

SUMMARY OF ASSUMPTIONS USED FOR DPFERS ACTUARIAL VALUATIONS

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%.

PAY INCREASE ASSUMPTIONS for individual active members have been calculated. Part of the assumption for each age is for a merit and/or seniority increase, and the other 4.0% recognizes inflation.

TOTAL ACTIVE MEMBER PAYROLL is assumed to increase 4.0% annually, which is the portion of the individual pay increase assumptions attributable to wage inflation.

NON-ECONOMIC ASSUMPTIONS

THE NUMBER OF ACTIVE MEMBERS is assumed to continue at the present number.

THE MORTALITY TABLE used to measure retired life mortality was 90% of the 1983 Group Annuity Mortality Table. This table was first used for the June 30, 1998 valuation.

THE PROBABILITIES OF AGE/SERVICE RETIREMENT for members eligible to retire have been calculated. These probabilities were last revised for the June 30, 2008 valuation.

THE PROBABILITIES OF SEPARATION from service (including death-in-service) are shown for sample ages. These probabilities were revised for the June 30, 2008 valuation.

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 and interest) which are level percent of payroll 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 three-year period. (Adopted for the 6/30/95 actuarial valuation.)

THE EFFECT OF CHANGES IN ELIGIBILITY FOR NORMAL RETIREMENT DUE TO SERVICE PURCHASES was approximated by increasing computed actuarial accrued liabilities by 3%. In addition, active member accrued liabilities were increased by 1% to approximate the effect of incomplete service data.

THE DATA ABOUT PERSONS NOW COVERED AND ABOUT PRESENT ASSETS were 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.).

ACTUARIAL & STATISTICAL SECTION

2014 - 2015 FISCAL YEAR EMPLOYER CONTRIBUTION RATES COMPUTED PAYABLE LAST DAY OF FISCAL YEAR

expressed as percents of active member payroll

CONTRIBUTIONS FOR	CONTRIBUTIONS EXPRESSED AS PERCENTS OF PAYROLL <i>for the Fiscal Year Ending June 30, 2015</i>
NORMAL COST	
Age & Service Allowances	21.03%
Disability Allowances	3.81%
Death-in-Service Allowances	0.43%
Administrative Services	3.00%
TOTAL	28.27%
Members Current Contributions:#	3.93%
(Future Refunds)	(0.41)%
Available for Monthly Benefits	3.52%
EMPLOYER NORMAL COST	24.75%
Actuarial Accrued Liabilities	
Total (\$ Millions)	\$3,890.1
Funding Value of Assets	3,474.5
Unfunded Actuarial Accrued Liabilities	
- Dollar (Millions)	\$415.6
- Amortization percent +	24.70%
<hr/>	
COMPUTED EMPLOYER RATE	49.45%
COMPUTED EMPLOYER RATE WITH INTEREST ADJUSTMENT*	51.39%
ESTIMATED DOLLARS (\$ MILLIONS)	44.8%
ACTUARIAL ACCRUED LIABILITIES (\$ MILLIONS)	44.7%
TOTAL (\$ MILLIONS) @	89.4%

Member statutory contributions of 5% to the Annuity Savings Fund are not payable during all periods of covered employment. The rate shown is the weighted average of expected contributions divided by expected pay in the upcoming fiscal year.

+ 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 28-year level dollar amortization period when accrued liabilities exceed assets.

* Computed Employer Rate if paid at end of year.

