



**THE REPORT OF THE  
ANNUAL ACTUARIAL VALUATION  
OF THE  
MISSOURI DEPARTMENT OF TRANSPORTATION AND  
HIGHWAY PATROL EMPLOYEES' RETIREMENT SYSTEM  
(MPERS)  
JUNE 30, 2006**

**Gabriel Roeder Smith & Company**



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October 10, 2006

The Retirement Board  
Missouri Department of Transportation  
and Highway Patrol Employees' Retirement System  
P.O. Box 1930  
Jefferson City, Missouri 65102-1930

Ladies and Gentlemen:

The results of the regular annual **actuarial valuation as of** June 30, 2006 of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System, as established by Chapter 104 of the Missouri Revised Statutes, are presented in this report.

The member statistical data required for the valuation together with pertinent data on financial operations was furnished by your Executive Director and his staff. Data was reviewed for reasonableness, but was not audited by the actuary. The actuarial assumptions used in making the valuation are shown in Section E of this report.

**Your attention is directed particularly** to the summary of the results on pages 2-6.

The actuarial calculations were performed in accordance with accepted actuarial procedures. The calculations were based upon current plan provisions of the Retirement System, the plan provisions of the Missouri State Employees Year 2000 Plan and upon actuarial assumptions that are internally consistent and reasonable based upon the actual experience of the System.

The cooperation of the Executive Director and the staff in furnishing materials requested for this valuation, and the complete and excellent condition of the records, is acknowledged with appreciation.

Respectfully submitted,

Brian B. Murphy, F.S.A.

Kenneth G. Alberts

## SUMMARY

This report contains the results of the June 30, 2006 valuation. The table below shows a summary of the data used in the valuation as well as the unfunded actuarial accrued liability for the two experience rated groups. This data was the basis for determining valuation results and recommended employer contribution rates.

	Non-Uniformed			Uniformed Patrol	Total
	Civilian Patrol Employees	MoDOT Employees	Non-Uniformed Total		
Participants					
Active Members					
Closed Plan	739	4,495	5,234	832	6,066
Year 2000 Plan	367	2,372	2,739	228	2,967
Total Active Members	1,106	6,867	7,973	1,060	9,033
<i>Total Active Members Prior Year</i>	<i>1,116</i>	<i>7,001</i>	<i>8,117</i>	<i>1,076</i>	<i>9,193</i>
Retiree -- Regular Pensioners					
Closed Plan	407	3,933	4,340	723	5,063
Year 2000 Plan	234	1,501	1,735	1	1,736
Total Regular Pensioners	641	5,434	6,075	724	6,799
Self Insured Disability Pensioners	7	120	127	3	130
Fully Insured Disability Pensioners	0	25	25	0	25
Terminated Vested Members	200	1,159	1,359	149	1,508
Total	1,954	13,605	15,559	1,936	17,495
Active Member Valuation Payroll	\$35,842,213	\$258,578,248	\$294,420,461	\$54,194,238	\$348,614,699
<i>Active Mem. Val. Payroll Prior Year</i>	<i>\$35,727,675</i>	<i>\$258,019,271</i>	<i>\$293,746,946</i>	<i>\$51,948,921</i>	<i>\$345,695,867</i>
Unfunded Actuarial Accrued Liability	N/A	N/A	\$952,752,165	\$266,542,719	\$1,219,294,884

The June 30, 2006 valuation results are used to determine the contribution rate for the plan year beginning July 1, 2007. A summary of valuation results and recommended contribution rates follows.

## SUMMARY - (CONTINUED)

The **total contribution rate** for the plan year beginning July 1, 2007 is shown below.

