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Gabriel Roeder Smith & Company  
Consultants & Actuaries

CITY OF TROY EMPLOYEES RETIREMENT SYSTEM  
FORTY-THIRD ANNUAL ACTUARIAL VALUATION  
DECEMBER 31, 2006

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July 6, 2007

The Board of Trustees  
City of Troy Employees Retirement System  
Troy, Michigan

Submitted in this report are the results of the Forty-Third Annual Actuarial Valuation of the assets, actuarial values and contribution requirements associated with benefits provided by the City of Troy Employees Retirement System.

The date of the valuation was December 31, 2006.

Valuation results, comments and conclusions are contained in Section A.

The valuation was based upon information, furnished by your Assistant City Manager-Finance Director, concerning Retirement System benefits, financial transactions, and individual members, terminated members, retirants and beneficiaries. Data was checked for year to year consistency, but was not otherwise audited by us. This information is summarized in Section B.

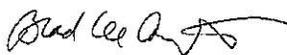
Descriptions of the actuarial cost method and actuarial assumptions are contained in Section C, along with a glossary of technical terms.

Governmental Accounting Standards Board (GASB) Statement No. 25 and No. 27 information is contained in Section D.

This report has been prepared by Members of the American Academy of Actuaries who have substantial experience valuing Public Employee Retirement Systems.

To the best of our knowledge, this report is complete and accurate and was made in accordance with actuarial methods recognized 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.

Respectfully submitted,



Brad Lee Armstrong  
A.S.A., E.A., M.A.A.A.



Randall J. Dziubek  
A.S.A., E.A., M.A.A.A.

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**SECTION A**

**VALUATION RESULTS, COMMENTS AND  
CONCLUSIONS**

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## **FINANCIAL OBJECTIVE**

The financial objective of the Retirement System is 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 citizens. This objective meets the requirements of the Retirement System Ordinance and Article IX, Section 24 of the Constitution of the State of Michigan.

## **CONTRIBUTION RATES**

The Retirement System is supported by member contributions, City contributions and investment income from Retirement System assets.

Contributions which satisfy the financial objective are determined by an annual actuarial valuation and are sufficient to:

- (1) cover the actuarial present value of benefits assigned to the current year by the actuarial cost methods described in Section C (the normal cost); and
- (2) amortize over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (unfunded actuarial accrued liability).

Contribution requirements for the fiscal year beginning July 1, 2007 are shown on page A-2.

**CONTRIBUTIONS COMPUTED TO MEET THE FINANCIAL OBJECTIVE  
OF THE RETIREMENT SYSTEM  
FOR THE FISCAL YEAR BEGINNING JULY 1, 2007**

Contributions for	Contributions Expressed as Percents of Payroll		
	General	Public Safety	Totals
Normal Cost			
Age & Service Benefits	11.88 %	20.40 %	
Death & Disability Benefits	1.54	1.80	
Termination Benefits			
Deferred Age & Service Benefits	1.72	0.88	-
Refunds of Member Contributions	0.25	0.37	
Total Normal Cost	<u>15.39</u>	<u>23.45</u>	-
Member Portion	<u>1.50</u>	<u>3.96</u>	
Employer Normal Cost	13.89 %	19.49 %	16.91 %
Amortization Payment			
Retired Members and Beneficiaries			0.00
Active and Vested Terminated Members			<u>(15.12)</u>
Total Amortization Payment			(15.12)
Total Pension Contribution Requirement *			1.79 %

Unfunded actuarial accrued liabilities were amortized as a level dollar amount over an open period of 10 years.

A procedure for determining dollar contribution amounts is described on page A-3.

Comparative contribution amounts for prior fiscal years are shown on page A-7.

\* *Percent should be applied to defined benefit payroll for both General and Public Safety members.*

## DETERMINING DOLLAR CONTRIBUTIONS

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollar amounts. We recommend the following procedure:

Contribute dollar amounts at the end of each payroll period which are equal to the City's percent-of-payroll contribution requirement multiplied by the covered active member payroll for the period. Adjustments should be made as necessary to exclude items of pay that are not covered compensation for Retirement System benefits and to include special payments that are covered compensation.

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The above amounts are assumed to be contributed, on average, halfway through the fiscal year. If contributions are made on a later schedule, interest should be added at the rate of 0.526% (compounded) for each month of delay.

## FINANCIAL OBJECTIVE ACHIEVEMENT TESTS

The Retirement System's financial objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of active 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**. Year by year computed contribution rates are displayed on page A-7.

There is no single all-encompassing test to measure a Retirement System's funding progress and current funded status.

A traditional measure has been the relationship of valuation assets to actuarial accrued liabilities - a method that is influenced by the choice of actuarial cost method.

**We believe a better understanding** of funding progress and status can be achieved using the following measures which are independent of the actuarial funding method. A year by year comparison of these measures is shown on page A-5.

**TEST 1 - The ratio of valuation assets (VA) to the actuarial present value of credited projected benefits (APVCPB)** - a plan continuation test. The ratio is expected to gradually increase in the absence of benefit improvements and changes in actuarial assumptions.

**TEST 2 - The ratio of the unfunded actuarial present value of credited projected benefits (UAPVCPB) to member payroll (MP)** - a plan continuation test. In a soundly financed retirement system, the amount of the unfunded actuarial present value of credited projected benefits will be controlled and prevented from increasing in the absence of benefit improvements or strengthening of actuarial assumptions. However, in an inflationary environment it is seldom practical to impose this control on dollar amounts which are depreciating in value. The ratio is a relative index of condition where inflation is present in both items. The ratio is expected to gradually decrease in the absence of benefit improvements and changes in actuarial assumptions.

# FINANCIAL OBJECTIVE ACHIEVEMENT TESTS - COMPARATIVE STATEMENT

\$ AMOUNTS IN THOUSANDS

Valuation Date December 31	(1) Valuation Assets	(2) Member Payroll	(3) APVCPB	(4) UAPVCPB	Continuation Tests	
					Test 1 (1) ÷ (3)	Test 2 (4) ÷ (2)
1985	\$ 23,857	\$11,374	\$ 24,109	\$ 252	99 %	2 %
1986 *	29,145	12,049	29,002	(143)	100	(1)
1987 *	34,096	13,083	33,703	(393)	101	(3)
1988	38,668	14,162	37,728	(940)	102	(7)
1989 *	45,040	14,774	42,631	(2,409)	106	(16)
1990 *	50,599	16,105	50,181	(418)	101	(3)
1991	60,001	17,324	55,370	(4,631)	108	(27)
1992	68,433	17,620	59,663	(8,770)	115	(50)
1993	77,489	18,519	65,628	(11,861)	118	(64)
1993 *	77,489	18,519	70,034	(7,455)	111	(40)
1994	84,399	17,599	75,209	(9,190)	112	(52)
1995	94,730	19,040	83,081	(11,649)	114	(61)
1996	106,335	20,536	89,654	(16,681)	119	(81)
1997	120,718	16,133	94,582	(26,136)	128	(162)
1997 *	120,718	16,133	96,446	(24,272)	125	(150)
1998	109,747	16,201	84,752	(24,995)	129	(154)
1998 *	109,474	16,201	84,913	(24,561)	129	(152)
1999	118,595	15,057	85,981	(32,614)	138	(217)
1999 *	118,595	15,057	87,347	(31,248)	136	(208)
2000	120,905	15,441	92,231	(28,674)	131	(186)
2000 *@	123,956	15,441	92,231	(31,725)	134	(205)
2001	123,669	14,566	90,965	(32,704)	136	(225)
2001 *	123,669	14,566	90,965	(32,704)	136	(225)
2002	117,372	13,553	89,589	(27,783)	131	(205)
2003	126,738	13,053	98,046	(28,692)	129	(220)
2004	126,802	12,572	104,457	(22,345)	121	(178)
2005	128,790	12,100	108,534	(20,256)	119	(167)
2006	132,168	11,472	113,579	(18,589)	116	(162)
<b>2006 *</b>	<b>132,168</b>	<b>11,472</b>	<b>114,689</b>	<b>(17,479)</b>	<b>115</b>	<b>(152)</b>

\* After changes in benefit provisions.

@ After changes in cost method.

APVCPB - actuarial present value of credited projected benefits (see page A-4).

UAPVCPB - unfunded actuarial present value of credited projected benefits (see page A-4).

The **Short Condition Test** is another way of looking at a system's progress under its funding program - based on the actuarial present value of credited projected benefits. In a short condition test, the plan's valuation assets are compared with: 1) Active member contributions on deposit; 2) The liabilities for future benefits to present retired lives; 3) The liabilities allocated to 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 valuation assets (except in rare circumstances). In addition, the liabilities assigned to service already rendered by active members (liability 3) will be partially covered by the remainder of valuation assets. The larger the funded portion of liability 3, the stronger the condition of the system. Liability 3 being fully funded is unusual and not necessarily the by-product of level percent-of-payroll financing methods.

