
<i>Other:</i>	Turnover decrement does not operate during retirement eligibility.
<i>Form of Payment:</i>	The assumed normal form of payment is a 80% joint and survivor annuity, if married. Otherwise, a single life annuity.
<i>Administrative Expense:</i>	0.40% of payroll each year. Administrative expenses beyond this allocation and all investment expenses are assumed to be funded by investment return in excess of the actuarial assumed rate of return.
<i>Cost of Living Adjustment:</i>	It was assumed the Retirement Board will grant the full 3% cost of living adjustment each year.



## GLOSSARY OF TERMS

<b>Actuarial Accrued Liability</b>	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as "accrued liability" or "actuarial liability."
<b>Actuarial Assumptions</b>	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement 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.
<b>Accrued Service</b>	Service credited under the system which was rendered before the date of the actuarial valuation.
<b>Actuarial Equivalent</b>	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 assumptions.
<b>Actuarial Cost Method</b>	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefit between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
<b>Experience Gain (Loss)</b>	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
<b>Actuarial Present Value</b>	The amount of funds currently 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.
<b>Amortization</b>	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
<b>Normal Cost</b>	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.
<b>Unfunded Actuarial Accrued Liability</b>	<p>The difference between actuarial accrued liability and the valuation assets.</p> <p>Most retirement systems have an unfunded actuarial accrued liability. They arise each time new benefits are added and each time an actuarial loss is realized.</p> <p>The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liability and the trend in its amount.</p>