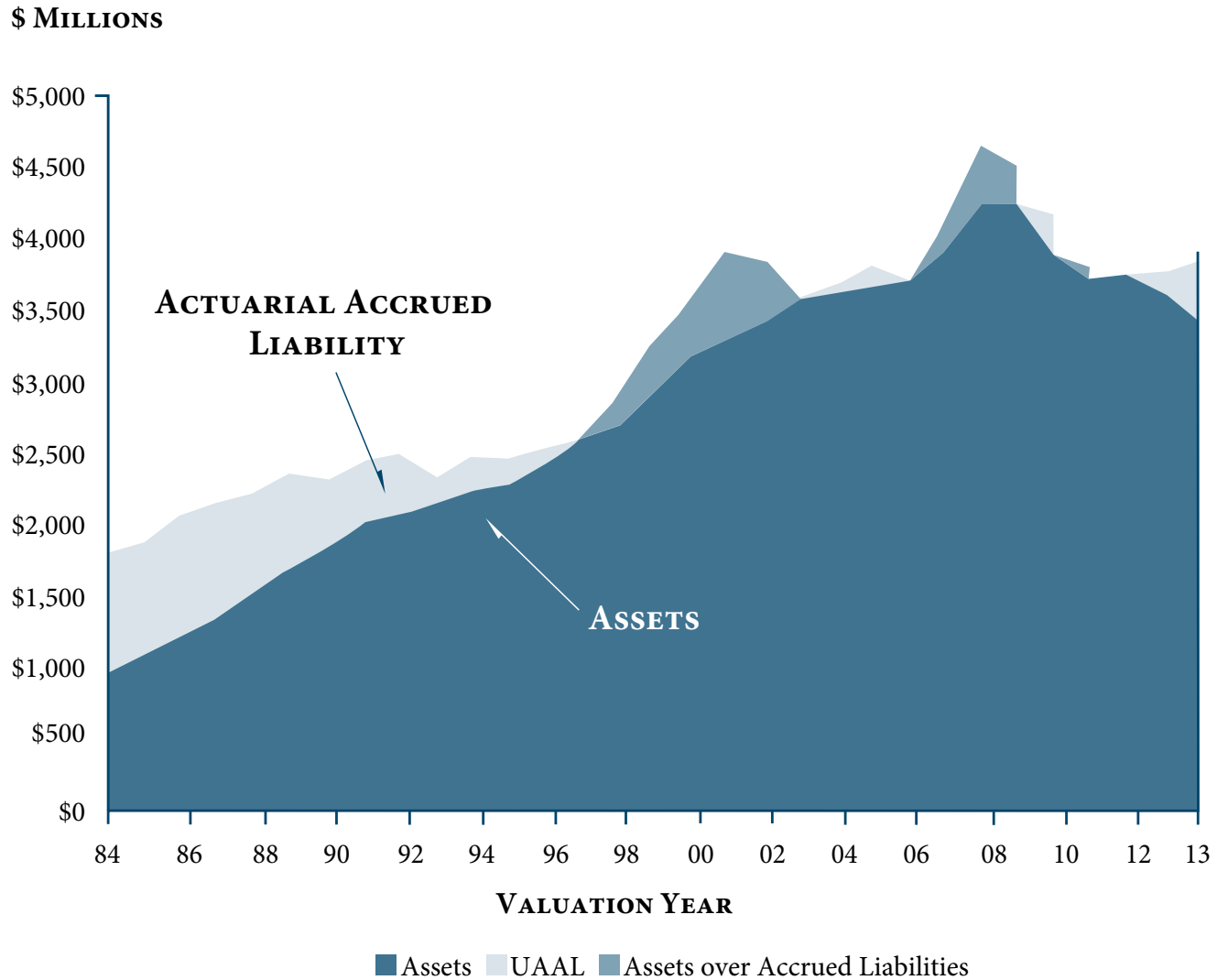
JUNE 30, 2013

ACTUARIAL ACCRUED LIABILITIES

PRESENT VALUE, JUNE 30	AMOUNT
ACCRUED PENSION LIABILITIES	
Retirees and Beneficiaries.....	\$ 2,911,280,932
Inactive Members Future Deferred Pensions	28,044,895
Active Members	749,847,358
Total Accrued Pension Liabilities	3,689,173,185
Pension Fund Balances	3,273,567,865
Unfunded Accrued Pension Liabilities	\$ 415,605,320
ACCRUED ANNUITY LIABILITIES	
Retirees and Beneficiaries	
Future Annuities	\$ 3,865,681
Reserve for Outstanding Refunds and Contingencies	18,872,770
Total	\$ 22,738,451
Members Annuities and Future Refunds	178,231,705
Total Accrued Annuity Liabilities	200,970,156
Annuity Fund Balances	200,970,156
Unfunded Accrued Annuity Liabilities	\$ 0
SYSTEM TOTALS	
ACTUARIAL ACCRUED LIABILITIES	\$ 3,890,143,341
ACCRUED ASSETS	3,474,538,021
UNFUNDED ACTUARIAL ACCRUED LIABILITIES#	\$ 415,605,320

#Assumes past due contributions of \$71 million are NOT MADE.