	<b>Employer Contribution Rates Expressed As % of Active Payroll For Total Benefits</b>					
	<b>Non-Uniformed</b>				<b>Uniformed Patrol</b>	
	<b>FY2008</b>			<b>FY2007 Total</b>	<b>FY2008</b>	<b>FY2007</b>
	<b>Civilian Patrol Employees</b>	<b>MoDOT Employees</b>	<b>Total</b>			
Normal Cost	11.17%	11.17%	11.17%	11.21%	13.12%	13.18%
Unfunded Liability	18.72%	18.72%	18.72%	18.28%	28.37%	29.49%
Expenses	0.55%	0.55%	0.55%	0.55%	0.55%	0.55%
Disability Insurance*	0.60%	0.60%	0.60%	0.56%	0.60%	0.56%
<b>Total</b>	<b>31.04%</b>	<b>31.04%</b>	<b>31.04%</b>	<b>30.60%</b>	<b>42.64%</b>	<b>43.78%</b>
Illustrative \$	\$11,125,423	\$80,262,688	\$91,388,111	\$89,886,566	\$23,108,423	\$22,743,238

*\* Actual charge by the insurance company is 0.60% of payroll. The difference of 0.04% of payroll is funding from a portion of the assets that were formerly held as a reserve for the LTD benefits.*

The dollar contribution amounts shown above are illustrated and based on the June 30, 2006 valuation payroll. Actual dollar contributions should be based on covered payroll for the fiscal year beginning July 1, 2007. The total contribution is based on a closed 29-year amortization period from July 1, 2007 of all UAAL in accordance with Board policy adopted September 28, 2006.

The combined contribution rate is less than the actual benefit payout rate. The difference is intended to be made up by investment return. The ability to contribute less than the benefit payout is one of the advantages of a funded retirement plan.

## SUMMARY (CONTINUED)

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**Assumption and Methods:** There were minor technical changes in the valuation process that enable us to better model the retirement and survivor benefits available to members who are expected to become disabled in the future. These changes resulted in an increase in the accrued liability of approximately \$14.8 million (or approximately 1/2% of the beginning of the year accrued liability). All other methods and assumptions are the same as those used in the June 30, 2005 actuarial valuation.

**Experience:** Aggregate experience during the year was more favorable than expected resulting in an experience gain of approximately \$36 million which is approximately 1.4% of beginning of year accrued liabilities. The primary source of experience gain was the return on investments (an 11.4% rate of return was recognized this year versus an assumed rate of 8.25%). This gain was partially offset by losses related to new retired members (more benefits were added than expected). The aggregate gain helped improve the funded status of the fund from 53.9% funded last year to 55.5% funded this year.

The expected illustrative dollar contribution for this valuation, based on last year's valuation results was \$114,842,548. The aggregate experience gain resulted in a lower dollar contribution than expected for both groups (based on the prior year's valuation results). However, the non-uniformed group had a decrease in membership of almost 2%. As a result, the computed contributions for the non-uniformed group became more expensive, relative to payroll, and the contribution *rate* for that group increased.

**Funding Policy:** The total contribution is based on normal cost plus a 29-year amortization of unfunded actuarial accrued liabilities from July 1, 2007. This policy was adopted by the Retirement Board on September 28, 2006. Currently, the remaining period as of July 1, 2007 is 29 years.

## SUMMARY - (CONTINUED)

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**Rate Reconciliation:** The table below shows the computed rate last year and the approximate effect of the changes that occurred during the year.

	<u>Non-Uniform</u>	<u>Uniform</u>
Computed employer contribution rate, prior valuation	30.60%	43.78%
Effects of:		
End of LTD reserve (used to offset premiums)	0.04%	0.04%
Revised methods and assumptions	0.26%	0.15%
'05/'06 recognized investment gain	(0.65%)	(1.10%)
'05/'06 liability experience loss	0.13%	0.16%
Change in administrative expenses	0.00%	0.00%
Extra 1/2% contribution for '06/'07 fiscal year	(0.03%)	(0.03%)
Misc (demographic, payroll weighting, etc.)	0.69%	(0.36%)
Computed employer contribution rate, current valuation	<u>31.04%</u>	<u>42.64%</u>

## SUMMARY - (CONCLUDED)

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**Conclusion:** Based upon the results of the June 30, 2006 regular annual actuarial valuation, it is our opinion that the Missouri Department of Transportation and Highway Patrol Employees' Retirement System continues to be financed in accordance with actuarial principles of level percent of payroll financing. This statement is based upon the fact that the employer is contributing to the system based upon actuarially determined rates and presumes a continuation of payment of actuarially determined contributions.

