

**THE POLICE AND FIRE RETIREMENT SYSTEM OF THE  
CITY OF DETROIT**  
70TH ANNUAL ACTUARIAL VALUATION  
JUNE 30, 2011

# OUTLINE OF CONTENTS

---

<b>Pages</b>	<b>Items</b>
1	Cover letter
	<b>Valuation Results</b>
2	COMPUTED EMPLOYER CONTRIBUTION RATES
3	Actuarial accrued liabilities
4	Comparative statement
5	Solvency tests
6	History of assets and liabilities (graph)
7	Experience gain/loss
8	Active members & valuation payroll comparative statement
9	Retired members & annual allowances comparative statement
10-11	Active members & retirees (graph)
12-13	COMMENTS AND CONCLUSION
	<b>Data Furnished for Valuation</b>
14-16	Summary of benefit provisions
17	Reported assets
18	Funding value of assets
19-22	Member data included in valuation
	<b>Actuarial Disclosures Required by Statement No. 25 of the Governmental Accounting Standards Board</b>
23-24	GASB Statement No. 25
	<b>Financial Principles</b>
25 L	Financing diagram
25 R	Actuarial valuation process
26-27	Financial objective
	<b>Appendix</b>
28-33	Summary of assumptions used in actuarial valuation
34	Meaning of unfunded actuarial accrued liabilities
35-36	Glossary

May 2, 2012

Board of Trustees  
The Police and Fire Retirement System of the City of Detroit

The results of the **70th Annual Actuarial Valuation** of the annuity and pension liabilities of the Police and Fire Retirement System of the City of Detroit are presented in this report. The purpose of the valuation was to measure the system's funding progress, to determine contribution rates for the 2012 fiscal year in accordance with the established funding policy, and to determine actuarial information for Governmental Accounting Standards Board (GASB) Statements No. 25 and No. 27. The results of the valuation may not be applicable for other purposes.

The date of the valuation was **June 30, 2011**.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and 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 provisions or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

The actuarial assumptions used in the valuation are summarized in the Appendix. Benefit provisions are summarized on pages 14-16. The statistical data concerning the active, inactive and retired persons covered by the System was furnished by the retirement system staff, together with needed financial information. Data was checked for year-to-year consistency, but was not otherwise audited by the actuary.

**Your attention is directed particularly** to the employer contribution rates on page 2 and the comments on pages 12 and 13.

This report has been prepared by actuaries who have substantial experience valuing public sector retirement systems. To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board of the American Academy of Actuaries. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

Board of Trustees  
May 2, 2012  
Page 2

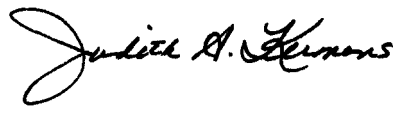
One or more of the signing actuaries are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The intended audience is the Board of Trustees for the Police and Fire Retirement System of the City of Detroit and their staff. If supplied to other parties, the report should be supplied in its entirety. The authors of this report are available to answer questions from the Board and Staff as needed.

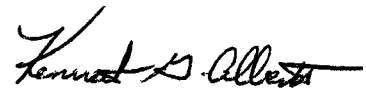
Respectfully submitted,



Norman L. Jones, FSA, MAAA



Judith A. Kermans, EA, MAAA



Kenneth G. Alberts

NLJ:lr

---

## **VALUATION RESULTS**

---

**EMPLOYER CONTRIBUTION RATES  
COMPUTED PAYABLE LAST DAY OF FISCAL YEAR  
EXPRESSED AS PERCENTS OF ACTIVE MEMBER PAYROLL  
2012-2013 FISCAL YEAR**

---

Contributions for	Contributions Expressed as Percents of Payroll for the Fiscal Year Ending June 30,	
	2013	2012
<b>Normal Cost</b>		
Age & service allowances	21.09 %	21.22 %
Disability allowances	3.71 %	3.72 %
Death-in-service allowances	0.38 %	0.38 %
Total	25.18 %	25.32 %
Members current contributions #	3.45 %	3.55 %
(Future refunds)	(0.38)%	(0.38)%
Available for monthly benefits	3.07 %	3.17 %
<b>Employer Normal Cost</b>	<b>22.11 %</b>	<b>22.15 %</b>
<b>Actuarial Accrued Liabilities</b>		
Total (\$ millions)	\$3,808.6	\$3,767.4
Funding Value of Assets	3,804.8	3,853.3
Unfunded Actuarial Accrued Liabilities		
- dollar (millions)	\$ 3.8	\$ (85.9)
- amortization percent +	0.16 %	0.00 %
<b>Computed Employer Rate ##</b>	<b>22.27 %</b>	<b>22.15 %</b>
<b>Computed Employer Rate with Interest Adjustment *</b>	<b>23.14 %</b>	<b>23.02 %</b>
<b>Estimated Dollars (\$ million)</b>	<b>\$ 51.0</b>	<b>\$ 52.7</b>

# Member statutory contributions of 5% to the Annuity Savings Fund are not payable during all periods of covered employment. The rate shown is the equivalent rate if paid during all covered employment.

## Accrued employer contributions were assumed to be charged with interest at 8.0% from the date accrued to the actual date paid.

+ Based on the Board of Trustees funding policy to continue full normal cost contributions when valuation assets exceed accrued liabilities and the use of a closed 30-year level dollar amortization period when accrued liabilities exceed assets.

\* Computed Employer Rate if paid at end of year.

## ACTUARIAL ACCRUED LIABILITIES AS OF JUNE 30, 2011

Present Value, June 30	Amount
<b>Accrued Pension Liabilities</b>	
Retirees and beneficiaries	\$2,707,482,305
Inactive members future deferred pensions	15,000,000
Active members	847,047,044
Total accrued pension liabilities	3,569,529,349
Pension fund balances	3,565,646,684
Unfunded accrued pension liabilities	\$ 3,882,665
<b>Accrued Annuity Liabilities</b>	
Retirees and beneficiaries	
Future annuities	\$ 4,879,713
Reserve for outstanding refunds & contingencies	4,567,440
Total #	\$ 9,447,153
Members annuities & future refunds	229,666,031
Total accrued annuity liabilities	239,113,184
Annuity fund balances	239,113,184
Unfunded accrued annuity liabilities	\$ 0
<b>System Totals</b>	
Actuarial accrued liabilities	\$3,808,642,533
Accrued assets	3,804,759,868
Unfunded actuarial accrued liabilities	\$ 3,882,665

# After \$22 million reserve transfer from ARF to PAF. See Comments on page 12 for additional details.

**VALUATION RESULTS - COMPARATIVE STATEMENT**  
**- - \$ IN MILLIONS - -**

June 30	Active Payroll		Actuarial Accrued Liabilities			Unfunded / Active Pays	Employer Contributions % of Pays
	Total	Average	Computed Total	Valuation Assets	Unfunded		
1986	\$ 185.3	\$29,220	\$2,171.5	\$1,378.5	\$ 793.0	4.3	50.21%
1987	202.3	30,906	2,238.2	1,557.0	681.2	3.4	44.69%
1988	206.1	33,120	2,386.0	1,705.4	680.6	3.3	45.71%
1989(a)	208.4	33,179	2,327.9	1,848.9	479.0	2.3	36.52%
1990*	221.5	36,874	2,453.6	2,037.4	416.2	1.9	35.98%
1991	213.1	39,182	2,517.2	2,085.5	431.7	2.0	36.19%
1992(a)*	205.7	39,095	2,345.9	2,163.8	182.1	0.9	27.83%
1993(a)	204.3	38,846	2,493.2	2,256.0	237.2	1.2	28.97%
1994	199.7	38,693	2,486.2	2,304.4	181.8	0.9	27.64%
1995(a)	209.7	39,692	2,574.2	2,443.0	131.2	0.6	25.90%
1996	212.7	39,965	2,633.4	2,628.6	4.8	0.0	21.81%
1997(b)	217.6	40,145	2,724.1	2,944.2	(220.1)	-	7.32%
1998*#	217.5	40,772	2,976.8	3,325.9	(349.1)	-	26.16%
1999#@	216.0	40,542	3,274.1	3,668.4	(394.3)	-	26.17%
2000*#	237.7	43,376	3,342.1	3,964.2	(622.1)	-	27.25%
2001#	253.3	45,353	3,463.2	3,900.0	(436.8)	-	27.22%
2002(a)#	248.7	46,203	3,632.0	3,635.1	(3.1)	-	23.39%
2003	248.7	47,305	3,721.6	3,205.5	516.1	2.1	43.89%
2004	258.7	51,126	3,857.5	3,074.5	783.0	3.0	54.36%
2005	250.5	52,197	3,780.4	3,757.9	22.5	0.1	25.98%
2006+&	228.1	52,908	3,809.0	3,980.3	(171.3)	-	25.09%
2007+	230.2	54,647	3,870.7	4,307.2	(436.5)	-	25.16%
2007+*	230.2	54,647	3,896.8	4,307.2	(410.4)	-	26.71%
2008+	232.8	57,090	3,992.4	4,316.3	(323.9)	-	26.75%
2008+(a)	232.8	57,090	4,071.1	4,316.3	(245.2)	-	26.27%
2009	231.8	57,418	4,221.3	3,945.2	276.1	1.2	35.22%
2010	228.8	57,322	4,180.1	3,412.8	767.3	3.4	49.75%
2010(a)	228.8	57,322	3,987.5	3,853.3	134.2	0.6	28.90%
2010(a)*	228.8	57,322	3,767.4	3,853.3	(85.9)	-	23.02%
2011	220.5	57,773	3,808.6	3,804.8	3.8	0.0	23.14%

(a) After changes in actuarial assumptions and/or methods.