**RETIREMENT SYSTEM TOTALS
ASSETS AND ACCRUED LIABILITIES**



COMPARATIVE STATEMENT

ACTUARIAL ACCRUED LIABILITIES \$ IN MILLIONS

JUNE 30	ACTIVE PAYROLL		COMPUTED TOTAL	VALUATION ASSETS	UNFUNDED	UNFUNDED/ ACTIVE PAYS	EMPLOYER CONTRIBUTIONS % OF PAYS
	TOTAL	AVERAGE					
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)	0.0	25.09
2007 ⁺ *	230.2	54,647	3,896.8	4,307.2	(410.4)	0.0	26.71
2008 ⁺ (a)	232.8	57,090	4,071.1	4,316.3	(245.2)	0.0	26.27
2009	231.8	57,418	4,221.3	3,945.2	276.1	1.2	35.22
2010(a)	228.8	57,322	3,987.5	3,853.3	134.2	0.6	28.90
2011	220.5	57,773	3,808.6	3,804.8	3.8	0.0	23.14
2012(a)	205.8	57,374	3,822.7	3,675.5	147.2	0.7	30.59
2013(c)	\$186.7	\$57,163	\$3,890.1	\$3,474.5	\$415.6	2.2	51.39%

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

* After Plan Amendments.

+ 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.

(c) Based on 28-year amortization of missed contributions.

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			TOTAL
	(1) ACTIVE MEMBER CONTR.	(2) RETIREEES AND BENEF.	(3) PRESENT MEMBERS (EMPLOYER FINANCED PORTION)		(1)	(2)	(3)	
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
2012#	199	2,822	801	3,675	100	100	82	96
2013*	\$178	\$2,934	\$777	\$3,475	100%	100%	47%	89%

(a) After changes in benefit provisions.

After changes in actuarial assumptions and/or methods.

* Assumes past due contributions of \$71 million are NOT MADE.

**GASB STATEMENT NO. 25 REQUIRED
SUPPLEMENTARY INFORMATION**

SCHEDULE OF FUNDING PROGRESS

ACTUARIAL VALUATION DATE	ACTUARIAL VALUE OF ASSETS (a)	ACTUARIAL ACCRUED LIABILITY (AAL) -ENTRY AGE (b)	UNFUNDED AAL (UAAL) (b-a)	FUNDED RATIO (a/b)	COVERED PAYROLL (c)	UAAL AS A % OF COVERED PAYROLL ((b-a)/c)
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%
2012#	\$3,675,459,604.....	\$3,822,676,002	\$147,216,398	96.1%	\$205,800,278	71.5%
2013#(a)	\$3,474,538,021.....	\$3,890,143,341	\$415,605,320	89.3%	\$186,694,166	222.6%

* 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.

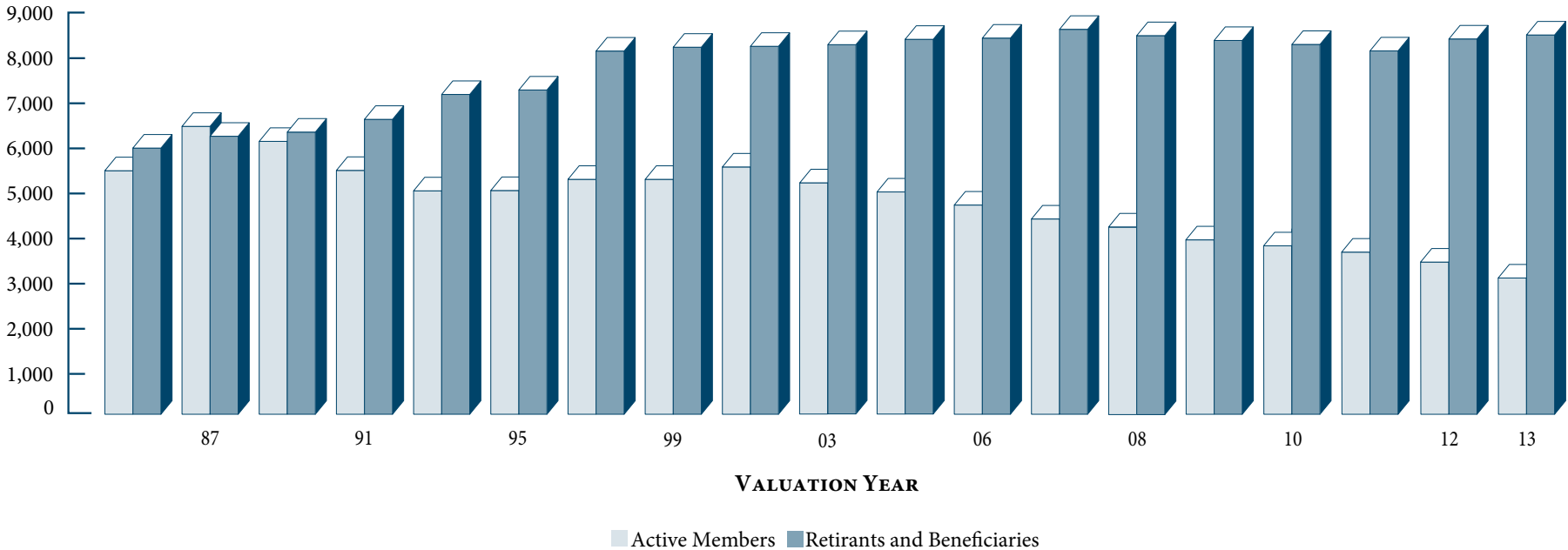
(a) Assumes past due contributions of \$71 million are **NOT MADE**.