The schedule below illustrates the history of liabilities 1, 2 and 3.

**Short Condition Test - Comparative Statement**  
(\$ amounts in thousands)

Valuation Date December 31	Present Value of Credited Projected Benefits			Valuation Assets	Portion of Present Values Covered by Assets		
	(1) Active Member Contr.	(2) Retirants and Benef.	(3) Active Members (Employer Financed Portion)		(1)	(2)	(3)
1986 *	\$ 1,655	\$ 6,006	\$ 21,341	\$ 29,145	100 %	100 %	101 %
1987 *	1,627	6,308	25,768	34,096	100	100	102
1988	1,584	6,998	29,146	38,668	100	100	103
1989 *	1,511	7,903	33,217	45,040	100	100	107
1990	1,489	8,853	37,949	50,599	100	100	106
1990 *	1,489	8,853	39,839	50,599	100	100	101
1991	1,428	10,403	43,539	60,001	100	100	111
1992	1,399	11,711	46,553	68,433	100	100	119
1993	1,472	12,515	51,641	77,489	100	100	123
1993 *	1,472	12,515	56,057	77,489	100	100	113
1994	1,401	20,491	53,317	84,399	100	100	117
1995 *	1,591	22,160	59,330	94,730	100	100	120
1996	1,685	26,481	61,488	106,335	100	100	127
1997	1,544	30,538	49,505	120,718	100	100	179
1997 *	1,544	31,787	51,369	120,718	100	100	173
1998	1,698	31,403	51,651	109,474	100	100	148
1998 *	1,698	31,403	51,812	109,474	100	100	147
1999	1,894	33,749	50,338	118,595	100	100	165
1999 *	1,894	33,749	51,703	118,595	100	100	160
2000	2,064	37,084	53,083	120,905	100	100	154
2000 *	2,064	37,084	53,083	123,956	100	100	160
2001	2,401	39,424	49,140	123,669	100	100	167
2001 *	2,401	39,424	49,140	123,669	100	100	167
2002	2,217	40,667	47,764	117,372	100	100	156
2003	2,388	47,047	56,222	126,738	100	100	137
2004	2,513	53,031	48,914	126,802	100	100	146
2005	2,670	57,995	47,869	128,790	100	100	142
2006	2,758	64,574	46,247	132,168	100	100	140
<b>2006 *</b>	<b>2,758</b>	<b>64,574</b>	<b>47,357</b>	<b>132,168</b>	<b>100</b>	<b>100</b>	<b>137</b>

\* After changes in benefit provisions/cost methods.

**COMPUTED CITY PENSION CONTRIBUTIONS  
COMPARATIVE STATEMENT**

Fiscal Year Beginning July 1	Valuation Date December 31	% of Payroll Contributions		Valuation Payroll
		General	Public Safety	
1983	1982 @	12.37 %	13.65 %	\$ 9,954,722
1984	1983 *	12.37	15.85	10,214,049
1985	1984 *	13.49	19.23	10,518,429
1986	1985	13.29	18.75	11,373,793
1987	1986	11.42	17.59	12,048,592
1987	1986 *	13.67	17.59	12,048,592
1988	1987	12.00	14.76	13,083,451
1988	1987 *	14.91	16.34	13,083,451
1989	1988	14.69	15.98	14,162,413
1990	1989	12.93	13.72	14,774,001
1990	1989 *	13.11	19.39	14,774,001
1991	1990	13.09	19.44	16,105,129
1991	1990 *	13.09	22.99	16,105,129
1992	1991	11.65	21.21	17,323,677
1993	1992	10.02	17.82	17,619,701
1994	1993	7.64	15.07	18,518,880
1994	1993 *	9.24	20.09	18,518,880
1995	1994	8.00	18.62	17,598,618
1996	1995 *	7.23	16.23	19,039,969
1997	1996	3.66	13.40	20,535,959
1998	1997	0.00	9.15	16,133,023
1998	1997 *	0.00	10.99	16,133,023
1999	1998	3.73	0.04	16,201,219
1999	1998 *	4.30	0.04	16,201,219
1999	1999	0.00	0.00	15,056,554
1999	1999 *	0.05	0.00	15,056,554
2000	2000	0.00	0.00	15,441,200
2000	2000 *@	0.00	0.00	15,441,200
2001	2001	0.00	0.00	14,566,460
2001	2001 *	0.00	0.00	14,566,460
2002	2002	1.69	0.00	13,552,549
2003	2003	1.87	0.00	13,052,713
2004	2004	3.64	0.00	12,572,374
2005	2005	4.97	0.00	12,099,631
2006	2006	0.00	0.00	11,471,511
<b>2006</b>	<b>2006 *</b>	<b>1.79</b>	<b>1.79</b>	<b>11,471,511</b>

\* After changes in benefit provisions/cost method.

@ After change in asset valuation method.

## COMMENTS AND CONCLUSION

**COMMENT A:** For the fiscal year ended December 31, 2006, the System generated a \$727,270 experience loss. The loss was primarily the result of more retirements than expected, mortality losses among exiting retirees, and fewer terminations than expected. Salary increases which were, on average, lower than expected, and favorable investment experience partially offset these losses. Overall, the experience loss was approximately 0.6% of beginning of year liabilities.

**COMMENT B:** The funding value of assets is based on a five-year smoothed market asset valuation method. Since the previous actuarial valuation, the following two changes were made to the calculation process: 1) Assets values attributable to retiree health funds are excluded from all calculations; 2) The deferred investment gains and losses from the four years ending December 31, 2005 were combined into a single base to be recognized in four equal installments beginning with the current valuation.

**COMMENT C:** The results presented in this report reflect plan changes made since the previous valuation. These include an increase to the benefit multipliers for the TCOA group and changes to member contribution rates.

**COMMENT D:** Previous actuarial valuations allocated the funding value of assets between the General and Public Safety populations. Individual contribution requirements were then determined for these two groups. Beginning with the December 31, 2006 valuation, assets will no longer be allocated and a single contribution requirement will be determined that applies to both groups.

**CONCLUSION:** It is the actuary's opinion that the required contribution rate determined by the most recent actuarial valuation are sufficient to meet the Retirement System's funding objective, presuming continued timely receipt of required contributions.

## ACTUARIAL BALANCE SHEET - DECEMBER 31, 2006

### Present Resources and Expected Future Resources

	<b>Totals</b>
A. Valuation assets:	
1. Net assets from system financial statements (market value)	\$133,527,630
2. Valuation adjustment	(1,359,293)
3. Valuation assets	132,168,337
B. Actuarial present value of expected future employer contributions:	
1. For normal costs	15,302,192
2. For unfunded actuarial accrued liabilities	(12,868,988)
3. Total	2,433,204
C. Actuarial present value of expected future member contributions	2,843,735
D. Total Actuarial Present Value of Present and Expected Future Resources	\$137,445,276

### ACTUARIAL PRESENT VALUE OF EXPECTED FUTURE BENEFIT PAYMENTS AND RESERVES

	General	Public Safety	Totals
A. To retirants and beneficiaries	\$31,460,356	\$33,113,292	\$ 64,573,648
B. To vested terminated members	1,213,199	0	1,213,199
C. To present active members:			
1. Allocated to service rendered prior to valuation date	25,818,111	27,694,391	53,512,502
2. Allocated to service likely to be rendered after valuation date	5,307,343	12,838,584	18,145,927
3. Total	31,125,454	40,532,975	71,658,429
D. Total Actuarial Present Value of Expected Future Benefit Payments	63,799,009	73,646,267	137,445,276
E. Reserves:			
1. Allocated to retirants and beneficiaries	0	0	0
2. Unallocated investment income	0	0	0
3. Total	0	0	0
F. Total Actuarial Present Value of Expected Future Benefit Payments and Reserves	\$63,799,009	\$73,646,267	\$137,445,276

**DERIVATION OF ACTUARIAL GAIN (LOSS)  
YEAR ENDED DECEMBER 31, 2006**

The actuarial gains or losses realized in the operation of the Retirement System provide an experience test. Gains and losses are expected to cancel each other over a period of years (in the absence of double-digit inflation) and sizable year to year fluctuations are common. Detail on the derivation of the actuarial gain (loss) is shown below, along with a year by year comparative schedule.