(b) After changes in actuarial assumptions and a temporary full funding credit.

\* After Plan Amendments.

# Employer normal cost before full funding credit.

@ After \$55.4 million reserve for 1998-99 13<sup>th</sup> check and ASF distributions.

+ Based on the Board of Trustees funding policy to continue full normal cost contributions when valuation assets exceed accrued liabilities.

& 2006 assets were revised following the 6/30/2006 valuation.



## SOLVENCY TESTS

The Police and Fire Retirement System of the City of Detroit funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will pay all promised benefits when due -- the ultimate test of financial soundness. Testing for level contribution rates is *the long-term solvency test*.

A *short-term solvency test* is one means of checking a system's progress under its funding program. In a short-term solvency test, the plan's present assets (cash and investments) are compared with:

- 1) Active member contributions on deposit;
- 2) The liabilities for future benefits to present retired lives;
- 3) The liabilities for service already rendered by active members.

In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for active member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by active members (liability 3) will often be partially covered by the remainder of present assets. The larger the funded portion of liability 3, the stronger the condition of the System.

### *Short-Term Solvency Test 5 Year Comparative Statement (\$ millions)*

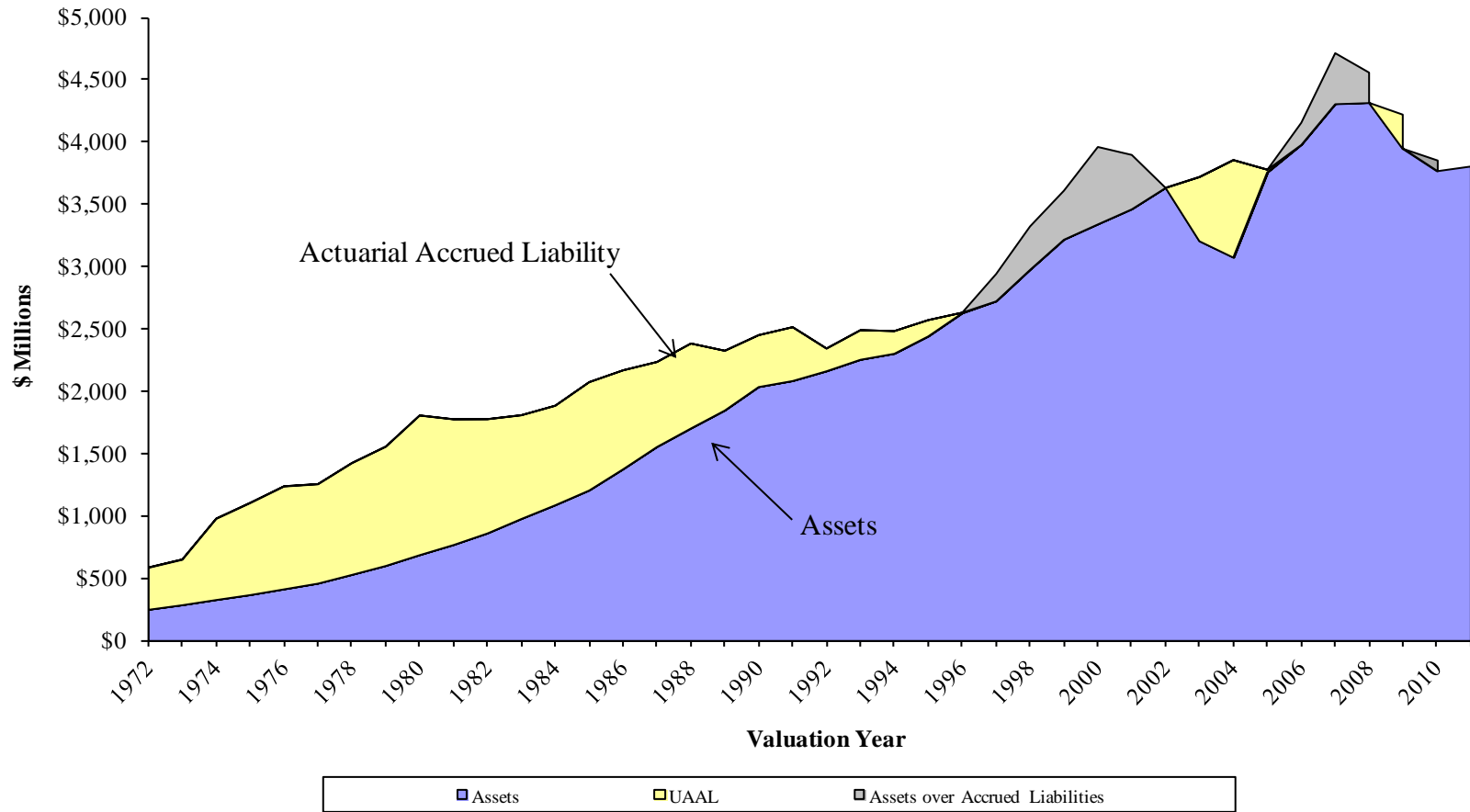
June 30	Actuarial Accrued Liabilities			Funding Value of Assets	Portion of Accrued Liabilities Covered by Assets			
	(1) Active Member Contr.	(2) Retirees and Benef.	(3) Present Members (Employer Financed Portion)		(1)	(2)	(3)	Total
		----- \$ Millions -----						
2007(a)	\$ 261	\$ 2,689	\$ 947	\$ 4,307	100%	100%	143%	111%
2008(a)	268	2,793	1,010	4,316	100%	100%	124%	106%
2009	301	2,837	1,083	3,945	100%	100%	75%	93%
2010#(a)	298	2,743	726	3,853	100%	100%	112%	102%
2011	230	2,717	861	3,805	100%	100%	100%	100%

(a) After changes in benefit provisions.

& 2006 assets were revised following the 6/30/2006 valuation.

# After changes in actuarial assumptions and/or methods.

# ASSETS AND ACCRUED LIABILITIES



**DERIVATION OF EXPERIENCE GAIN (LOSS)  
YEAR ENDED JUNE 30, 2011**

---

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses will often cancel each other over a period of years, but sizable year to year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below.

(1) UAAL* at start of year	\$(85,915,180)
(2) Employer and employee normal cost from last valuation	58,809,310
(3) Actual employer and employee contributions	92,096,017
(4) Interest accrual: (1) x .080	(6,873,214)
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	(126,075,101)
(6) Change due to benefit provision modifications	0
(7) Change due to revised actuarial methods and/or assumptions	0
(8) Asset Method Change	0
(9) Expected UAAL after changes: (5) + (6) + (7) + (8)	(126,075,101)
(10) Actual UAAL at end of year	3,882,665
(11) Experience gain (loss): (9) - (10)	(129,957,766)
(12) Experience gain (loss) as a % of beginning of year accrued liability	(3.4)%
(13) Experience gain (loss)	(129,957,766)
(14) Gain (loss) due to investment experience	(93,981,660)
(15) Gain (loss) from other sources	(35,976,106)