**COMPARATIVE STATEMENT OF
ANNUAL RETIREMENT ALLOWANCES**

being paid to retirants and beneficiaries

JUNE 30	NO. RETIRED		% OF CURRENT ALLOWANCES			CURRENT ALLOWANCES		ALLOWANCES AS A % OF PAYROLL
	PRE-1969	TOTAL	ANNUITIES	PENSIONS	ESCALATORS	TOTAL	AVERAGE	
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%
2012	2,723	8,451	0.2	72.2	27.6	258,660,084	30,607	126%
2013	2,544	8,476	0.2%	72.9%	26.9%	\$266,438,460	\$31,434	143%

RETIREMENT SYSTEM TOTALS
ACTIVE AND RETIRED MEMBERS



**RETIREMENT SYSTEM TOTALS
ACTIVE AND RETIRED MEMBERS
& VALUATION PAYROLL**

JUNE 30	NO. MEMBERS		TOTAL MEMBERS				AVERAGE PAY	
	1969 PLAN	PRE-1969	No.	% CHANGE	RATIO OF ACTIVE TO RETIRED	ANNUAL PAYROLL	\$	CHANGE
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
2012	3,580	7	3,587	- 6	0.4	205,800,278	57,374	-0.7
2013	3,260	6	3,266	- 9%	0.4	\$186,694,166	\$57,163	- 0.4%

ACTIVE MEMBERS AS OF JUNE 30, 2013

by attained age & years of service

ATTAINED AGE	POLICE MEMBERS YEARS OF SERVICE TO VALUATION DATE							TOTALS	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	VALUATION PAYROLL
Under 20									0
20-24	13	1						14	\$554,338
25-29	75	37	1					113	4,979,066
30-34	52	72	118					242	12,322,579
35-39	28	37	253	138				456	24,647,370
40-44	21	16	235	368	35			675	38,032,302
45-49	6	12	86	183	64	53		404	23,437,201
50-54	3	2	33	62	36	118	1	255	15,159,145
55-59	1	2	9	20	18	78	38	166	10,442,187
60				1		11	11	23	1,463,012
61		1				5	10	16	955,662
62						4	8	12	769,233
63					1	2	4	7	425,608
64		1	2			2	6	11	659,397
65					1	1	4	6	363,696
66					1		3	4	235,931
70							2	2	121,232
71							1	1	53,687
74							1	1	67,995
TOTALS	199	181	737	772	156	274	89	2,408	\$134,662,641

ATTAINED AGE	FIRE MEMBERS YEARS OF SERVICE TO VALUATION DATE							TOTALS	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	VALUATION PAYROLL
Under 20									
20-24									
25-29	1	3	1					5	223,140
30-34	3	19	43	1				66	3,429,055
35-39	1	20	90	17				128	6,857,651
40-44		8	79	65	33	1		186	10,550,171
45-49	3	2	29	38	107	47	1	227	14,281,974
50-54			16	20	56	59	11	162	10,579,253
55-59		1	2	3	14	28	33	81	5,892,664
60					1	1	1	3	217,617
TOTALS	8	53	260	144	211	136	46	858	\$52,031,525

ACTUARIAL & STATISTICAL SECTION

**TOTAL ACTIVE MEMBERS
AS OF JUNE 30, 2013**

by attained age & 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+	No.	VALUATION PAYROLL
UNDER 20.....									0
20-24	13	1						14	\$554,338
25-29	76	40	2					118	5,202,206
30-34	55	91	161	1				308	15,751,634
35-39	29	57	343	155				584	31,505,021
40-44	21	24	314	433	68	1		861	48,582,473
45-49	9	14	115	221	171	100	1	631	37,719,175
50-54	3	2	49	82	92	177	12	417	25,738,398
55-59	1	3	11	23	32	106	71	247	16,334,851
60.....				1	1	12	12	26	1,653,629
61		1				5	10	16	955,662
62						4	8	12	769,233
63					1	2	4	7	425,608
64		1	2			2	6	11	659,397
65					1	1	4	6	363,696
66					1		3	4	235,931
67									0
68									0
69									0
70							2	2	121,232
71							1	1	53,687
72									0
73									0
74							1	1	67,995
75									0
TOTALS	207	234	997	916	367	410	135	3,266	\$186,694,166