UAAL* at start of year	\$ (15,530,227)
Normal cost	1,994,547
Actual employer contributions	247,688
Interest accrual	(952,692)
Expected UAAL before changes	(14,736,060)
Change from revised benefit provisions	1,139,802
Change from revised actuarial assumptions/cost method	0
Expected UAAL after changes	(13,596,258)
Actual UAAL at end of year	(12,868,988)
Gain (loss) (8) - (9)	\$ (727,270)
Gain (loss) as percent of actuarial accrued liabilities at start of year (\$113,260,008)	(0.6)%

\* *Unfunded actuarial accrued liability.*

Valuation Date December 31	Actuarial Gain (Loss) As % of Beginning Accrued Liabilities
1995	1.6 %
1996	5.9
1997	6.7
1998	3.8
1999	7.0
2000	4.3
2001	3.3
2002	(3.2)
2003	1.6
2004	(3.7)
2005	(0.7)
<b>2006</b>	<b>(0.6)</b>

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**SECTION B**

**SUMMARY OF BENEFIT PROVISIONS AND  
VALUATION DATA SUBMITTED BY THE  
RETIREMENT SYSTEM**

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**BENEFIT PROVISIONS EVALUATED AND/OR CONSIDERED  
(DECEMBER 31, 2006)**

**REGULAR RETIREMENT** (no reduction factor for age):

*Eligibility* - T.P.O.A., T.F.S.O.A. and T.C.O.A. members: 25 years of service; or age 60 with 10 years of service. General AFSCME, General Clerical Members, Classified or Exempt: Age 50 with 27 years of service; or age 55 with 25 years of service; or age 60 with 10 years of service.

*Mandatory Retirement Age* - None.

*Annual Amount*

<u>Division</u>	<u>Benefit</u>	<u>Supplemental Benefit</u>
T.P.O.A.	2.80% * FAC to 25 years 1.00% * FAC 26-30 years	
T.C.O.A.	2.80% * FAC to 25 years 1.00% * FAC 26-30 years	
T.F.S.O.A.	2.25% * FAC * Service	0.25% * FAC * Service
General AFSCME	2.25% * FAC * Service	0.25% * FAC * Service
General Classified/Exempt	2.25% * FAC * Service	0.25% * FAC * Service
General Clerical	2.25% * FAC * Service	0.25% * FAC * Service

*Type of Final Average Compensation* - Highest 3 years out of last 10. Some lump sums are included but payment of sick or vacation leave is not included.

**EARLY RETIREMENT (AGE REDUCTION FACTOR USED):**

*Eligibility* - Age 55 with 10 years of service.

*Annual Amount* - Computed as regular retirement benefit but reduced by 1/2% for each month by which retirement precedes age 60.

**DEFERRED RETIREMENT (vested benefits):**

*Eligibility* - 10 years of service. Benefit payable at age 60.

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

**DUTY DISABILITY RETIREMENT:**

*Eligibility* - No age or service requirement. Worker's compensation must be payable.

*Annual Amount* - Same as regular retirement. Upon termination of worker's compensation the benefit is recomputed to grant service credit for the period in receipt of worker's compensation. Minimum benefit is based on 10 years of credited service (66 2/3% of final average compensation for non-command/exempt public safety members, while in receipt of worker's compensation).

**NON-DUTY DISABILITY RETIREMENT:**

*Eligibility* - 5 years of service (10 years for Exempt and Classified, AFSCME employees hired after 2/96.

*Annual Amount* - Same as regular retirement, but with a minimum benefit based on 10 years of credited service.

**DUTY DEATH BEFORE RETIREMENT:**

*Eligibility* - No age or service requirement.

*Annual Amount* - Widow's benefit equal to regular retirement benefit actuarially reduced in accordance with a 100% joint and survivor election. Minimum benefit is 25% (50% for T.F.S.O.A., Command Officers and T.P.O.A.) of final average compensation. If no widow, children under 18 share equally in 25% (50% for Command Officers and T.P.O.A.) of final average compensation.

**NON-DUTY DEATH BEFORE RETIREMENT:**

*Eligibility* - 10 years service.

*Annual Amount* - Same as regular retirement but reduced in accordance with a 100% joint and survivor election.

**AUTOMATIC DEATH BENEFIT AFTER RETIREMENT: NONE.**

**POST-RETIREMENT ADJUSTMENTS:** One-time increases were granted in 1973, 1977, 1978, 1981, 1983, 1989 and 1999.

**HEALTH INSURANCE PREMIUM SUBSIDY:** Post-retirement health insurance premiums are subsidized by the City as follows:

T.C.O.A. - Fully paid after 7/1/94.

T.P.O.A - 4% per complete year, retired after 2/20/1996.

T.F.S.O.A- 4% per complete year, retired after 1/1/99.

AFSCME - 4% per complete year, retired after 1/1/01

Classified Exempt, Clerical - \$400/month or 4% per complete year, whichever is greater.

Retirees from prior provisions - \$400/month or 3% per complete year, whichever is greater.

**MEMBER CONTRIBUTIONS:** Expressed as percentages of compensation are as follows:

1.5% for clerical members

3.0% for T.F.S.O.A.

1.5% for classified and Exempt members

1.5% for AFSCME

4.0% for T.P.O.A.

4.0% for T.C.O.A

## REPORTED FUND BALANCE (MARKET VALUE)

Reserves	Reported Fund Balance December 31,	
	2006	2005
Reserve for Employees' Contributions	\$ 2,753,704	\$ 2,713,734
Reserve for Employer Contributions	85,141,685	85,768,821
Reserve for Retired Benefit Payments	45,632,241	38,620,326
Reserve for Undistributed Investment Income	0	0
Reserve for Health Insurance Premiums	38,874,516	37,189,824
Total Fund Balance	\$172,402,146	\$164,292,705

Valuation assets are equal to reported market value of assets (excluding health reserves), except that all realized and unrealized gains and losses are spread over a period of years, with 20% recognition the first year. Such spreading reduces the fluctuation in the City's computed contribution rate which might otherwise be caused by market value fluctuations. The details of the spreading technique are shown on page B-4. The valuation assets as of December 31, 2006 total \$132,168,337.

In financing actuarial accrued liabilities, valuation assets of \$132,168,337 were distributed as follows:

Reserves for	Valuation Assets Applied to Actuarial Accrued Liabilities for			Totals
	Active Members	Retirants & Beneficiaries	Contingency Reserve	
Employees' Contributions	\$ 2,753,704			\$ 2,753,704
Employer Contributions	85,141,685			85,141,685
Retired Benefit Payments		\$ 45,632,241		45,632,241
Valuation Asset Adjustment	(1,359,293)			(1,359,293)
<b>Totals</b>	<b>\$ 86,536,096</b>	<b>\$ 45,632,241</b>	<b>\$</b>	<b>\$132,168,337</b>

**Derivation of Valuation Assets  
Market Value with 20% Recognition of the Difference Between  
The Market Rate of Return and the Projected Rate of Return**

	2006	2007	2008	2009	2010
A. Funding Value Beginning of Year	\$ 128,790,235				
B. Market Value End of Year	133,527,630				
C. Market Value Beginning of Year	127,102,881				
D. Non-Investment Net Cash Flow (EE + ER cont.) - (Ret Ben. + Refunds + Adm.exp)	(5,063,076)				
E. Investment Income:					
E1. Market Total:B-C-D	11,487,825				
E2. Assumed Rate	6.50%				
E3. Amount for Immediate Recognition E2 * (A+D/2)	8,206,815				
E4. Amount for Phased-In Recognition E1-E3	3,281,010				
F. Phased-In Recognition of Investment Income:					
F1. Current Year: 0.20*E4	656,202				
F2. First Prior Year	(421,839) \$	656,202			
F3. Second Prior Year	0	(421,839) \$	656,202		
F4. Third Prior Year	0	0	(421,839) \$	656,202	
F5. Fourth Prior Year	0	0	0	(421,837) \$	656,202
F6. Total Recognized Investment Gain	234,363	234,363	234,363	234,365	656,202
<b>G. Funding Value End of Year: A+D+E3+F6</b>	<b>\$ 132,168,337</b>				
H. Difference between Market & Funding Value	1,359,293	1,124,930	890,567	656,202	0
I. Recognized Rate of Return	6.69%				
K. Ratio of Funding Value to Market Value	99%				