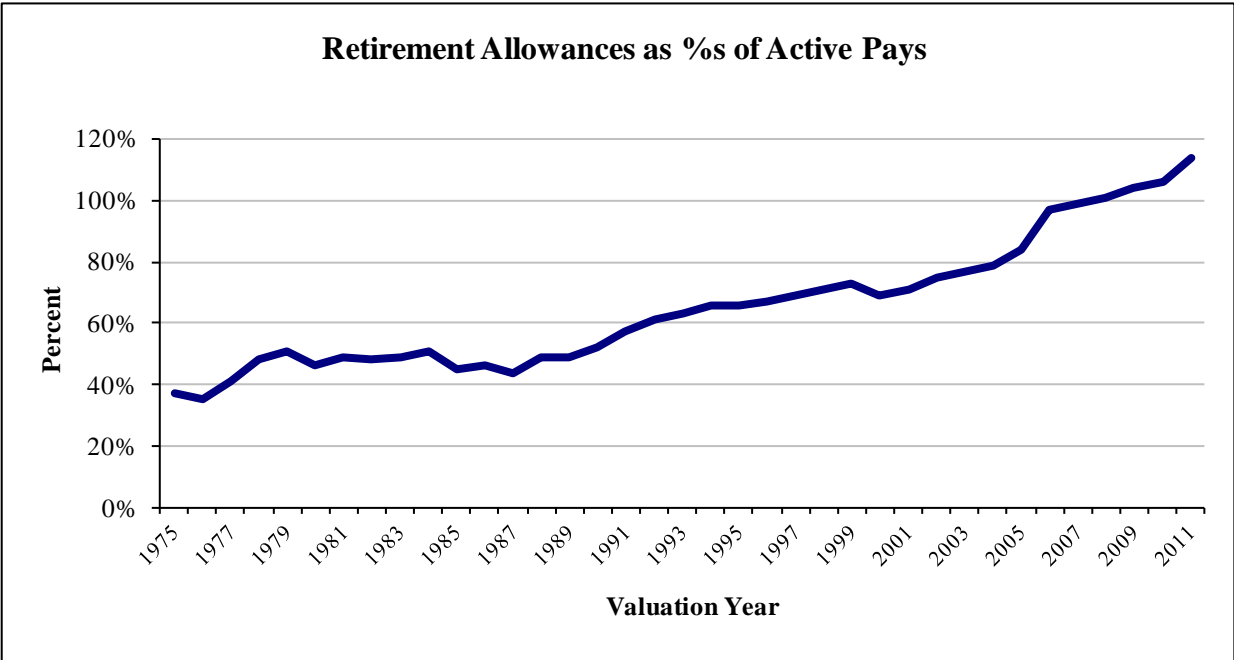
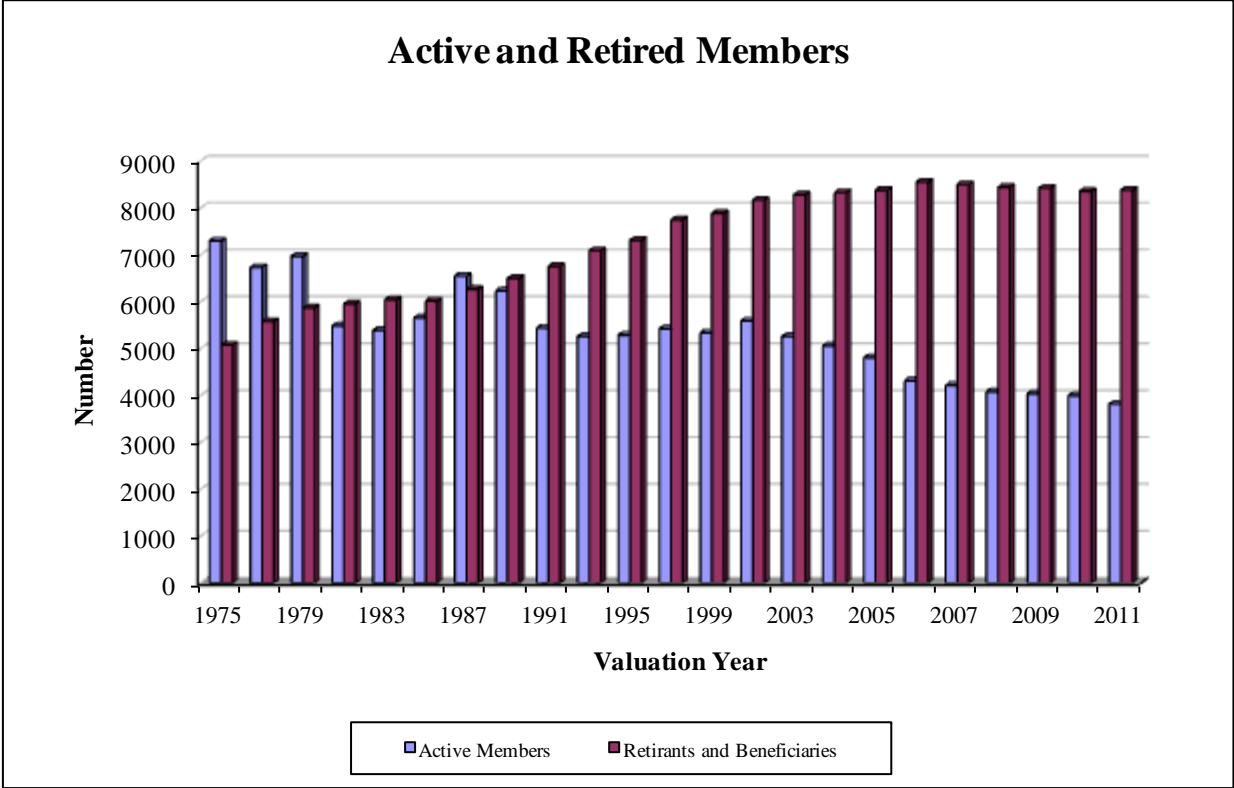
\* *Unfunded actuarial accrued liability.*

**COMPARATIVE STATEMENT OF ACTIVE MEMBERS  
AND VALUATION PAYROLL**

June 30	No. Members		Total Members					
	1969 Plan	Pre- 1969	No.	% Change	Ratio of Active to Retired	Annual Payroll	Average Pay	
							\$	Change
1977	3,463	3,265	6,728	3 %	1.2	\$134,639,135	\$20,012	1.3 %
1978	4,432	2,911	7,343	9 %	1.3	164,975,236	22,467	12.3 %
1979	4,230	2,739	6,969	(5)%	1.2	175,174,674	25,136	11.9 %
1980	3,719	2,640	6,359	(9)%	1.1	178,004,349	27,993	11.4 %
1981	2,991	2,491	5,482	(14)%	0.9	155,849,804	28,429	1.6 %
1982	3,185	2,299	5,484	0 %	0.9	155,372,732	28,332	(0.3)%
1983	3,176	2,214	5,390	(2)%	0.9	153,347,716	28,450	0.4 %
1984	3,070	2,139	5,209	(3)%	0.9	148,223,416	28,455	0.0 %
1985	3,657	1,998	5,655	9 %	0.9	171,357,741	30,302	6.5 %
1986	4,463	1,879	6,342	12 %	1.0	185,312,563	29,220	(3.6)%
1987	4,918	1,627	6,545	3 %	1.0	202,277,028	30,906	5.8 %
1988	4,776	1,447	6,223	(5)%	1.0	206,107,980	33,120	7.2 %
1989	4,942	1,338	6,280	1 %	1.0	208,361,567	33,179	0.2 %
1990	4,834	1,174	6,008	(4)%	0.9	221,538,387	36,874	11.1 %
1991	4,372	1,066	5,438	(9)%	0.8	213,072,553	39,182	6.3 %
1992	4,411	850	5,261	(3)%	0.8	205,681,412	39,095	(0.2)%
1993	4,534	725	5,259	0 %	0.7	204,289,195	38,846	(0.6)%
1994	4,578	584	5,162	(2)%	0.7	199,734,550	38,693	(0.4)%
1995	4,779	505	5,284	2 %	0.7	209,733,734	39,692	2.6 %
1996	4,889	432	5,321	1 %	0.7	212,656,401	39,965	0.7 %
1997	5,049	371	5,420	2 %	0.7	217,585,229	40,145	0.5 %
1998	5,018	316	5,334	(2)%	0.7	217,479,443	40,772	1.6 %
1999	5,099	230	5,329	0 %	0.7	216,049,687	40,542	(0.6)%
2000	5,291	190	5,481	3 %	0.7	237,741,560	43,376	7.0 %
2001	5,453	132	5,585	2 %	0.7	253,297,027	45,353	4.6 %
2002	5,290	92	5,382	(4)%	0.7	248,663,133	46,203	1.9 %
2003	5,181	76	5,257	(2)%	0.6	248,681,461	47,305	2.4 %
2004	5,007	53	5,060	(4)%	0.6	258,699,581	51,126	8.1 %
2005	4,768	31	4,799	(5)%	0.6	250,491,872	52,197	2.1 %
2006	4,298	14	4,312	(10)%	0.5	228,140,160	52,908	1.4 %
2007	4,204	8	4,212	(2)%	0.5	230,173,964	54,647	3.3 %
2008	4,071	7	4,078	(3)%	0.5	232,812,606	57,090	4.5 %
2009	4,030	7	4,037	(1)%	0.5	231,795,528	57,418	0.6 %
2010	3,985	7	3,992	(1)%	0.5	228,829,999	57,322	(0.2)%
2011	3,809	7	3,816	(4)%	0.5	220,461,691	57,773	0.8 %

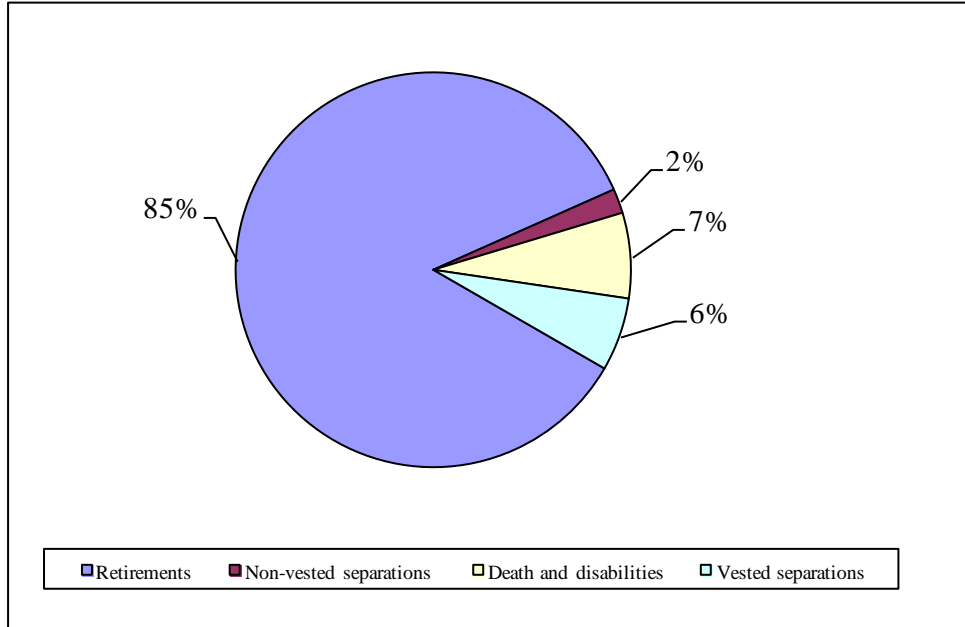
**COMPARATIVE STATEMENT OF ANNUAL RETIREMENT ALLOWANCES  
BEING PAID RETIREES AND BENEFICIARIES**