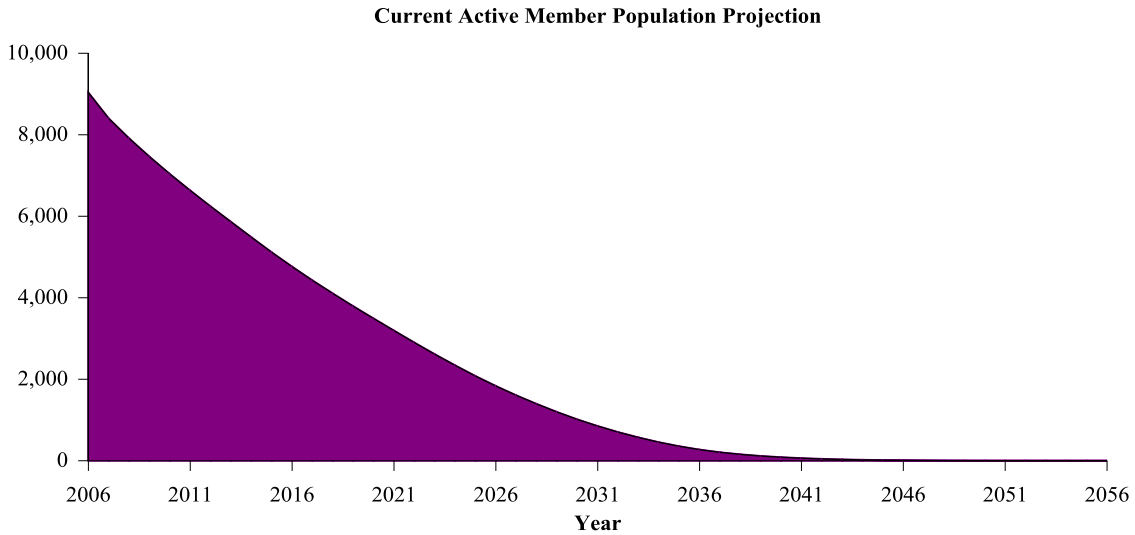


## SUMMARY OF KEY VALUATION RESULTS

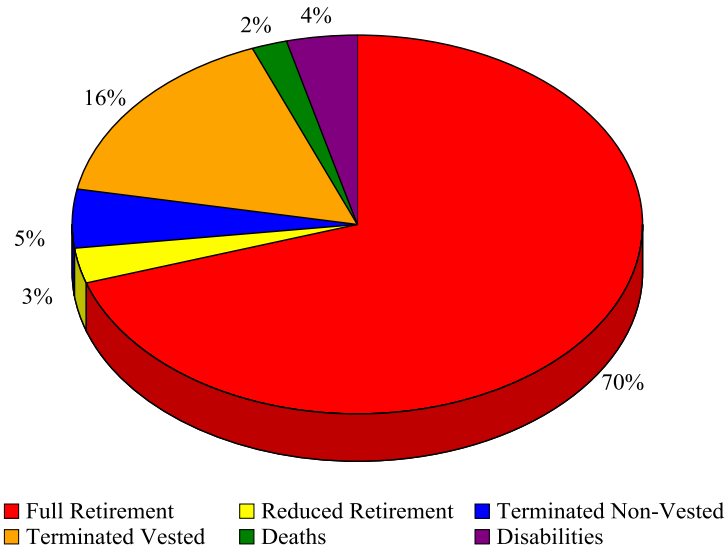
Actuarial Present Value	June 30, 2006			June 30, 2005
	(1) Actuarial Present Value	(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1) - (2)	Actuarial Accrued Liabilities
<b>Active Members</b>				
Service retirement benefits based on service rendered before and likely to be rendered after valuation date	\$ 1,219,384,081	\$ 335,187,000	\$ 884,197,081	\$ 863,313,757
Disability benefits likely to be paid to present active members who become totally and permanently disabled	43,513,698	11,763,155	31,750,543	19,320,080
Survivor benefits likely to be paid to widows and children of present active members who die before retiring	26,331,049	8,567,623	17,763,426	16,288,439
Separation benefits likely to be paid to present active members	49,007,514	22,272,577	26,734,937	21,882,567
Active Member Totals	\$ 1,338,236,342	\$ 377,790,355	\$ 960,445,987	\$ 920,804,843
<b>Terminated Vested Members</b>			46,104,940	37,293,046
<b>Retired Lives</b>			1,733,886,910	1,669,311,136
<b>Total Actuarial Accrued Liability</b>			\$ 2,740,437,837	\$ 2,627,409,025
<b>Actuarial Value of Assets</b>			1,521,142,953	1,417,348,982
<b>Unfunded Actuarial Accrued Liability</b>			\$ 1,219,294,884	\$ 1,210,060,043