# ASSET INFORMATION REPORTED FOR VALUATION COMPARATIVE STATEMENT

Year Ended December 31	Revenues					Expenses					Assets Year-End *
	Employee Contrib.	Employer Contrib.	Investment Income	Misc. Income	Retirement Benefits	Contrib. Refunds	Health Insurance	Misc. Expenses			
1982	\$ 896	\$ 1,182,825	\$ 2,532,666	\$ -	\$ 112,755	\$ 27,667	\$ -	\$ 2,375	\$ 14,690,193		
1983	1,127	1,498,799	2,735,165	0	197,421	168,807	0	2,630	18,556,426		
1984	3,973	1,458,176	1,204,339	0	253,174	65,856	7,560	0	20,896,324		
1985	1,011	1,483,547	3,952,592	0	349,086	11,087	18,268	3,026	25,952,007		
1986	8,126	1,864,968	7,423,057	0	487,308	8,960	22,931	3,445	34,725,514		
1987	1,998	1,922,529	1,264,117	0	559,647	893	32,525	4,321	37,316,772		
1988	1,296	1,989,070	3,384,845	0	621,836	8,490	55,381	0	42,006,276		
1989	1,490	2,259,952	7,158,731	0	712,137	19,967	60,189	9,010	50,625,146		
1990	1,558	2,401,060	3,861,487	0	782,167	19,292	68,886	4,984	56,013,922		
1991	1,760	3,081,239	11,116,274	0	878,775	1,431	87,281	0	69,245,708		
1992	6,177	2,626,564	7,134,901	0	1,040,882	14,188	100,340	5,600	77,852,340		
1993	24,939	2,647,753	7,900,961	0	1,115,225	392	119,120	6,000	87,185,256		
1994	144,934	2,950,360	(187,532)	0	1,351,290	590	152,637	6,300	88,582,201		
1995	198,746	3,156,148	20,889,448	0	1,819,840	14,066	220,291	6,600	110,765,746		
1996	335,144	3,311,550	16,325,274	0	2,013,257	3,047	251,138	11,300	128,458,972		
1997	371,811	3,167,814	25,544,354	0	2,459,287	11,273	329,312	16,404	154,726,675		
1998	340,807	2,819,785	21,825,629	0	2,666,133	19,105,397	449,779	19,846	160,216,807		
1999	335,828	1,795,070	12,085,389	0	2,860,935	1,095,796	481,660	28,782	167,220,855		
2000	421,161	1,113,993	3,075,759	0	3,156,251	7,349,663	688,138	27,515	160,610,201		
2001	398,572	1,303,079	2,162,267	0	3,351,223	6,753,854	693,345	28,998	153,646,699		
2002	364,130	1,532,439	(7,992,398)	0	3,496,301	7,249,513	942,054	31,653	135,831,349		
2003	343,629	1,543,286	25,064,474	0	3,843,356	10,230	1,102,076	29,334	157,797,742		
2004	333,305	1,571,547	12,763,027	0	4,482,783	335,998	1,254,559	29,322	166,362,959		
2005	309,731	972,454	2,995,153	0	4,923,401	2,613	1,368,331	53,247	164,292,705		
<b>2006</b>	<b>308,887</b>	<b>247,688</b>	<b>14,764,828</b>	<b>0</b>	<b>5,529,394</b>	<b>57,875</b>	<b>1,592,311</b>	<b>32,382</b>	<b>172,402,146</b>		

\* Includes assets for retiree health benefits.

**SUMMARY OF  
CURRENT ASSET INFORMATION \*  
REPORTED FOR VALUATION**

**Market Value of Assets**

	<u>12/31/2006</u> Market Value	<u>12/31/2005</u> Market Value
Cash & equivalents	\$ 6,513,335	\$ 8,641,334
Government bonds	10,633,120	3,127,350
Corporate bonds	40,225,025	32,818,869
Stock	119,038,873	115,715,599
Real estate	0	3,666,260
Other (annuities)	0	2,432,152
Total Assets	<u>176,410,353</u>	<u>166,401,564</u>
Less accounts payable	<u>4,008,207</u>	<u>2,108,859</u>
Net Assets Available for Benefits	<u><u>\$172,402,146</u></u>	<u><u>\$164,292,705</u></u>

**Revenues and Expenses**

	<u>2006</u>	<u>2005</u>
Balance - January 1	\$164,292,705	\$ 166,362,959
Revenues		
Employees' contributions	308,887	309,731
Employer contributions	247,688	972,454
Investment income	14,764,828	2,995,153
Miscellaneous	0	0
Expenses		
Benefit payments	5,529,394	4,923,401
Refunds of member contributions	57,875	2,613
Administrative expenses	32,382	53,247
Health Insurance Premiums	1,592,311	1,368,331
Miscellaneous	<u>0</u>	<u>0</u>
Balance - December 31	<u><u>\$172,402,146</u></u>	<u><u>\$ 164,292,705</u></u>
Rate of Return net of expenses	9.2%	1.8%

\* Includes assets for retiree health benefits.

# RETIRANTS AND BENEFICIARIES ADDED TO AND REMOVED FROM ROLLS

## DEFINED BENEFIT PLAN COMPARATIVE STATEMENT

Year Ended December 31	Added to Rolls		Removed from Rolls		% Incr. Annual Benefit	Average Annual Benefit	Present Value of Benefits	Expected Removal
	No.	Annual Benefit	No.	Annual Benefit				
1977	2	\$ 10,273		\$ 3,489	52.7	\$ 2,449	\$ 371,952	*
1978	3	5,047	2	1,402	14.3	2,600	417,886	*
1979	3	19,301	1	4,039	49.2	3,394	560,168	*
1980	4	18,129	2	2,326	25.9	3,799	736,672	*
1981	9	26,689	1	8,434	43.5	3,774	1,057,130	*
1982	6	41,119	2		33.3	4,360	1,468,289	0.4
1983	17	90,799	1	5,288	69.8	4,829	2,418,904	0.6
1984	14	150,796	3	12,163	62.4	6,330	4,037,853	1.0
1985	8	112,614	1	2,435	30.5	7,359	5,351,070	1.2
1986	8	64,758	1	3,820	12.9	7,492	6,006,326	1.3
1987	6	45,628	3	12,295	6.3	7,638	6,307,514	1.6
1988	6	82,290	2	8,825	13.0	8,188	6,997,601	1.7
1989	6	71,518	1	4,836	14.7	8,824	7,902,521	1.9
1990	5	102,108	2	13,370	12.1	9,548	8,852,756	2.1
1991	10	185,752	6	53,568	16.1	10,592	10,403,174	2.2
1992	10	154,697	4	41,160	11.9	11,113	11,711,334	2.4
1993	6	110,685	3	26,135	7.9	11,630	12,514,776	2.6
1994	21	648,681		(1,572)	56.2	14,987	20,491,084	2.7
1995	6	84,312	4	55,506	1.6	14,978	21,287,811	2.9
1996	20	446,833	6	60,831	21.1	16,274	25,459,651	2.0
1997	14	420,457	1	10,217	18.5	17,608	30,537,712	2.8
1998	8	163,633	4	56,055	4.1	17,850	31,402,870	3.6
1999	10	286,293	3	69,193	7.9	18,426	33,748,959	4.0
2000	11	340,403	8	59,325	9.5	19,812	37,083,835	4.0
2001	9	240,483	3	24,905	6.7	20,384	39,424,271	4.4
2002	8	189,284	6	59,479	3.8	20,905	40,667,169	4.4
2003	15	521,015	4	17,957	14.1	22,405	47,046,673	4.4
2004	21	615,572	7	87,193	13.0	23,501	53,030,527	4.8
2005	14	520,152	5	101,352	9.1	24,512	57,995,428	4.8
<b>2006</b>	<b>15</b>	<b>609,624</b>	<b>3</b>	<b>29,746</b>	<b>11.5</b>	<b>25,829</b>	<b>64,573,648</b>	<b>4.8</b>

\* Not available.

**RETIRED MEMBERS - DECEMBER 31, 2006**  
**TABULATED BY VALUATION DIVISIONS**

**DEFINED BENEFIT MEMBERS**

<u>Valuation Division</u>	<u>No.</u>	<u>Annual Benefit</u>	<u>Age</u>
General	149	\$ 2,913,000	69.4 years
Public Safety	<u>68</u>	<u>2,691,799</u>	59.6 years
Totals	217	\$ 5,604,799	

**RETIRANTS AND BENEFICIARIES INCLUDED IN DEFINED BENEFIT VALUATION**  
**TABULATED BY TYPE OF BENEFITS BEING PAID**  
**DECEMBER 31, 2006**

Type of Benefits Being Paid	Number	Annual Benefits
Age and Service benefits		
Regular benefit - benefit terminating at death of retiree	63	\$1,259,918
100% joint and survivor benefit		
Option A	44	1,606,812
Option C	39	1,294,590
50% joint and survivor benefits		
Option B	21	584,728
Option D	15	511,549
Survivor Beneficiary	<u>23</u>	<u>220,504</u>
Total age and service benefits	205	5,478,101
Casualty benefits		
Non-Duty Disability - Regular		
- Retiree	1	12,097
- Beneficiary	4	21,843
Duty- Disability - Option A	1	7,866
Non-Duty Death benefit	3	44,206
Duty Death benefit	<u>3</u>	<u>40,686</u>
Total Casualty benefits	<u>12</u>	<u>126,698</u>
<b>Total Benefits Being Paid</b>	<b>217</b>	<b>\$5,604,799</b>