June 30	No. Retired		% of Current Allowances			Current Allowances		Allowances as a % of Payroll
	Pre-69	Total	Annuities	Pensions	Escalators	Total	Average	
1977	5,576	5,576	3.2%	52.0%	44.8%	\$ 51,040,761	\$ 9,154	38%
1978	5,760	5,760	2.8%	44.2%	53.0%	58,117,007	10,090	35%
1979	5,869	5,869	2.6%	51.3%	46.1%	61,355,273	10,454	35%
1980	5,676	5,911	2.1%	45.3%	52.6%	72,671,386	12,294	41%
1981	5,691	5,951	2.0%	46.7%	51.3%	74,565,233	12,530	48%
1982	5,709	6,006	2.0%	49.0%	49.0%	75,348,490	12,545	48%
1983	5,705	6,038	2.0%	50.8%	47.2%	75,774,552	12,550	49%
1984	5,641	5,986	1.9%	51.7%	46.4%	76,126,476	12,717	51%
1985	5,581	6,011	1.9%	54.0%	44.1%	70,776,660	12,773	45%
1986	5,585	6,117	1.6%	52.5%	45.9%	85,409,280	13,962	46%
1987	5,486	6,264	1.5%	53.5%	45.0%	88,608,492	14,146	44%
1988	5,442	6,416	1.3%	53.9%	44.8%	100,659,780	15,689	49%
1989	5,415	6,496	1.3%	55.7%	43.0%	103,122,696	15,875	49%
1990	5,412	6,660	1.1%	54.3%	44.6%	114,650,196	17,215	52%
1991	5,361	6,754	1.1%	54.3%	44.6%	121,715,028	18,021	57%
1992	5,342	6,899	1.0%	57.0%	42.0%	124,835,208	18,095	61%
1993	5,349	7,091	1.0%	59.5%	39.5%	129,027,970	18,196	63%
1994	5,249	7,169	0.9%	61.7%	37.4%	131,595,379	18,356	66%
1995	5,161	7,311	0.9%	61.3%	37.8%	138,959,417	19,007	66%
1996	5,049	7,469	0.8%	62.6%	36.6%	143,536,485	19,218	67%
1997	5,012	7,743	0.8%	63.3%	35.9%	150,843,744	19,481	69%
1998	4,719	7,750	0.7%	65.8%	33.5%	154,226,437	19,900	71%
1999	4,573	7,883	0.7%	68.4%	30.9%	158,523,816	20,110	73%
2000	4,498	8,079	0.6%	70.0%	29.4%	164,279,376	20,334	69%
2001	4,394	8,166	0.6%	67.4%	32.0%	180,239,652	22,072	71%
2002	4,229	8,179	0.5%	68.4%	31.1%	185,658,396	22,699	75%
2003	4,104	8,277	0.5%	69.8%	29.7%	191,634,636	23,153	77%
2004	3,961	8,328	0.4%	68.5%	31.1%	203,083,524	24,386	79%
2005	3,791	8,376	0.4%	69.5%	30.1%	211,114,020	25,205	84%
2006	3,666	8,550	0.4%	70.9%	28.7%	222,357,372	26,007	97%
2007	3,501	8,498	0.3%	70.6%	29.1%	227,671,788	26,791	99%
2008	3,318	8,442	0.3%	70.0%	29.7%	234,223,368	27,745	101%
2009	3,168	8,424	0.3%	70.1%	29.6%	240,094,968	28,501	104%
2010	3,035	8,356	0.3%	70.3%	29.4%	243,688,596	29,163	106%
2011	2,861	8,379	0.2%	71.6%	28.2%	250,376,700	29,881	114%



## EXPECTED TERMINATIONS FROM ACTIVE EMPLOYMENT FOR CURRENT ACTIVE MEMBERS

---



The chart above shows the expected future development of the present population in simplified terms. The retirement system presently covers 3,816 active members. Eventually, 77 members are expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. 3,486 members are expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 253 members are expected to become eligible for death-in-service or disability benefits.

## COMMENTS AND CONCLUSION

---

### **Experience during the Past Year**

Investment experience for the year ended June 30, 2011 was favorable with a market rate of return of 21.3% which exceeded the assumed 8.00% investment rate of return. However, the recognized rate of return on the funding value of assets was 5.5% due to continued recognition of prior investment losses. Because of the past unfavorable market returns, the funding value of assets now exceeds the market value by \$425 million. Unless material market gains occur within a relatively short period of time, upward pressure on the employer rate can be expected in each of the next several years.

### **Annuity Reserve Fund**

The Annuity Reserve Fund (ARF), as reported, was \$26.6 million higher than the accrued liabilities for Retirees and Beneficiaries. However, the reported balance in the ARF does not appear to include the \$22 million special transfer approved by the Board in 2011. We have reflected the transfer in this report.

The Board approved a transfer of \$12 million from the Annuity Reserve Fund to the Pension Accumulation Fund in 2001, a transfer of \$5 million in 2005 and a transfer of \$22 million in 2011.

### **Closed Plan**

Due to the plan closing, we recommend that a plan be developed to:

- Reduce the asset smoothing period over the near term.
- Reduce the investment return assumption as the asset allocation is changed to meet changing cash-flow needs.
- Shorten the amortization of unfunded actuarial accrued liabilities over a period of time until it equals the average future working lifetime of the remaining active members.

### **Employer Contribution Rate**

The employer contribution rate increased from 23.02% of covered payroll last year to 23.14% of covered payroll this year. The System experienced actuarial losses this year primarily due to lower than assumed investment return on a funding (smoothed) value of assets basis and to retirees living longer than expected. These losses eliminated the overfunded status that existed in the June 30, 2010 actuarial valuation. However, the computed employer rate only increased marginally because of the Boards' funding policy which is 1) to contribute full normal cost contributions when valuation assets exceed accrued liabilities and 2) to contribute the normal cost plus an amortization payment on the UAAL (based on a closed 30-year period) when accrued liabilities exceed valuation assets. As of June 30, 2011, the System is just under 100% funded so the computed employer contribution is just above the employer normal cost, which means the rate is only slightly higher than it was in the June 30, 2010 valuation. With the elimination of the overfunding status, gains and losses in future years, will have a larger effect on the employer contribution rate. There are approximately \$470 million in net investment losses scheduled to be recognized over the next 5 years.



## COMMENTS AND CONCLUSION

---

### **Data**

Data for terminated vested members has been questionable for several years. GRS began estimating liabilities for terminated vested members with the 2008 valuation (see page 27 of the 2008 valuation report, page 28 of the 2009 valuation report and page 29 of the 2010 valuation report). We recommend that the system undertake an audit of the terminated vested members (deferred members) in order to ensure that valuation data is as complete as possible for future valuations. As a closed plan matures, such data precision will become more and more important.

### **Conclusion**

**Based upon the funding policy established by the Board, the data furnished by the Retirement System and the actuarial assumptions shown in the Appendix, the recommended employer contribution rate for the 2012-2013 fiscal year is 23.14% of covered payroll.**

---

**DATA FURNISHED FOR VALUATION**

---

## SUMMARY OF BENEFIT PROVISIONS (JULY 1, 2011)

---

### *Age and Service Retirement*

**Eligibility** - 25 years of service regardless of age. 20 years of service regardless of age for eligible DPOA and DFFA members.

**Annual Amount** - An annuity equal to the actuarial equivalent of the member's accumulated contribution account plus a defined benefit, which, when added to the annuity will provide the following:

**Pre-1969 Members** - For all service earned up to April 5, 2011 for LSA members (September 1, 2011 for DPOA members), 2.5% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation.

For all service earned after April 5, 2011 for LSA members (September 1, 2011 for DPOA members), 2.1% of AFC times the first 25 years of service, with a maximum allowance of 15/22 of a police officer's or firefighter's annual rate of compensation.

**1969 Plan Members** - For all service earned up to April 5, 2011 for LSA members (September 1, 2011 for DPOA members), 2.5% of AFC times the first 25 years of service plus 2.1% of AFC times each of the next 10 years of service.

For all service earned after April 5, 2011 for LSA members (September 1, 2011 for DPOA members), 2.1% of AFC times each year of service, up to 35 years of service.

Members may elect to receive their accumulated contribution account in a lump sum after 25 years of service (20 years of service for eligible DPOA and DFFA members). The defined benefit at retirement is then reduced by the actuarial equivalent of the amount of principal withdrawn. No reduction is made with regard to the interest portion of the withdrawal.

Pre-1969 plan members may elect 1969 plan benefits at the time of retirement.

**Type of Average Final Compensation (AFC)** - Average of the current compensation for the ranks held in each of last 5 years (last 3 years for DPCOA, Executive Members and their Fire equivalents). Pension benefits for non-union employees may not be diminished due to a reduction in compensation because of fiscal emergency. AFC includes prior longevity distributions during the averaging period in accordance with the following schedule: 1% of compensation after 5 years of service, 2% after 11 years, 3% after 16 years and 4% after 21 years. A member may elect that upon retirement or upon death before retirement either (i) a lump sum payment equal to 85% (100% for DPOA and DPCOA members) of the amount of his or her unused accumulated sick leave bank, or (ii) to have the three year average of 25% of the value of the accumulated unused sick leave bank added to his or her AFC. Any member electing the AFC adjustment option will also be paid a lump sum equal to the remaining value of the sick leave bank as provided in (i) above. Lump sum payments are not paid by the retirement system.