# EXPECTED DEVELOPMENT OF PRESENT POPULATION AS OF JUNE 30, 2006

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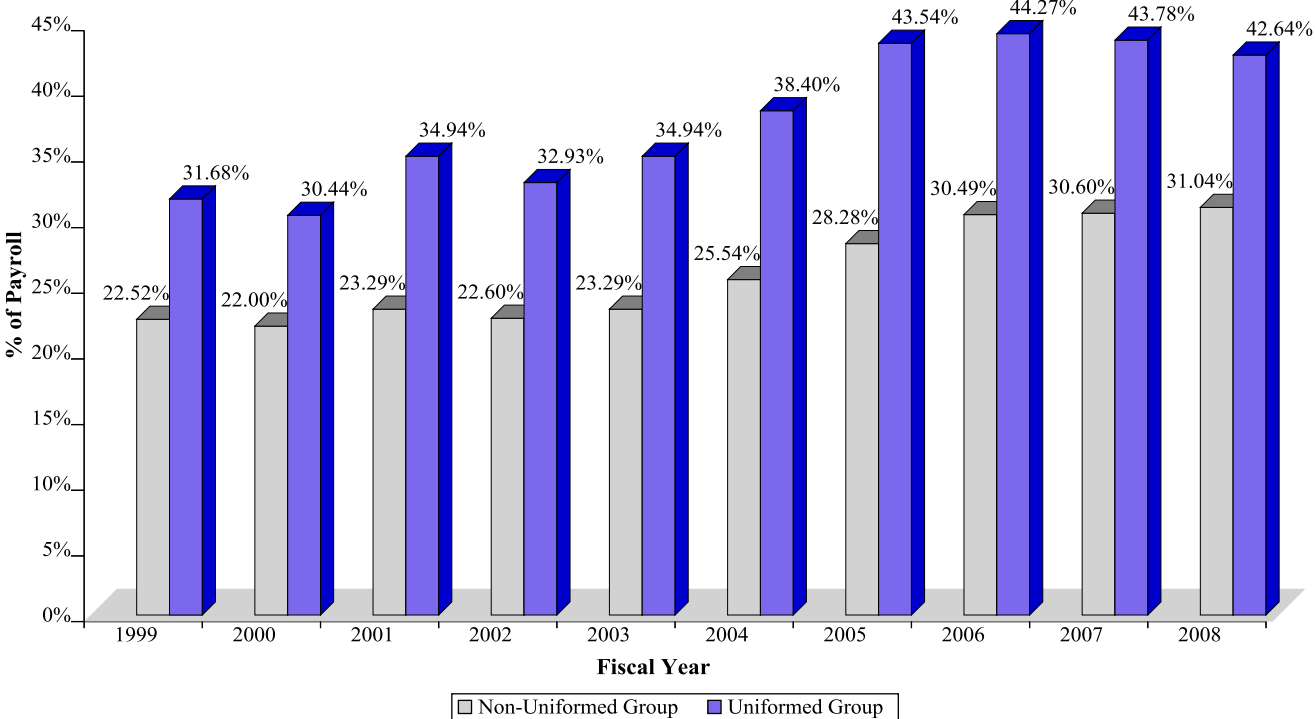
**Expected Terminations from Active Employment for Current Active Members**