**RETIRANTS AND BENEFICIARIES INCLUDED IN DEFINED BENEFIT VALUATION**  
**BY ATTAINED AGES**  
**DECEMBER 31, 2006**

Attained Ages	No.	Annual Pensions
under 40	0	\$ -
40-44	1	7,866
45-49	7	251,423
50-54	27	1,001,136
55-59	35	1,538,092
60-64	41	1,128,936
65-69	28	727,807
70-74	23	410,056
75-79	27	304,294
80-84	19	175,130
85-89	8	46,235
90-94	1	13,824
95-99	0	0
100 & over	0	0
<b>Totals</b>	<b>217</b>	<b>\$ 5,604,799</b>

**VESTED TERMINATED MEMBERS INCLUDED IN DEFINED BENEFIT VALUATION**  
**BY ATTAINED AGES**  
**DECEMBER 31, 2006**

Attained Ages	Estimated	
	No.	Annual Benefits
43	1	\$ 6,175
45	1	13,230
47	2	16,808
48	1	8,826
49	1	18,720
51	1	13,419
52	1	6,312
53	1	11,442
54	2	39,579
56	1	16,350
58	2	36,556
59	3	28,023
<b>Totals</b>	<b>17</b>	<b>\$ 215,440</b>

**ACTIVE MEMBERS - DECEMBER 31, 2006**

**TABULATED BY VALUATION DIVISIONS**

**DEFINED BENEFIT MEMBERS**

<b>Valuation Division</b>	<b>No.</b>	<b>Annual Payroll</b>	<b>Average Age</b>	<b>Average Service</b>	<b>Average Pay</b>
General	90	\$ 5,429,336	51.5 years	19.1 years	\$60,326
Public Safety	<u>71</u>	<u>6,042,175</u>	43.5 years	15.6 years	85,101
Totals	161	\$ 11,471,511			

## ACTIVE MEMBERS INCLUDED IN DEFINED BENEFIT VALUATION

Valn. Date Dec. 31	Active Members					Average				
	General		Public Safety			Valuation Payroll	Age	Service	Pay	% Incr.
	Class/ Exempt	Other	Comm/ Other	TPOA	Total					
1972		183		66	249	\$ 2,907,267	36.1 yrs.	4.7 yrs.	\$ 11,676	7.6 %
1973		205		64	269	3,434,997	36.2	4.9	12,770	9.4
1974		222		68	290	4,123,892	36.3	5.3	14,220	11.4
1975		247		81	328	4,996,368	36.2	5.5	15,233	7.1
1976		254	20	62	336	5,615,394	36.8	6.2	16,712	9.7
1977		269	18	63	350	5,970,264	37.7	6.5	17,058	2.1
1978		261	18	69	348	6,628,692	38.0	7.2	19,048	11.7
1979		282	22	72	376	7,700,464	37.9	7.2	20,480	7.5
1980		279	21	86	386	8,947,885	38.0	7.6	23,181	13.2
1981	100	167	25	87	379	9,697,649	38.4	8.3	25,587	10.4
1982	92	163	32	78	365	9,954,722	39.0	9.2	27,273	6.6
1983	94	140	30	78	342	10,214,049	39.2	10.0	29,866	9.5
1984	97	135	32	74	338	10,518,429	39.2	11.3	31,120	4.2
1985	103	139	32	79	353	11,373,793	39.2	11.1	32,220	3.5
1986	108	141	37	79	365	12,048,592	39.5	11.0	33,010	2.5
1987	116	143	41	84	384	13,083,451	40.0	11.3	34,071	3.2
1988	118	142	43	86	389	14,162,413	40.4	11.7	36,407	6.8
1989	122	144	47	86	399	14,774,001	40.5	11.7	37,028	1.7
1990	128	148	46	90	412	16,105,129	41.1	12.0	39,090	5.6
1991	129	150	44	98	421	17,323,677	41.5	12.0	41,149	5.3
1992	132	150	45	96	423	17,619,701	42.0	12.7	41,654	1.2
1993	134	150	47	93	424	18,518,880	42.6	13.1	43,677	4.9
1994	128	147	39	87	401	17,598,618	43.0	13.4	43,887	0.5
1995	127	153	43	95	418	19,039,969	43.4	13.6	45,550	3.8
1996	135 *	160	44	95	434	20,535,959	43.2	13.1	47,318	3.9
1997	55 *	146	37	102	340	16,133,023	42.4	12.1	47,590	0.6
1998	59	116 *	40	99	314	16,201,219	43.0	13.3	51,761	8.8
1999	55	85 #	40	99	279	15,056,554	43.4	14.4	54,553	5.4
2000	55	76	29	97 *	257	15,441,200	44.1	14.8	60,317	10.6
2001	56	73	20	92	241	14,566,460	44.7	14.7	60,442	0.2
2002	59	66	21	71	217	13,552,549	45.7	15.8	62,454	3.3
2003	56	61	19	69	205	13,052,713	46.5	16.3	63,672	1.9
2004	52	54	19	61	186	12,572,374	46.9	16.9	67,593	6.2
2005	48	51	21	54	174	12,099,631	47.7	17.4	69,538	2.9
<b>2006</b>	<b>44</b>	<b>46</b>	<b>20</b>	<b>51</b>	<b>161</b>	<b>11,471,511</b>	<b>48.0</b>	<b>17.6</b>	<b>71,252</b>	<b>2.5</b>

\* Includes 1 member on leave of absence.

# Includes 3 members on leave of absence.

**ADDITIONS TO AND REMOVALS FROM ACTIVE MEMBERSHIP**  
**ACTUAL AND EXPECTED NUMBERS**

Year Ended Dec. 31	Number Added During Year		Normal Retirement		Disability Retirement		Died-In Service		Terminations			Active Members End of Year
	A	E	A	E	A	E	A	E	Trans. to DC	Other	E	
									A	A		
1987	33	14	5	2.5	0	0.9	2	0.9		7	23.9	384
1988	26	21	5	3.7	0	1.1	1	0.9		15	25.5	389
1989	30	20	5	3.6	1	1.1	1	1.0		13	24.5	399
1990	27	14	4	4.8	0	1.1	0	1.0		10	24.7	412
1991	24	15	9	8.7	0	1.1	0	1.0		6	24.8	421
1992	13	11	7	6.6	0	1.2	0	1.0		4	23.1	423
1993	18	17	6	9.1	0	1.2	0	1.2		11	21.4	424
1994	9	32	19	14.6	0	1.2	1	1.1		12	20.5	401
1995	17	16	3	8.6	0	1.2	1	1.2		10	17.8	418
1996	40	24	15	8.7	0	1.3	0	0.8		9	23.5	434
1997	27	121	13	8.7	0	1.3	0	0.8	98	10	23.5	340
1998	9	35	4	6.9	0	0.8	0	0.8	28	3	18.6	314
1999	5	40	7	8.6	0	0.7	0	0.5	26	7	14.7	279
2000	1	23	9	9.3	0	0.6	0	0.4	11	3	10.3	257
2001	0	16	4	6.9	0	0.6	1	0.5	10	1	8.2	241
2002	1	25	6	5.3	0	0.8	0	0.5	19	0	6.5	217
2003	0	12	10	4.4	0	0.7	1	0.4	0	1	5.3	205
2004	0	19	15	13.5	0	0.6	0	0.4	0	4	3.5	186
2005	0	12	10	13.5	1	0.6	0	0.4	0	1	3.5	174
<b>2006</b>	<b>1</b>	<b>14</b>	<b>13</b>	<b>10.6</b>	<b>0</b>	<b>0.6</b>	<b>0</b>	<b>0.4</b>	<b>0</b>	<b>1</b>	<b>3.1</b>	<b>161</b>
<b>5-Yr. Totals</b>	<b>2</b>	<b>82</b>	<b>54</b>	<b>47.3</b>	<b>1</b>	<b>3.3</b>	<b>1</b>	<b>2.05</b>	<b>19</b>	<b>7</b>	<b>22.014</b>	

A represents actual number.

E represents expected number based on assumptions outlined in Section C.

**GENERAL (CLERICAL) - DECEMBER 31, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Age Group	Years of Accrued Service						Totals		
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Salary
25-29		1						1	\$ 51,665
30-34		1						1	52,627
35-39			1					1	54,016
40-44		1			1			2	116,214
45-49		1	1			4		6	283,346
50-54			1		1	1		3	144,370
55-59			1	1		2		4	197,774
60				1				1	40,358
61			2					2	82,642
62			1	1				2	86,387
63		1			1			2	86,185
<b>Totals</b>		<b>5</b>	<b>7</b>	<b>3</b>	<b>3</b>	<b>7</b>		<b>25</b>	<b>\$ 1,195,584</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 51.0 years.

Service: 17.5 years.