## SUMMARY OF BENEFIT PROVISIONS (CONTINUED)

---

### *Deferred Retirement (vested benefit)*

**Eligibility** - 10 years of service for DPOA and Fire equivalents, age 40 with 8 years of service for all others.

**Annual Amount** - Same as regular retirement but based on average final compensation and credited service at the time of termination.

**Benefit Commencement - DPOA and Fire equivalent members hired after 6/30/85:** Unreduced benefit begins at age 62. **All other members:** Unreduced benefit begins at the age when the member would have first been eligible for regular retirement had the member continued in City service. **All** members may elect a reduced benefit payable immediately.

### *Duty Disability Retirement*

**Eligibility** - No age or service requirement.

**Annual Amount** - A basic benefit of 50% of final compensation and a supplemental benefit of 16-2/3% of final compensation is payable for 24 months. After 24 months, members disabled from any occupation continue to receive both benefits; otherwise, only the 50% benefit is then payable. Upon attaining 25 years of service, the disability benefit is 50% of final compensation. Members convert to regular retirement benefit at age 65. Worker's compensation payments are offset. Members who have already filed under the old duty disability plan will receive 66-2/3% of final compensation payable to eligibility date for regular retirement.

### *Non-Duty Disability Retirement*

**Eligibility** - 5 years of service.

**Annual Amount** - Computed as a regular retirement benefit, but based on average final compensation and credited service at the time of disability. Minimum benefit is 20% of average final compensation.

### *Duty Death Before Retirement*

**Eligibility** - No age or service requirement.

**Annual Amount** - Surviving spouse receives 5/11 of police officer's or firefighter's compensation and each child under age 18 receives 1/10 of such compensation with a maximum total of 7/33 of such compensation. If there is no surviving spouse, each child receives 1/4 of such compensation with a maximum total of 1/2 of such compensation. If there is no surviving spouse or children, each dependent parent receives 1/6 of such compensation. Worker's compensation payments are offset.

## SUMMARY OF BENEFIT PROVISIONS (CONCLUDED)

---

### *Non-Duty Death Before Retirement*

**Eligibility** - No age or service requirement.

**Annual Amount** - Same as a regular retirement benefit to a surviving spouse, but reduced in accordance with a 100% joint and survivor option election. Minimum benefit is 20% of average final compensation. Each child under 18 receives 1/7 of police officer's or firefighter's compensation with a maximum total of 2/7 of such compensation. If there is no spouse or children, each dependent parent receives 1/7 of such compensation.

### *Post-Retirement Cost-of-Living Adjustments*

- Pre-1969 Members** - Allowances increase in proportion to active member compensation for the corresponding rank.
  
- 1969 Plan Members** - Police retired after July 1, 2001, certain Police classes retired after July 1, 1998 and all Fire members: For all service earned up to April 5, 2011 for LSA members (September 1, 2011 for DPOA members) pensions increase by 2.25% of the **current** pension amount each July 1. No cost-of-living adjustments for service earned after April 5, 2011 for LSA members (September 1, 2011 for DPOA members).

### *Member Contributions*

5% of covered compensation payable until first eligible for regular retirement.

### *DROP plan*

Members with 25 years (20 years for DPOA members) of service may elect to participate in the DROP. When a DROP election is made, the member ceases to accrue any further age and service retirement benefits. Seventy five percent (75%) of the member's benefit (accrued to their DROP date) is contributed to a DROP account (a defined contribution account). At retirement the member is entitled to the balance in the DROP account and a monthly benefit equal to 100% of their benefit accrued to their DROP date, increased by any post-retirement increases that the member would have received, had the member been retired. Fire members must retire from the DROP plan at age 60. Participation in the DROP is limited to 10 years for LSA members electing to DROP after April 5, 2011.

### *Participation*

Plan is closed to new members, effective April 5, 2011 for LSA and July 1, 2012 for DPOA.

## ASSET INFORMATION FURNISHED FOR VALUATION

### *Reserve Accounts\**

Funds	Fund Balances	
	June 30, 2011	June 30, 2010
Annuity Savings	\$ 229,666,031	\$ 297,755,895
Annuity Reserve #	9,447,153	5,309,058
Total Annuity Funds	239,113,184	303,064,953
Pension Accumulation	124,574,896	(56,934,009)
Pension Reserve	2,745,818,143	2,921,102,914
Accrued Liability Fund Reserve	689,859,074	680,858,878
Survivor Benefit	5,394,571	5,186,645
Total Pension Funds	3,565,646,684	3,550,214,428
Total Fund Balances	\$3,804,759,868	\$3,853,279,381

# Actual balance was reported to be \$31,447,153 as of June 30, 2011. Amount shown is net of \$22 million transfer to Pension Accumulation Fund.

### *Revenues and Expenditures\**

	Pension Funds	Annuity Funds	Total Funds
Balance, July 1, 2010	\$3,550,214,428	\$ 303,064,953	\$3,853,279,381
Prior valuation audit adjustment	0	0	0
Balance July 1, 2010 after adjustment	3,550,214,428	303,064,953	3,853,279,381
Revenues			
Member contributions	0	10,453,905	10,453,905
Employer contributions	81,642,112	0	81,642,112
Recognized investment income	202,274,330	1,898,660	204,172,990
Transfers	434,917	(434,917)	0
Total	\$ 284,351,359	\$ 11,917,648	\$ 296,269,007
Expenditures			
Benefit payments	263,432,423	0	263,432,423
Refund of member contributions	0	75,869,417	75,869,417
Administrative expenses	5,486,680	0	5,486,680
Total	\$ 268,919,103	\$ 75,869,417	\$ 344,788,520
Balance, June 30, 2011	\$3,565,646,684	\$239,113,184	\$3,804,759,868
Funding Value Rate of Return	5.9%	0.7%	5.5%

\* Excludes the Market Stabilization Fund.

## FUNDING VALUE OF ASSETS

	2010	2011	2012	2013	2014	2015	2016	2017
A. Funding Value Beginning of Year	\$ 3,945,205,453	\$ 3,853,279,381						
B. Market Value End of Year	3,017,949,235	3,380,091,601						
C. Market Value Beginning of Year	3,052,160,615	3,017,949,235						
D. Contributions During Year								
D1. City Contributions (End of Year)	32,808,485	81,642,112						
D2. Member Contributions	10,764,969	10,453,905						
E. Expenses								
E1. Benefits Paid During Year	278,924,572	339,301,840						
E2. Administrative Expenses	4,258,318	5,486,680						
F. Investment Income								
F1. Market Total: B - C - D + E	205,398,056	614,834,869						
F2. Assumed Rate	7.5%	8.0%						
F3. Amount for Immediate Recognition *	286,905,055	298,154,650						
F4. Amount for Phased-In Recognition: F1-F3	(81,506,999)	316,680,219						
G. Phased-In Recognition of Investment Income								
G1. Current Year: F4/7	(139,221,691)	45,240,031						
G2. 1st Prior Year		(139,221,691)	\$ 45,240,031					
G3. 2nd Prior Year			(139,221,691)	\$ 45,240,031				
G4. 3rd Prior Year				(139,221,691)	\$ 45,240,031			
G5. 4th Prior Year					(139,221,691)	\$ 45,240,031		
G6. 5th Prior Year						(139,221,691)	\$ 45,240,031	
G7. 6th Prior Year							(139,221,691)	\$45,240,033
G8. Total Recognized Investment Gain	(139,221,691)	(93,981,660)	(93,981,660)	(93,981,660)	(93,981,660)	(93,981,660)	(93,981,660)	45,240,033
H. Total Interest Distributed - Current Year: (F3 + G8)	147,683,364	204,172,990						
I. Funding Value End of Year:								
I1. Preliminary Funding Value End of Year: A + D - E + H	3,853,279,381	3,804,759,868						
I2. Upper Corridor Limit 130% x B	3,923,334,006	4,394,119,081						
I3. Lower Corridor Limit 70% x B	2,112,564,465	2,366,064,121						
I4. <b>Funding Value End of Year</b>	3,853,279,381	3,804,759,868						
J. Difference Between Market & Funding Value: (B - I)	(835,330,146)	(424,668,267)						
K. Recognized Rate of Return: H / [ 1/2 (A + I4 - H)]	3.9%	5.5%						
L. Market Rate of Return: F1 / [ C - 1/2 (E - D)]	7.0%	21.3%						
M. Ratio of Funding Value to Market Value	127.7%	112.6%						

The Funding Value of Assets recognizes assumed investment income (line F2) fully each year. Differences between actual and assumed investment income (line F3) are phased-in over a closed 3-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. The Funding Value of Assets is unbiased with respect to Market Value. At any time it may be either greater or less than Market Value. If assumed rates are exactly realized for two consecutive years, the Funding Value will become equal to Market Value.

\* The amount for immediate recognition (F3) was calculated by GRS beginning in 2010.