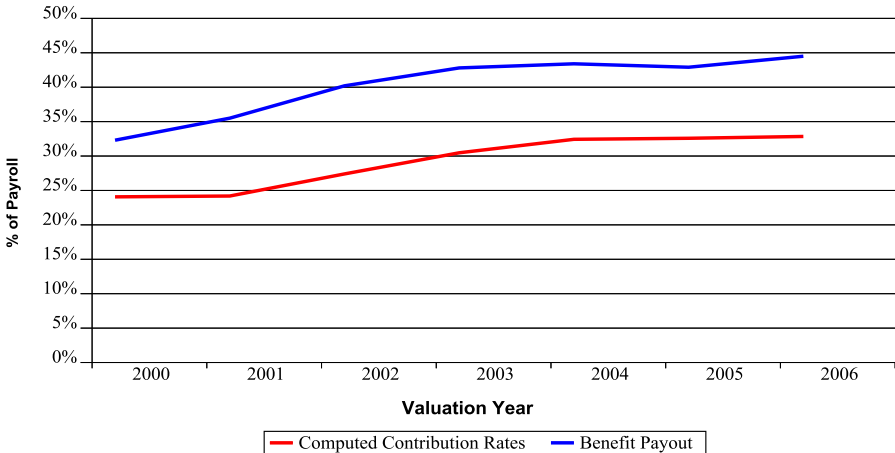
The charts show the expected future development of the present population in simplified terms. The retirement system presently covers 9,033 active members. Eventually, 5% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. Of the present population, 89% is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service with a vested benefit and 6% of the present population is expected to become eligible for death-in-service or disability benefits. Within 11 years, over half of the covered membership is expected to consist of new hires.

# HISTORICAL CONTRIBUTION RATES AND BENEFIT PAYOUTS

### Computed Contribution Rates



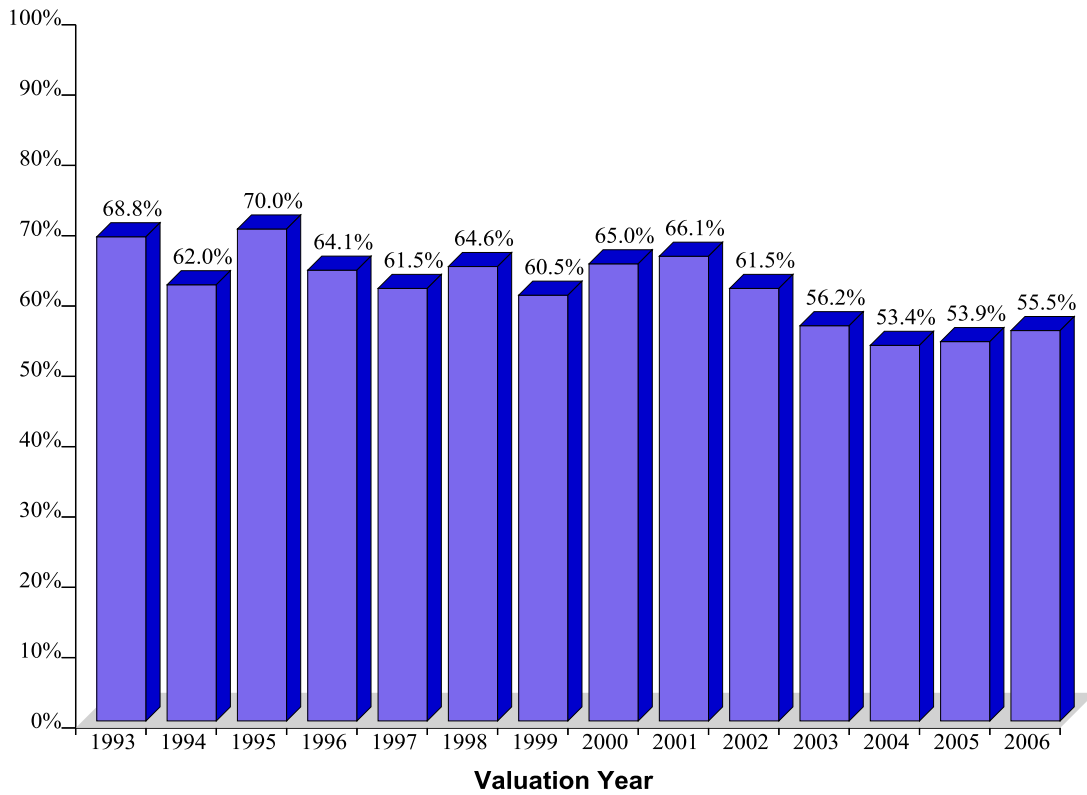
### Contribution Rates vs. Benefit Payout