Annual Pay: \$47,823

**GENERAL (CLASSIFIED AND EXEMPT) - DECEMBER 31, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Age Group	Years of Accrued Service							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Up	No.	Salary
25-29								0	\$ -
30-34								0	0
35-39			1	1				2	128,526
40-44					1			1	67,724
45-49			2	3	1	1	1	8	612,519
50-54			5	4	4	3	4	20	1,418,285
55-59		1	2	2	2	1	1	9	641,374
61						1		1	69,188
64				1				1	51,066
67			1		1			2	106,161
<b>Totals</b>		<b>1</b>	<b>11</b>	<b>11</b>	<b>9</b>	<b>6</b>	<b>6</b>	<b>44</b>	<b>\$ 3,094,843</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 52.7 years.

Service: 20.3 years.

Annual Pay: \$70,337

**GENERAL (AFSCME) - DECEMBER 31, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Age Group	Years of Accrued Service						Totals		
	0-4	5-9	10-14	15-19	20-24	25-29	30 Up	No.	Salary
25-29									\$ -
20-24									
25-29		1						1	49,106
30-34			1					1	50,467
35-39		1	2	3	3	2		11	604,435
40-44			1	1		1	1	4	220,101
45-49			1	1	2			4	214,800
50-54									
55-59									
<b>Totals</b>		<b>2</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>3</b>	<b>1</b>	<b>21</b>	<b>\$ 1,138,909</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 49.3 years.

Service: 18.4 years.

Annual Pay: \$54,234

**PUBLIC SAFETY - T.F.S.O.A. - DECEMBER 31, 2006**

**BY ATTAINED AGE AND YEARS OF SERVICE**

Age Group	Years of Accrued Service							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Up	No.	Salary
55-59			1				2	3	\$ 261,407
<b>Totals</b>			<b>1</b>				<b>2</b>	<b>3</b>	<b>\$ 261,407</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 56.6 years.

Service: 21.3 years.

Annual Pay: \$87,136

**PUBLIC SAFETY (T.P.O.A.) - DECEMBER 31, 2006**

**By Attained Age and Years of Service**

Age Group	Years of Accrued Service							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Up	No.	Salary
25-29		1						1	\$ 87,064
30-34		4						4	340,886
35-39		6	10	2				18	1,432,635
40-44			3	8				11	831,413
45-49				5	2			7	579,438
50-54			1	3		3		7	581,764
55-59		1		1	1			3	220,503
<b>Totals</b>	<b>0</b>	<b>12</b>	<b>14</b>	<b>19</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>51</b>	<b>\$ 4,073,703</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 42.1 years.

Service: 14.4 years.

Annual Pay: \$79,877

**PUBLIC SAFETY (T.C.O.A.) - DECEMBER 31, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Age Group	Years of Accrued Service						Totals		
	0-4	5-9	10-14	15-19	20-24	25-29	30 Up	No.	Salary
25-29									\$ -
30-34		1						1	85,175
35-39		1	1					2	202,763
40-44			1	2	1			4	387,855
45-49					6			6	630,897
50-54					1	1		2	213,507
55-59				1	1			2	186,868
<b>Totals</b>		<b>2</b>	<b>2</b>	<b>3</b>	<b>9</b>	<b>1</b>		<b>17</b>	<b>\$ 1,707,065</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest:

Age: 45.5 years.

Service: 18.5 years.

Annual Pay: \$100,416

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## SECTION C

FINANCIAL PRINCIPLES, ACTUARIAL VALUATION  
PROCESS, ACTUARIAL COST METHODS,  
ACTUARIAL ASSUMPTIONS AND DEFINITIONS OF  
TECHNICAL TERMS

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## BASIC FINANCIAL PRINCIPLES 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 pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit the member is, in effect, handed an "IOU" which reads: "The City of Troy Employees 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 requirement by having as its ***financial objective the establishment and receipt of 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 present value of future benefits assigned to members' 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).

The accumulation of invested assets *is a by-product of level percent-of-payroll contributions, not the objective*. Investment income becomes the 3rd major contributor to the retirement program, and the amount is directly related to the amount of contributions and investment performance.

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:

$$B = C + I - E$$

The aggregate amount of **B**enefit payments to any group of members and their beneficiaries cannot exceed the sum of:

The aggregate amount of **C**ontributions received on behalf of the group

... plus ...

**I**vestment earnings on contributions received and not required for immediate cash payments of benefits

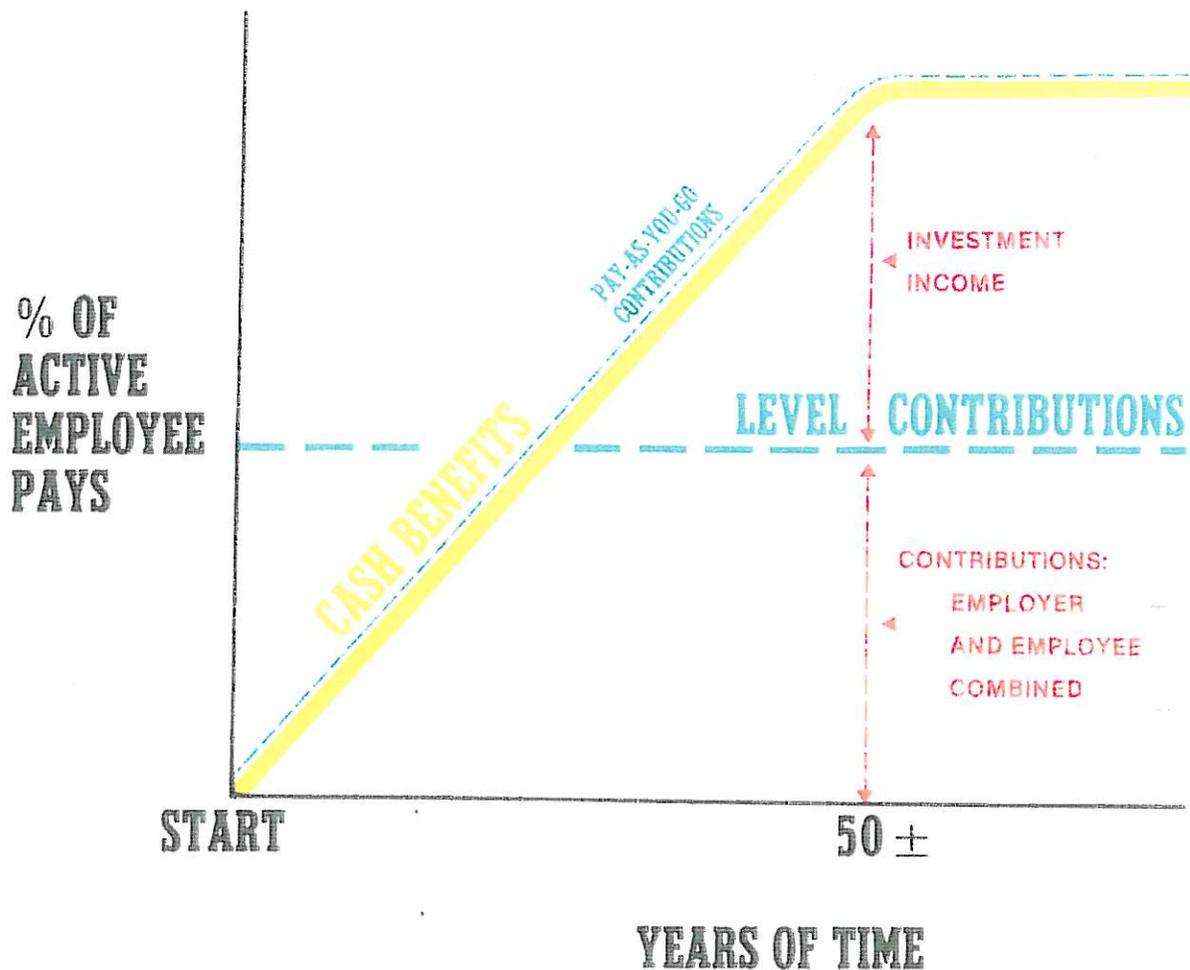
... minus ...

The **E**xpenses of operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. The present contribution rate for such systems is *artificially low*. The fact that the contribution rate is destined to increase relentlessly to a much higher level is often ignored.

*This method of financing is prohibited in Michigan by the state constitution.*

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



**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 previous page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program) which is an *increasing contribution method*; and the *level contribution method* which equalizes contributions between the generations.

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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. ***Covered Person Data***, furnished by plan administrator.
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
  
- B. + ***Asset data*** (cash & investments), furnished by plan administrator
  
- C. + ***Assumptions concerning future financial experience in various risk areas***, which assumptions are established by the Board of Trustees after consulting with the actuary
  
- D. + The ***funding method*** for employer contributions (the long-term, planned pattern for employer contributions)
  
- E. + ***Mathematically combining the assumptions, the funding method, and the data***
  
- F. = Determination of:
  - Plan financial position
  
  - and/or New Employer Contribution Rate

## ACTUARIAL COST METHODS USED FOR THE VALUATION

*Age and Service Benefits.* Normal cost and the allocation of actuarial present values between service rendered before and after the valuation date were determined using an individual entry-age actuarial cost method having the following characteristics:

- (i) the annual normal costs for each individual active member, payable from the entry date to the member's projected date of retirement, are sufficient to accumulate the actuarial present value of the member's future service benefit at the time of retirement;
- (ii) each annual normal cost is a constant percentage of the member's year by year projected covered pay.