**RETIREES AND BENEFICIARIES JUNE 30, 2011**  
**TABULATED BY ATTAINED AGE**

Attained Age	Age & Service		Disability		Death-in-Service		Totals	
	No.	Monthly Allowances	No.	Monthly Allowances	No.	Monthly Allowances	No.	Monthly Allowances
Under 20*	5	\$ 17,155			61	\$ 30,191	66	\$ 47,346
20-24								
25-29	1	1,213	2	\$ 6,295	0	0	3	7,508
30-34	5	7,431	29	85,843	5	8,504	39	101,778
35-39	5	8,677	53	159,714	12	19,735	70	188,126
40-44	29	44,805	69	206,111	8	12,910	106	263,826
45-49	98	204,423	123	352,806	10	18,051	231	575,280
50-54	236	532,157	122	320,366	26	46,686	384	899,209
55-59	696	1,860,757	250	652,008	34	54,619	980	2,567,384
60-64	1,427	4,247,966	500	1,154,264	55	92,459	1,982	5,494,689
65-69	1,087	2,990,393	344	782,817	33	52,492	1,464	3,825,702
70-74	637	1,669,429	137	307,143	18	30,477	792	2,007,049
75-79	465	1,058,150	69	167,576	12	24,029	546	1,249,755
80-84	627	1,377,484	103	253,303	33	60,963	763	1,691,750
85-89	577	1,183,346	69	164,970	27	52,550	673	1,400,866
90-94	199	378,032	28	70,297	5	7,919	232	456,248
95 & Over	45	82,062	0	0	3	6,147	48	88,209
<b>Totals</b>	<b>6,139</b>	<b>\$15,663,480</b>	<b>1,898</b>	<b>\$4,683,513</b>	<b>342</b>	<b>\$517,732</b>	<b>8,379</b>	<b>\$20,864,725</b>

\* May include records with defective birth dates.

**INACTIVE VESTED MEMBERS JUNE 30, 2011**

Not explicitly valued since the June 30, 2007 actuarial valuation due to incomplete reporting subsequent to June 30, 2007. Liabilities are estimated for the valuation.



**PRE-1969 RETIREES AND BENEFICIARIES JUNE 30, 2011**  
**TABULATED BY ATTAINED AGE**

Attained Age	Age & Service#		Disability#		Death-in-Service		Totals	
	No.	Monthly Allowances	No.	Monthly Allowances	No.	Monthly Allowances	No.	Monthly Allowances
Under 20*	0	\$ 0					0	\$ 0
20-24								
25-29								
30-34	1	1,657	1	\$ 2,534			2	4,191
35-39								
40-44	1	1,054					1	1,054
45-49	0	0					0	0
50-54	6	5,576			0	\$ 0	6	5,576
55-59	6	9,410			2	3,812	8	13,222
60-64	68	119,371	14	29,825	12	22,232	94	171,428
65-69	305	608,266	142	316,970	15	28,142	462	953,378
70-74	352	761,656	100	218,202	16	25,751	468	1,005,609
75-79	315	636,549	56	123,383	9	16,712	380	776,644
80-84	444	893,561	92	222,611	31	55,506	567	1,171,678
85-89	507	1,003,497	66	156,987	27	52,550	600	1,213,034
90-94	195	369,076	28	70,297	4	7,224	227	446,597
95 & Over	43	79,942	0		3	6,147	46	86,089
<b>Totals</b>	<b>2,243</b>	<b>\$4,489,615</b>	<b>499</b>	<b>\$1,140,809</b>	<b>119</b>	<b>\$218,076</b>	<b>2,861</b>	<b>\$5,848,500</b>

\* May include records with defective birth dates.

# Includes survivor beneficiaries of service and disability retirees.

**ACTIVE MEMBERS JUNE 30, 2011**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

*Police Members*

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20									\$ 0
20-24	49							49	1,947,287
25-29	108	43	4					155	7,077,554
30-34	64	75	216	2				357	18,506,790
35-39	32	38	380	115				565	31,020,903
40-44	19	29	293	226	46	2		615	34,922,285
45-49	6	9	118	103	142	77		455	27,090,525
50-54	4	3	42	33	86	119	7	294	18,046,503
55-59	2	2	6	9	36	112	37	204	12,905,408
60					4	14	9	27	1,781,581
61				2	4	4	5	15	910,536
62		1	2		1	7	8	19	1,167,308
63					2	2	11	15	918,311
64	1				1	1	6	9	578,195
65						1	1	2	135,990
67							1	1	53,237
68							4	4	242,464
69							2	2	121,682
70							1	1	67,995
72							2	2	121,232
76							1	1	53,237
<b>Totals</b>	<b>285</b>	<b>200</b>	<b>1,061</b>	<b>490</b>	<b>322</b>	<b>339</b>	<b>95</b>	<b>2,792</b>	<b>\$157,669,023</b>

*Fire Members*

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20									
20-24	1	1						2	\$ 73,476
25-29	3	11						14	677,173
30-34	12	48	52					112	5,797,470
35-39	4	33	99	19	1			156	8,447,840
40-44	2	17	73	81	59	2		234	13,727,329
45-49	2	9	24	42	119	29		225	14,230,820
50-54		1	8	19	60	53	19	160	10,689,280
55-59			1	3	23	21	59	107	8,056,830
60						2	12	14	1,092,450
<b>Totals</b>	<b>24</b>	<b>120</b>	<b>257</b>	<b>164</b>	<b>262</b>	<b>107</b>	<b>90</b>	<b>1,024</b>	<b>\$62,792,668</b>

**TOTAL ACTIVE MEMBERS JUNE 30, 2011  
BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20									
20-24	50	1						51	\$ 2,020,763
25-29	111	54	4					169	7,754,727
30-34	76	123	268	2				469	24,304,260
35-39	36	71	479	134	1			721	39,468,743
40-44	21	46	366	307	105	4		849	48,649,614
45-49	8	18	142	145	261	106		680	41,321,345
50-54	4	4	50	52	146	172	26	454	28,735,783
55-59	2	2	7	12	59	133	96	311	20,962,238
60					4	16	21	41	2,874,031
61				2	4	4	5	15	910,536
62		1	2		1	7	8	19	1,167,308
63					2	2	11	15	918,311
64	1				1	1	6	9	578,195
65						1	1	2	135,990
67							1	1	53,237
68							4	4	242,464
69							2	2	121,682
70							1	1	67,995
72							2	2	121,232
76							1	1	53,237
<b>Totals</b>	<b>309</b>	<b>320</b>	<b>1,318</b>	<b>654</b>	<b>584</b>	<b>446</b>	<b>185</b>	<b>3,816</b>	<b>\$220,461,691</b>

	Group Averages		
	Police	Fire	Total
Age:	42.2 years	44.4 years	42.8 years
Service:	15.5 years	18.3 years	16.3 years
Annual Pay:	\$56,472	\$61,321	\$57,773

---

**ACTUARIAL DISCLOSURES REQUIRED BY  
STATEMENT NO. 25 OF THE  
GOVERNMENTAL ACCOUNTING STANDARDS  
BOARD**

---

**This information is presented in draft form for review by the System's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the System's financial statements.**

## GASB STATEMENT NO. 25 REQUIRED SUPPLEMENTARY INFORMATION

Actuarial Valuation Date	Actuarial Value of Assets (a)	Schedule of Funding Progress			Covered Payroll (c)	UAAL as a % of Covered Payroll ((b - a) / c)
		Actuarial Accrued Liability (AAL) -- Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)		
1999	\$3,668,362,979	\$3,274,050,127	\$(394,312,852)	112.0%	\$216,049,687	-
2000*	3,964,231,470	3,342,123,550	(622,107,920)	118.6%	237,741,560	-
2001	3,900,020,703	3,463,248,393	(436,772,310)	112.6%	253,297,027	-
2002#	3,635,106,581	3,631,971,448	(3,135,133)	100.1%	248,663,133	-
2003	3,205,516,657	3,721,593,210	516,076,553	86.1%	248,681,461	207.5 %
2004	3,074,516,589	3,857,493,282	782,976,693	79.7%	258,699,581	302.7 %
2005@&	3,757,884,417	3,780,447,414	22,562,997	99.4%	250,491,872	9.0 %
2006&	3,980,254,576	3,808,952,741	(171,301,835)	104.5%	228,140,160	-
2007*&	4,307,194,763	3,896,814,229	(410,380,534)	110.5%	230,173,964	-
2008#	4,316,263,291	4,071,053,752	(245,209,539)	106.0%	232,812,606	-
2009	3,945,205,453	4,221,291,045	276,085,592	93.5%	231,795,528	119.1 %
2010#*	3,853,279,381	3,767,364,201	(85,915,180)	102.3%	228,829,999	-
2011	3,804,759,868	3,808,642,533	3,882,665	99.9%	220,461,691	1.8 %

\* Plan amended.

# After changes in actuarial assumptions and/or methods.

@ After POC transfer.

& 2005 and 2006 assets were revised following the June 30, 2006 valuation. 2007 assets were revised after the June 30, 2007 valuation.

## SCHEDULE OF EMPLOYER CONTRIBUTIONS

Fiscal Year Ended June 30	Reported Employer Contributions	
	From Pension Obligation Certificates (POCs)	Employer Contributions Other than from POCs
1999		\$ 15,709,799
2000		19,972,058
2001		14,443,382
2002		8,449,645
2003		66,843,029
2004		69,475,202
2005	\$ 630,829,189	51,602,596
2006&		57,766,542
2007		57,423,366
2008		33,934,636
2009@		36,151,057
2010		32,808,485
2011		81,642,112

& 2006 assets were revised following the 6/30/2006 valuation.

@ Contribution receivable.