# HISTORICAL FUNDED RATIOS

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## Actuarial Value of Assets as Percents of Accrued Liabilities (Funded Ratio)



# Section A



## Valuation Results

**COMPUTED CONTRIBUTIONS TO SUPPORT BENEFITS  
FOR PLAN YEAR BEGINNING JULY 1, 2007  
CONTRIBUTIONS COMPUTED AS OF JUNE 30, 2006**

<b>Contributions for</b>	<b>Non-Uniformed Employees</b>	<b>Uniformed Patrol</b>	<b>Total</b>
<b>Normal Cost</b>			
Age & service benefits	9.77%	12.25%	10.15%
Disability benefits #	0.44%	0.16%	0.40%
Survivor benefits	0.26%	0.25%	0.26%
Separation benefits	0.70%	0.46%	0.66%
<b>Total Normal Cost</b>	<b>11.17%</b>	<b>13.12%</b>	<b>11.47%</b>
<b>Unfunded Actuarial Accrued Liabilities*</b>			
Expense Provision	18.72%	28.37%	20.22%
Disability Insurance	0.55%	0.55%	0.55%
	0.60%	0.60%	0.60%
<b>Total Contribution Rate</b>	<b>31.04%</b>	<b>42.64%</b>	<b>32.84%</b>
<b>Illustrative Dollar Contribution</b>	<b>\$ 91,388,111</b>	<b>\$ 23,108,423</b>	<b>\$ 114,496,534</b>
<b>Prior Year</b>			
<b>Total Contribution Rate</b>	<b>30.60%</b>	<b>43.78%</b>	<b>32.58%</b>
<b>Illustrative Dollar Contribution</b>	<b>\$ 89,886,566</b>	<b>\$ 22,743,238</b>	<b>\$ 112,629,804</b>

# Includes costs for benefits payable after conversion to normal retirement and/or benefits payable to survivors. Costs for disability benefits payable prior to conversion are shown under Disability Insurance which is outsourced.

\* Amortized as a level-percentage of payroll over 29 years from July 1, 2007.

## DEVELOPMENT OF LIABILITIES

### AS OF JUNE 30, 2006

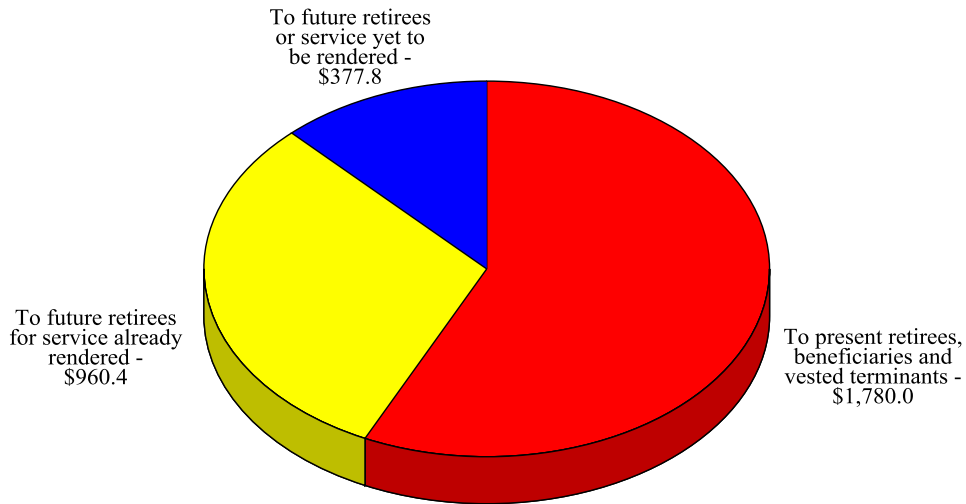
	Non-Uniformed Employees	Uniformed Patrol	Total
<b>Present Value of Future Benefits - Inactives</b>			
Retirees and Survivors	\$ 1,324,222,425	\$ 380,976,198	\$ 1,705,198,623
Disability Pensioners	27,420,294	1,267,993	28,688,287
Vested Terminated Employees	38,237,336	7,867,604	46,104,940
Subtotal PVFB - Inactives	1,389,880,055	390,111,795	1,779,991,850
<b>Present Value of Future Benefits - Actives</b>			
Age & Service benefits	924,742,096	294,641,985	1,219,384,081
Normal and Work Related Disability benefits	40,048,398	3,465,300	43,513,698
Survivor benefits	21,037,019	5,294,030	26,331,049
Separation benefits	41,231,588	7,775,926	49,007,514
Subtotal PVFB - Actives	1,027,059,101	311,177,241	1,338,236,342
<b>Total Present Value of Future Benefits</b>	2,416,939,156	701,289,036	3,118,228,192
<b>Less Present Value of Future Entry Age Normal Costs</b>	303,838,722	73,951,633	377,790,355
<b>Equals Actuarial Accrued Liability</b>	2,113,100,434	627,337,403	2,740,437,837
<b>Less Actuarial Value of Assets</b>	1,160,348,269	360,794,684	1,521,142,953
<b>Equals Unfunded Actuarial Accrued Liabilities</b>	952,752,165	266,542,719	1,219,294,884
<b>29-Year Amortization Payment on UAAL as a % of Projected Payroll</b>	\$ 59,334,395 18.72%	\$ 16,547,728 28.37%	\$ 75,882,123 20.22%