*Casualty Benefits.* Normal cost contributions were determined using a one-year term cost method. This method produces contributions sufficient to fund the value of (i) disability benefits likely to be incurred during the year (net of the member's accrued age and service benefits), and (ii) survivor benefits likely to be incurred during the year because of a member's death while employed.

*Amortization of Unfunded Actuarial Accrued Liabilities.* Unfunded actuarial accrued liabilities were amortized by level dollar contributions (principal and interest combined) over a period of 10 years for pension benefits.

## ACTUARIAL ASSUMPTIONS IN THE VALUATION PROCESS

The actuary calculates contribution requirements and actuarial present values of a retirement system by applying actuarial assumptions to the benefit provisions and people information of the system, using the actuarial cost methods described on page C-5.

The principal areas of risk which require assumptions about future experience are:

- (i) Long-term rates of investment return to be generated by the assets of the System.
- (ii) Patterns of pay increases to members.
- (iii) Rates of mortality among members, retirants and beneficiaries.
- (iv) Rates of withdrawal of active members.
- (v) Rates of disability among active members.
- (vi) The age patterns of actual retirements.

In making a valuation, the actuary calculates the monetary effect of each assumption for as long as a present covered person survives - - - a period of time which can be as long as a century.

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The employer contribution rate has been computed to remain level from year to year so long as benefits and the basic experience and make-up of members do not change. Examples of favorable experience which would tend to reduce the employer contribution rate are:

- (1) Investment returns in excess of 6.5% per year.
- (2) Member non-vested terminations at a higher rate than outlined on page C-11.
- (3) Mortality among retirants and beneficiaries at a higher rate than indicated by the 1983 Group Annuity Mortality Table.
- (4) Increases in the number of active members.

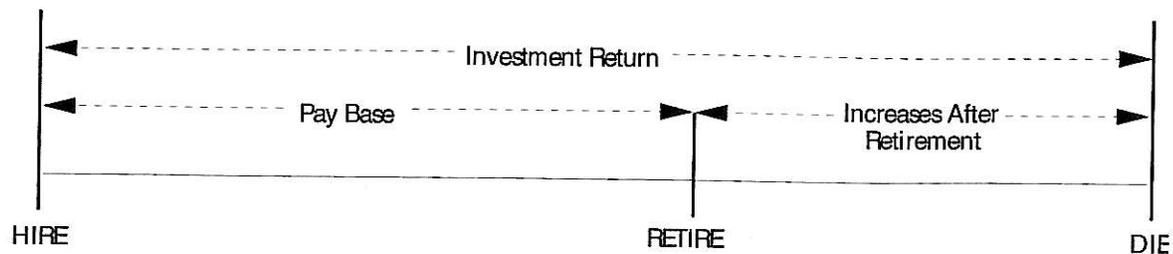
Examples of unfavorable experience which would tend to increase the employer contribution rate are:

- (1) Pay increases in excess of the rates outlined on page C-9.
  - (2) An acceleration in the rate of retirement from the rates outlined on page C-12.
  - (3) A pattern of hiring employees at older ages than in the past.
- 

Actual experience of the system will not coincide exactly with assumed experience, regardless of the choice of the assumptions, the skill of the actuary or the precision of the calculations. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time one or more of the assumptions is modified to reflect experience trends (but not random or temporary year to year fluctuations).

## Relationship of Economic Assumptions In Computing Contributions to a Retirement System



### Investment Return

An increase in this assumption reduces computed contributions. The assumption operates over all parts of an employee's lifetime.

### Pay Base

An increase in this assumption increases computed contributions. However, a 1% increase in this assumption, coupled with a 1% increase in Investment Return reduces computed contributions. This is because the Pay Base assumption operates only over an employee's working lifetime, while the Investment Return assumption operates over the employee's entire lifetime, and therefore has a greater effect.

### Increases After Retirement

An increase in this element increases computed contributions.

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If Investment Return, Pay Base, and Increases After Retirement are each increased by equal amounts, computed contributions remain the same (except in plans using Final Average Pay as a factor in computing benefits; the multi-year average used for Final Average Pay causes computed contributions to decrease slightly).

If Investment Return and Pay Base are increased by equal amounts, with no change in Increases After Retirement, computed contributions decrease – sometimes significantly. The decreases represent the projected devaluation of an employee's benefits following retirement.

## ACTUARIAL ASSUMPTIONS USED FOR THE VALUATION

**Investment Return** (net of expenses).

6.5% a year, compounded annually. This rate consists of a real rate of return of 2.5% a year plus a long-term rate of inflation of 4.0% a year.

This assumption is used to equate the value of payments due at different points in time and was first used for the December 31, 1995 valuation. Approximate rates of investment return, for the purpose of comparisons with assumed rates, are shown below.

	Year Ended December 31				
	2006	2005	2004	2003	2002
Recognized Rate of Investment Return	6.7%	4.8%	5.0%	9.7%	7.6%

The nominal rate of return was computed using the approximate formula  $i = I$  divided by  $1/2 (A + B - I)$ , where  $I$  is actual investment income (after smoothing gains and losses) net of expenses,  $A$  is the beginning of year valuation asset value, and  $B$  is the end of year valuation asset value.

These rates of return should not be used for measurement of an investment advisor's performance or for comparisons with other systems -- *to do so will mislead.*

**Pay Projections.** These assumptions are used to project current pays to those upon which benefits will be based. The assumptions were first used for the December 31, 1978 valuation.

Annual Rate of Pay Increase for Sample Ages			
Sample Ages	Base (Economic)	Merit and Longevity	Total
20	4.0 %	4.0 %	8.0 %
25	4.0	3.2	7.2
30	4.0	2.8	6.8
35	4.0	2.5	6.5
40	4.0	2.2	6.2
45	4.0	1.7	5.7
50	4.0	1.2	5.2
55	4.0	0.7	4.7
60	4.0	0.2	4.2

If the number of active members remains constant, the total active member payroll will increase 4.0% annually, the base portion of the individual pay increase assumptions.

Changes actually experienced in average pay have been as follows:

Increase in	Year Ended December 31					3-Year Average	5-Year Average
	2006	2005	2004	2003	2002		
Average pay	2.5%	2.9%	6.2%	1.9%	3.3%	3.8%	3.3%

**Mortality Table.** The 1983 Group Annuity Mortality Table, for males and females. This table was first used for the December 31, 1995 valuation. Sample values follow:

Sample Attained Ages	Single Life Retirement Values			
	Present Value of \$1.00 Monthly for Life		Future Life Expectancy (Years)	
	Men	Women	Men	Women
	50	\$151.83	\$163.46	29.18
55	141.54	155.23	24.82	30.24
60	129.07	144.87	20.64	25.67
65	114.32	132.18	16.69	21.29
70	98.49	116.95	13.18	17.13
75	82.32	100.04	10.15	13.37
80	66.65	83.10	7.64	10.20

This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement.

**Rates of separation from active membership.** The rates do not apply to members eligible to retire and do not include separation on account of death or disability. This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	Percent Separating Within Next Year	
		General	Public Safety
ALL	0	30.00 %	15.00 %
	1	20.00	10.00
	2	15.00	8.00
	3	10.00	7.00
	4	7.00	6.00
25	5 & Over	6.00	5.00
30		6.00	4.50
35		6.00	3.55
40		6.00	1.45
45		3.50	0.75
50		1.50	0.75
55		1.50	0.75
60		1.50	0.75

The rates were first used for the December 31, 1975 valuation.

**Rates of Disability.** These assumptions represent the probabilities of active members becoming disabled.

Sample Ages	Percent Becoming Disabled Within Next Year	
	Men	Women
20	0.08 %	0.10 %
25	0.08	0.10
30	0.08	0.10
35	0.08	0.10
40	0.20	0.36
45	0.26	0.41
50	0.49	0.57
55	0.89	0.77
60	1.41	1.02
65	1.66	1.23

The mortality table was set forward 10 years for projecting disability costs.

These rates were first used for the December 31, 1976 valuation.

**Rates of Retirement.** These rates are used to measure the probabilities of an eligible member retiring during the next year.