## GASB STATEMENT NO. 25 REQUIRED SUPPLEMENTARY INFORMATION

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation date	June 30, 2011
Actuarial cost method	Entry Age
Amortization method	Level dollar, closed
Remaining amortization period	30 years
Asset valuation method	7 year smoothed market
Actuarial assumptions:	
Investment rate of return	8.0%
Projected salary increases*	5.0% - 9.2%
*Includes inflation at	0% for three years; 4% thereafter
Cost-of-living adjustments	Pre-1969 Plan Members: Allowances increase in proportion to active member compensation for corresponding rank.
	1969 Plan Members: Pensions increase by 2.25% of current pension amount each July 1.

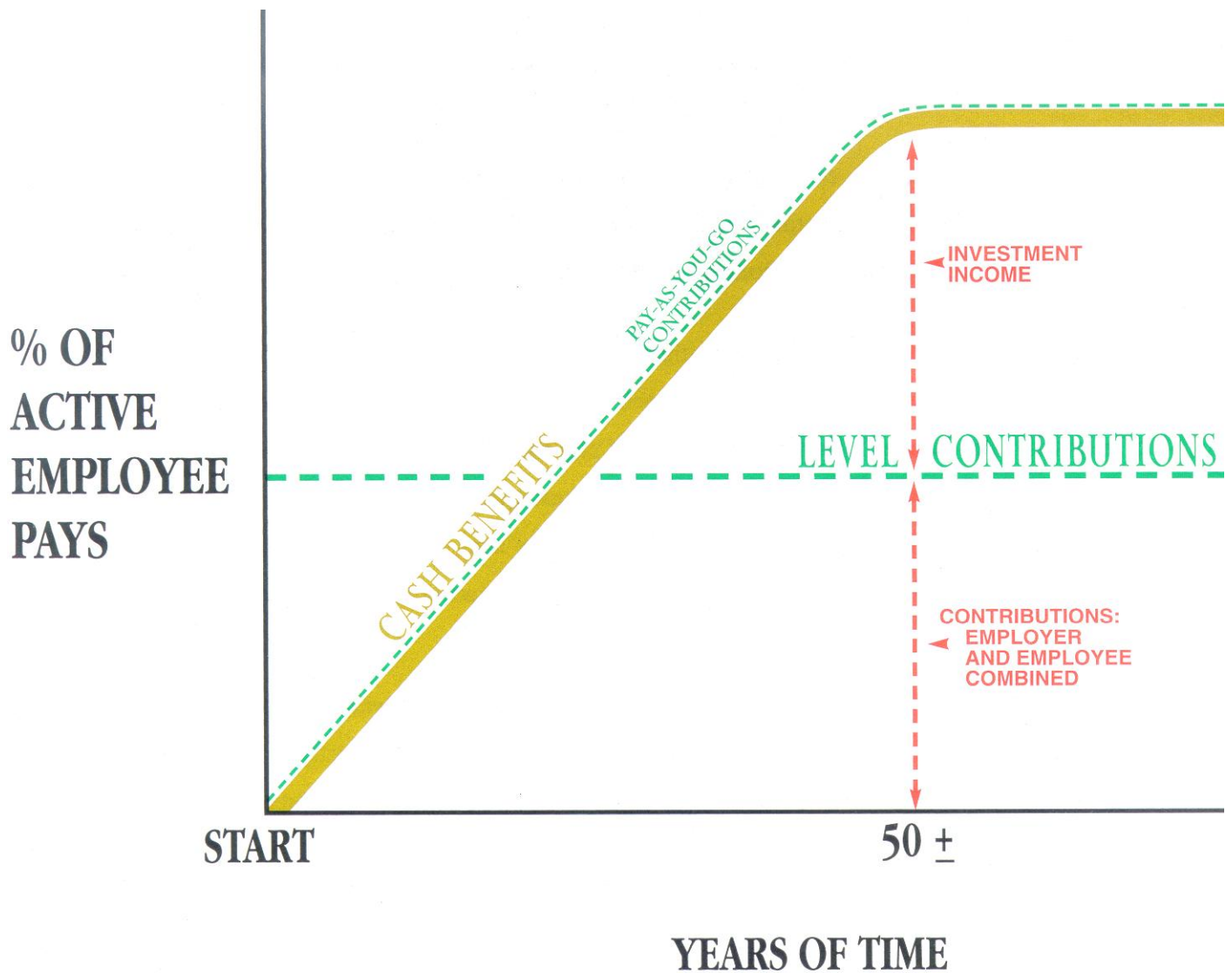
Membership of the plan consisted of the following at June 30, 2011, the date of the latest actuarial valuation:

Retirees and beneficiaries receiving benefits	8,379
Terminated plan members entitled to but not yet receiving benefits	NA
Active plan members	3,816
<b>Total</b>	<b>12,195</b>

---

# **FINANCIAL PRINCIPLES**

---



**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

Economic Risk Areas

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

Non-Economic Risk Areas

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability



## THE ACTUARIAL VALUATION PROCESS

---

*The financing diagram* on the opposite page shows the relationship between two different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (as in the Federal Social Security program) is an *increasing contribution method*; and the *level contribution method* which seeks to balance contributions between generations.

---

*The actuarial valuation* is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

A. *Member Census Data:*

- Retired lives now receiving benefits
- Former members with vested benefits
- Active members

B. *Benefit provisions* that establish eligibility and amounts of payments to members

C. *Asset Data* (cash & investments)

D. *Assumptions concerning future experience in various risk areas*, which are established by the Board of Trustees and the City Council after consulting with the actuary

E. *The funding method* for employer contributions (the long-term, planned pattern for employer contributions)

F. *Mathematically combining the assumptions, the funding method, and the data*

G. *Determination* of:

- Plan Financial position and
- New Employer Contribution Rate

## BASIC FINANCIAL OBJECTIVE AND OPERATION OF THE RETIREMENT SYSTEM

---

**Benefit Promises Made Which Must Be Paid For.** A retirement program is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an “IOU” which reads: **“The Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire.”**

The principal related financial question is: When shall the money required to cover the “IOU” be contributed? This year, when the benefit of the member’s service is received? Or, some future year when the “IOU” becomes a cash demand?

The **Constitution of the State of Michigan** is directed to the question:

**“Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities.”**

This retirement system meets this constitutional requirement by having the following *Financial Objective: To establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level* from year to year and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

*Normal Cost* (the value of benefits likely to be paid which is assigned to service being rendered in the current year)

. . . plus . . .

*Interest on the Unfunded Actuarial Accrued Liability* (the difference between the actuarial accrued liability and current system assets).

If contributions to the retirement program are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

$$B = C + I - E$$

**Benefit** payments to any group of members and their beneficiaries cannot exceed the sum of:

**Contributions** received over time on behalf of the group

. . . plus . . .

**Ivestment** earnings on contributions received and not required for immediate payment of benefits

. . . minus . . .

**Expenses** incurred in operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. Contributions in early years are low, but the inevitable consequence is a relentlessly increasing contribution rate – to a level greatly in excess of the level percent of payroll rate. ***This method of financing is prohibited in Michigan by the state constitution.***

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Investment income becomes the major contributor to the retirement program, and the amount is directly related to the amount of past contributions and investment performance.

**Computed Contribution Rate Needed To Finance Benefits.** From a given schedule of benefits and from the data furnished, the contribution rate is calculated ***by means of an actuarial valuation*** – the technique of assigning monetary values to the risks assumed in operating a retirement program.

---

## **APPENDIX**

---

**SUMMARY OF ASSUMPTIONS USED FOR DPFERS ACTUARIAL VALUATION  
ASSUMPTIONS ADOPTED BY BOARD OF TRUSTEES  
AFTER CONSULTING WITH ACTUARY**

---

**ECONOMIC ASSUMPTIONS**

*The investment return rate* used in the valuation was 8.0% per year, compounded annually (net after administrative expenses). The real rate of return is the portion of total investment return which is more than the inflation rate. Considering other financial assumptions, the 8.0% total investment return rate translates to an assumed real rate of return of 4.0% over wage inflation. This assumption was first used for the June 30, 2010 valuation.

*Pay increase assumptions* for individual active members are shown on page 31. Part of the assumption for each age is for a merit and/or seniority increase, and the other recognizes wage inflation (assumed to be 0% for the next 3 years and 4% per year thereafter).

**NON-ECONOMIC ASSUMPTIONS**

*The number of active members* is assumed to decrease over time since the Plan is closed.

*The mortality table* used to measure retired life mortality was 95% of the RP-2000 Combined Table for males and 100% of the RP-2000 Combined Table set back 2 years for females. No provision is currently made for future improvements in mortality after the measurement date. Related values are shown on page 31. This table was first used for the June 30, 2008 valuation. For disabled members, a 10 year set forward of the healthy rates was used to measure post-retirement mortality.

*The probabilities of age/service retirement* for members eligible to retire are shown on page 32. Probabilities for service eligibility were first used for the June 30, 2008 valuation.

*The probabilities of separation* from service (including *death-in-service*) are shown for sample ages on page 33. These probabilities were first used for the June 30, 2008 valuation.

# MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

## JUNE 30, 2011

---

<b>Marriage Assumption:</b>	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses.
<b>Pay Increase Timing:</b>	End of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year beginning the day after the valuation date.
<b>Decrement Timing:</b>	Decrements are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and exact fractional service nearest the date the decrement is assumed to occur.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.
<b>Incidence of Contributions:</b>	Member contributions are assumed to be received continuously throughout the year. Employer contributions are assumed to be received on the last day of the fiscal year.
<b>Longevity in AFC:</b>	Longevity payments included in the computation of Average Final Compensation were assumed to increase age and service costs by 4% and disability and death-in-service costs by 2%.
<b>Unused Sick Leave Payout:</b>	The normal cost was increased by 1.0% of payroll to account for the inclusion of a percentage of unused sick leave banks in the determination of AFC.
<b>Post-Retirement COLA:</b>	Active members are assumed to receive a 1.9% COLA rather than 2.25% because the annuity portion is not subject to the COLA. Post retirement increases for retired members was based on the plan in effect at retirement. For the pre-69 plan members, future COLA's are assumed to be the same as wage inflation for active members.
<b>FAC Period:</b>	1 year FAC period was used.
<b>Disability Change Age:</b>	The duty disability benefit is assumed to change at normal retirement age.
<b>Administrative Expense Load:</b>	1.2% of pay is added to the normal cost to account for administrative expenses.
<b>Deferred Liability:</b>	Deferred data was incomplete for June 30, 2011. Liabilities were estimated to be \$15,000,000.
<b>Miscellaneous Loads:</b>	Normal retirement accrued liability (excluding DROP members) was increased by 3% for service purchases. Active accrued liability (excluding DROP members) was increased by 1% to approximate the effect of incomplete service data.
<b>DROP Assumption:</b>	Members are assumed to DROP upon first eligibility and stay in the DROP program for 5 years.

## FUNDING METHODS

---

*The entry age actuarial cost method* was used in determining age and service liabilities and normal cost, vesting liabilities and normal cost, and casualty liabilities and normal cost.

*Differences between assumed experience and actual experience* (“actuarial gains and losses”) become part of actuarial accrued liabilities.

*Unfunded actuarial accrued liabilities, if any*, are amortized over periods of future years to produce contribution amounts (principal & interest) which are level dollar contributions.

*Employer contribution dollars* were assumed to be *paid in a single sum on the last day* of the employer fiscal year. (Adopted for the 6-30-79 actuarial valuation.)

*Valuation assets* recognize investment return above or below the actuarial assumed rate over a seven year period. (Adopted for the 6-30-10 actuarial valuation.)

---

*The data about persons now covered and about present assets* was furnished by the System’s administrative staff. Although examined for general reasonableness, the data was not audited by the actuary.

**The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (M.A.A.A.).**

## SAMPLE SALARY ADJUSTMENT RATES

---

Service	Salary Increase Assumptions for an Individual Member		
	Merit & Seniority	Base (Economic)	Increase Next Year
5	5.20%	4.00%	9.20%
10	1.70%	4.00%	5.70%
15	1.00%	4.00%	5.00%
20	1.00%	4.00%	5.00%
25	1.00%	4.00%	5.00%
30	1.00%	4.00%	5.00%
35	1.00%	4.00%	5.00%
Ref			306 + 4.00%

Select and ultimate wage inflation rates are assumed to be 0% for the next 4 years and 4% thereafter.

### SINGLE LIFE RETIREMENT VALUES BASED ON RP-2000 COMBINED & 8.0% INTEREST 95% OF MALE RATES SET-BACK 0 YEARS 100% OF FEMALE RATES SET-BACK 2 YEARS

---

Sample Attained Ages	Present Value of \$1.00 Monthly Increasing "X"% Annually After Retirement						Future Life Expectancy (years)	
	4.0% Compound		2.25% Simple		2.25% Compound		Men	Women
	Men	Women	Men	Women	Men	Women		
45	\$ 224.52	\$ 236.82	\$ 173.21	\$ 178.99	\$ 180.46	\$ 187.39	35.97	40.28
50	208.32	222.62	164.68	172.13	170.60	179.24	31.24	35.49
55	189.54	206.05	153.76	163.26	158.37	169.04	26.61	30.77
60	168.51	187.03	140.39	152.02	143.78	156.51	22.16	26.17
65	145.94	166.04	124.89	138.53	127.22	141.84	18.00	21.78
70	122.74	144.03	107.85	123.36	109.33	125.65	14.23	17.75
75	99.47	121.39	89.64	106.67	90.50	108.15	10.88	14.08
80	77.33	98.98	71.33	89.14	71.77	90.01	8.02	10.85
Ref:	506 x 0.95	507 x 1.00	506 x 0.95	507 x 1.00	506 x 0.95	507 x 1.00		



## PROBABILITIES OF SERVICE RETIREMENT

---

Service	Percent of Eligible Active Members Retiring Within Next Year			
	Police		Fire	
19	25%		15%	
20	18%		12%	
21	18%		12%	
22	18%		12%	
23	18%		12%	
24	18%	35%	12%	15%
25	18%	25%	12%	15%
26	18%	20%	12%	12%
27	18%	20%	12%	12%
28	18%	20%	12%	12%
29	18%	18%	15%	12%
30	18%	18%	15%	12%
31	18%	18%	15%	12%
32	20%	20%	15%	12%
33	25%	25%	20%	20%
34	30%	30%	25%	20%
35	30%	30%	30%	30%
36	30%	30%	30%	35%
37	30%	30%	30%	35%
38	30%	30%	30%	35%
39	30%	30%	30%	35%
40	100%	100%	100%	100%
Ref	1548	823	1549	1639

Age	Percent of Eligible Active Members Retiring Within Next Year	
	Police	Fire
60	25%	100%
61	25%	100%
62	25%	100%
63	22%	100%
64	20%	100%
65	18%	100%
66	15%	100%
67	15%	100%
68	15%	100%
69	15%	100%
70	100%	100%
Ref	1638	1

## PROBABILITIES OF SEPARATION

Sample Ages	Years of Service	% of Active Members Separating Within Next Year			
		Withdrawal		Death	
		Police	Fire	Male	Female
ALL	0	8.50%	5.00%		
	1	7.50%	4.00%		
	2	6.00%	3.00%		
	3	5.00%	2.00%		
	4	4.50%	2.00%		
25	5 & Over	4.50%	1.96%	0.03%	0.01%
30		3.30%	1.61%	0.03%	0.02%
35		2.30%	1.11%	0.06%	0.03%
40		1.70%	0.76%	0.08%	0.04%
45		1.50%	0.60%	0.11%	0.07%
50		1.10%	0.51%	0.16%	0.11%
55		0.80%	0.51%	0.27%	0.17%
60		0.80%	0.51%	0.51%	0.29%
Ref		566 207	230 113 x .85	506 x .75	507 x .75

Sample Ages	% of Active Members Becoming Disabled Within Next Year			
	Police		Fire	
	Ordinary	Duty	Ordinary	Duty
25	0.06%	0.13%	0.07%	0.34%
30	0.07%	0.19%	0.08%	0.52%
35	0.08%	0.34%	0.09%	0.90%
40	0.10%	0.49%	0.12%	1.30%
45	0.16%	0.73%	0.18%	1.92%
50	0.47%	1.16%	0.53%	3.06%
55	0.73%	1.96%	0.82%	5.18%
60	0.82%	2.82%	0.93%	7.47%
Ref	105 x 0.75	90 x 0.85	105 x 0.85	90 x 2.25

## MEANING OF “UNFUNDED ACTUARIAL ACCRUED LIABILITIES”

---

*Actuarial accrued liabilities* are *the portion of the present value of plan promises to pay benefits in the future not covered by future normal cost contributions* --- a liability has been established (“accrued”) because the service has been rendered, but the resulting monthly cash benefit may not be payable until years in the future.

If actuarial accrued liabilities at any time exceed the plan’s accrued assets (cash & investments), the difference is *unfunded actuarial accrued liabilities*. If the plan’s assets equal the plan’s actuarial accrued liabilities, the plan would be termed “fully funded.”

---

Each time a plan adds a new benefit which applies to service already rendered, an actuarial accrued liability is created. If assets are insufficient to cover the value of the new benefit promises, an additional unfunded actuarial accrued liability is also created. Payment for such unfunded accrued liabilities is generally spread over a period of years, commonly in the 15-30 year range.

Unfunded actuarial accrued liabilities can occur in another way: if actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded actuarial accrued liabilities. For example, during periods of high inflation, unfunded actuarial accrued liabilities generally increase because unexpected rates of pay increase will create additional liabilities which may not be matched by investment performance.

---

The existence of unfunded actuarial accrued liabilities is not bad, but the changes from year to year in the amount of unfunded actuarial accrued liabilities are important -- “bad” or “good” or somewhere in between.

Unfunded actuarial accrued liabilities do not represent a bill payable immediately, but it is important that policy-makers prevent the amount from becoming unreasonably high and *it is vital that there is a sound method in place for making payments toward them*, so that they are controlled.

## GLOSSARY

---

***Actuarial Accrued Liability.*** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

***Accrued Service.*** The service credited under the plan which was rendered before the date of the actuarial valuation.

***Actuarial Assumptions.*** Estimates of future plan 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.

***Actuarial Cost Method.*** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

***Actuarial Equivalent.*** A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

***Actuarial Present Value.*** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

***Amortization.*** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

***Experience Gain (Loss).*** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

***Normal Cost.*** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

***Reserve Account.*** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

***Unfunded Actuarial Accrued Liability.*** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

***Valuation Assets.*** The value of current plan assets recognized for valuation purposes.