GROUP AVERAGES:

	POLICE	FIRE	TOTAL
Age:	42.9 years	45.1 years	43.5 years
Service:	16.2 years	18.9 years	16.9 years
Annual Pay:	\$55,923	\$60,643	\$57,163

ACTUARIAL COMMENTS

REVISED ASSUMPTIONS AND FUNDING METHODS

Each year as of June 30, the actuarial liabilities of DPFRS are valued. In order to perform the valuation, assumptions must be made regarding the future experience of the System with regard to the following risk areas:

1. Rates of *withdrawal* of active members.
2. Rates of *disability* among active members.
3. Patterns of *salary increases* to active members.
4. Rates of *retirement* among active members.
5. Rates of *mortality* among active members, retirants and beneficiaries.
6. Long-term rates of *investment return* to be generated by system assets.

Assumptions should be carefully chosen and continually monitored. An unrealistic set of assumptions can lead to:

- *Understated costs resulting in either an inability to pay*

benefits when due, or sharp increases in required contributions at some point in the future;

- *Overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate, or an unnecessarily large burden on the current generation of members, employers and taxpayers.*

A single set of assumptions will not be suitable indefinitely. Things change, and our understanding of things (whether or not they are changing) also changes.

In recognition of this, the City Charter provides that assumptions used to value the liabilities of the Policemen and Firemen Retirement System should be studied in depth every five years. The package of assumptions is then adjusted to reflect basic experience trends – but not random year-to-year fluctuations. Actuarial assumptions were revised following the 2002-2007 experience study. A summary of the experience study results follows:

RATES OF WITHDRAWALS from service were varied but higher than current rates. The recommended revised withdrawal assumptions recognize a portion of the observed rates. Full credibility is generally not given to a 5-year experience period because it is not known that recent trends will persist indefinitely.

PAY INCREASE RATES (MERIT AND SENIORITY PORTION) were found to be higher than assumed rates, especially for members with fewer than 5-years of service. As with other decrement changes, the recommended rates partially reflect observed experience.

RETIREMENT EXPERIENCE indicated many more retirements than expected for Police members. Retirement experience for Fire members indicated fewer retirements than expected. Each group's results indicated that service is being purchased to allow for earlier retirements. Recommended rates reflect these trends. This change puts upward pressure on contribution rates.

POST-RETIREMENT MORTALITY RATES observed in the study were only slightly greater than the present assumed rates. Consequently, it is recommended that mortality rates remain unchanged since they already include a margin for future longevity improvement.

PRE-RETIREMENT MORTALITY experience was inconclusive. Recommended rates are the same as current rates and are approximately 90% of post-retirement mortality rates.

NON-DUTY DISABILITY rates were found to be lower than expected for both the Police and Fire group. Recommended rates partially reflect the observed lower rates of non-duty disability over the past 5 years.

DUTY DISABILITY rates were found to be much lower than previously assumed for Police and higher for the Fire group. Recommended rates partially reflect the observed patterns of duty disability over the past 5 years.

ACTUARIAL COMMENTS CON'T

VALUATION METHOD.

The method used to measure the cost of disability and death-in-service benefits was changed from a 5-year terminal funding method to the entry age normal cost method. The previous method is a carry-over from the original city charter. This change puts all portions of the rate setting process on a consistent basis.

EXPERIENCE DURING THE PAST YEAR

Investment experience for the year ended June 30, 2013 was favorable with a market rate of return of 14.4% which is 6.4% above the assumed 8.00% investment rate of return. However, because of the 7-year smoothing of the current gain (as well as prior gains and losses), the recognized rate of return on the funding value of assets was only 4.1%. Because of the past unfavorable market returns and the 7-year smoothing, the funding value of assets exceeds the market value by \$440 million. Substantial upward pressure on the employer rate can be expected in each of the next three years unless offset by investment or other gains.

ANNUITY RESERVE FUND

The Annuity Reserve Fund (ARF), as reported, was \$19 million higher than the related accrued liabilities for Retirees and Beneficiaries. 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.

OVERALL FINANCIAL CONDITION

The Retirement System continues in sound actuarial condition in accordance with the principles of level percent-of-payroll financing.