Retirement Ages	Percent of Active Members Retiring Within Next Year			
	General	Public Safety		
		T.F.S.O.A. & Exempt	T.C.O.A.	T.P.O.A.
43			35	40
44			25	40
45			20	40
46			15	40
47			15	40
48			15	40
49			15	35
50	15	35	15	20
51	10	25	25	15
52	5	20	30	15
53	5	15	100	15
54	5	15		15
55	5	15		15
56	5	15		15
57	5	15		25
58	5	25		100
59	5	30		100
60	5	100		
61	5			
62	30			
63	10			
64	10			
65	100			

T.P.O.A, T.F.S.O.A. and T.C.O.A. members were assumed to be eligible for retirement after 25 years of service, or after attaining age 60 with 10 or more years of service. Members were assumed to be eligible for retirement after attaining age 50 with 27 years of service, or after attaining age 60 with 10 or more years of service. General AFSCME, General Clerical, and Classified or Exempt members were assumed to be eligible for retirement after attaining age 50 with 27 years of service, or age 55 with 25 years of service; or age 60 with 10 years of service.

These rates were first used for the December 31, 1973 valuation. The rates for Classified, Exempt and Command Officers were first used for the December 31, 1981 valuation. The rates for Non-Classified/Exempt General members were first used for the December 31, 1986 valuation.

**Active Member Group Size.** The number of active members was assumed to remain constant. This assumption is unchanged from previous valuations.

**SUMMARY OF ASSUMPTIONS USED  
DECEMBER 31, 2006**

*Pensions in an Inflationary Environment*

**VALUE OF \$1,000/MONTH RETIREMENT BENEFIT  
To an Individual Who Retires at Age 60  
In an Environment of 4.00% Inflation**

<u>Age</u>	<u>Value</u>
60	\$1,000
61	962
62	925
63	889
64	855
65	822
70	676
75	556
80	457
85	375

The life expectancy of a 60 year old male retiree is age 80. The life expectancy for a 60 year old female retiree is age 85. Half of the people will outlive their life expectancy. The effects of even moderate amounts of inflation can be significant for those who live to an advanced age.

**SUMMARY OF ASSUMPTIONS USED**  
**MISCELLANEOUS AND TECHNICAL ASSUMPTIONS**  
**DECEMBER 31, 2006**

**Marriage Assumption.** 90% of males and 90% of females are assumed to be married for purposes of death-in-service benefits.

**Pay Increase Timing.** Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

**Decrement Timing.** Decrements of all types are assumed to occur mid-year.

**Eligibility Testing.** Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

**Benefit Service.** Exact fractional service is used to determine the amount of benefit payable.

**Decrement Relativity.** Decrement rates are used without adjustment for multiple decrement table effects.

**Decrement Operation.** Disability and mortality decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility.

**Normal Form of Benefit.** The assumed normal form of benefit is the straight life form.

**Loads.** 5% for age and service retirements to account for lump sums includable in final average compensation.

**Incidence of Contributions.** Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.

## DEFINITIONS OF TECHNICAL TERMS

**Accrued Service.** Service credited under the system which was rendered before the date of the actuarial valuation.

**Actuarial Accrued Liability.** The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as "past service liability".

**Actuarial Assumptions.** 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.

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

**Actuarial Equivalent.** One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

**Actuarial Gain (Loss).** The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

**Actuarial Present Value.** 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 payments.

**Amortization.** Paying off an interest-discounted amount with periodic payments of interest and (generally) principal -- as opposed to paying off with a lump sum payment.

**Credited Projected Benefit.** The portion of a member's projected benefit attributable to service before the valuation date - allocated based on the ratio of accrued service to projected total service and based on anticipated future compensation.

**Experience Gain (loss).** The difference between actual actuarial costs and assumed actuarial costs – during the period between two valuation dates.

**Funding Value of Assets.** Also referred to as actuarial value of assets, smoothed market value of assets, or valuation assets.

Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased in over a closed 5 year period. During periods when investment performance exceeds the assumed rate, valuation assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, valuation assets will tend to be greater than market value. If assumed rates are exactly realized for 4 consecutive years, valuation assets will become equal to market value.

**Normal Cost.** The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as "current service cost".

**Unfunded Actuarial Accrued Liabilities.** The difference between actuarial accrued liabilities and valuation assets. Sometimes referred to as "unfunded past service liability" or "unfunded supplemental present value".

Most retirement systems have unfunded actuarial accrued liabilities. They arise each time new benefits are added and each time an actuarial loss occurs.

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

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**SECTION D**

**CERTAIN DISCLOSURES REQUIRED BY STATEMENT  
NO. 25 AND NO. 27 OF THE GOVERNMENTAL  
ACCOUNTING STANDARDS BOARD**

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## ACTUARIAL ACCRUED LIABILITY

The actuarial accrued liability is a measure intended to help users assess (i) a pension fund'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 individual attained-age actuarial cost method for General and the individual entry-age actuarial cost method for Public Safety. 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 actuarial accrued liability was determined as part of an actuarial valuation of the plan as of December 31, 2006. Significant actuarial assumptions used in determining the actuarial accrued liability include (a) a rate of return on the investment of present and future assets of 6.5% per year compounded annually, (b) projected salary increases of 4.0% per year compounded annually, (c) additional projected salary increases of 0.2% to 4.0% per year attributable to seniority/merit, and (d) the assumption that benefits will not increase after retirement.

Actuarial Accrued Liability	
Active members	\$ 53,512,502
Retired members and beneficiaries currently receiving benefits	64,573,648
Vested terminated members not yet receiving benefits	<u>1,213,199</u>
Total Actuarial Accrued Liability	119,299,349
Actuarial Value of Assets (market value was \$133,527,630)	<u>132,168,337</u>
Unfunded Actuarial Accrued Liability	<u><u>\$(12,868,988)</u></u>

During the year ended December 31, 2006, the Plan experienced a net change of \$6,039,341 in the actuarial accrued liability. A change to benefit provisions account for \$1,139,802 of this change. There were no changes in actuarial assumptions during the year.

**REQUIRED SUPPLEMENTARY INFORMATION**  
**SCHEDULE OF FUNDING PROGRESS**  
(\$ amounts in thousands)

Actuarial Valuation Date December 31	Actuarial Value of Assets# (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded AAL (b)-(a)	Funded Ratio (a)/(b)	Active Member Covered Payroll (c)	Unfunded AAL as a Percentage of Active Member Covered Payroll ((b-a)/c)
1995	\$ 94,730	\$ 85,625	(\$9,105)	110.6	\$19,040	(47.8) %
1996	106,334	92,845	(13,489)	114.5	20,536	(65.7)
1997	120,718	105,689	(15,029)	114.2	16,133	(93.2)
1998	109,474	90,869	(18,605)	120.5	16,201	(114.8)
1999	118,595	94,661	(23,934)	125.3	15,057	(159.0)
2000	123,956	99,740	(24,216)	124.3	15,441	(156.8)
2001	123,669	97,140	(26,529)	127.3	14,566	(182.1)
2002	117,372	95,527	(21,845)	122.9	13,553	(161.2)
2003	126,738	103,558	(23,180)	122.4	13,053	(177.6)
2004	126,802	109,364	(17,438)	115.9	12,572	(138.7)
2005	128,790	113,260	(15,530)	113.7	12,100	(128.4)
<b>2006</b>	<b>132,168</b>	<b>119,299</b>	<b>(12,869)</b>	<b>110.8</b>	<b>11,472</b>	<b>(112.2)</b>

# smoothed-market value.

Analysis of the dollar amounts of actuarial value of assets, actuarial accrued liability, or 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. 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 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.

**REQUIRED SUPPLEMENTARY INFORMATION  
SCHEDULE OF EMPLOYER CONTRIBUTIONS**

<b>Fiscal Year Ending June 30</b>	<b>Actuarial Valuation Date December 31</b>	<b>Annual Required Contribution* (In thousands)</b>
1995	1993	\$3,146
1996	1994	3,267
1997	1995	3,367
1998	1996	2,759
1999	1997	2,655
2000	1998	1,087
2001	1999	1,174
2002	2000	1,461
2003	2001	1,605
2004	2002	1,482
2005	2003	117
2006	2004	213
<b>2007</b>	<b>2005</b>	<b>273</b>

\* Since it was stated to the actuary that the City's practice is to contribute the percent of payroll employer contribution rate shown in the actuarial valuation results, the values shown are the actual contributions reported by the City in the fiscal year. Also, for fiscal years ending in 2004 and earlier, annual required contributions include contributions for retiree health benefits.

**NOTES TO REQUIRED SUPPLEMENTARY INFORMATION  
SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS**

Valuation Date	12/31/2006
Actuarial Cost Method	Individual Entry Age
Amortization Method	Level Percent of payroll, no growth
Remaining Amortization Period	10-years open
Asset Valuation Method	5-year smoothed market
Actuarial Assumptions:	
Investment Rate of Return*	6.5%
Projected Salary Increases*	4.2% - 8.0%
*Includes Inflation	4.0%