**SYSTEM RESOURCES & OBLIGATIONS**  
**SOURCES AND USES OF \$3,118.2 MILLION**  
**AS OF JUNE 30, 2006**

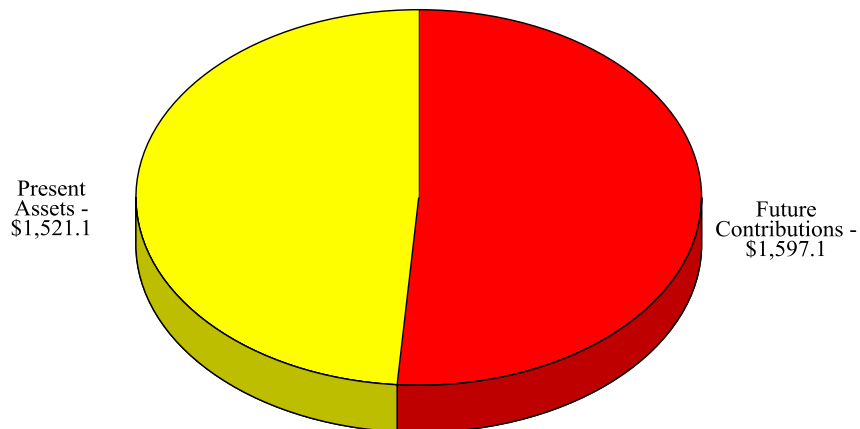
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(\$ Millions)

**Uses of Funds**



**Sources of Funds**





**FINANCING UNFUNDED ACTUARIAL ACCRUED LIABILITIES (UAL)  
WHICH WERE CALCULATED USING A WAGE INFLATION ASSUMPTION  
OF 3.75% AND AN INVESTMENT RETURN ASSUMPTION OF  
8.25% COMPOUNDED ANNUALLY  
29-YEAR AMORTIZATION**

Fiscal Year Ending June 30	Active Employee Payroll	Unfunded Actuarial Accrued Liability at End of Year	Annual UAAL Contributions During Fiscal Year		UAAL at Year End as % of Payroll
			Dollars	% of Payroll	
2006	\$348,614,699	\$1,219,294,884			349.8%
2007	361,687,750	1,242,399,239	\$72,192,875	19.96%	343.5%
2008	375,251,041	1,265,941,397	75,875,760	20.22%	337.4%
2009	389,322,955	1,288,464,941	78,721,102	20.22%	331.0%
2010	403,922,566	1,309,774,804	81,673,143	20.22%	324.3%
2011	419,069,662	1,329,655,662	84,735,886	20.22%	317.3%
2012	434,784,774	1,347,870,107	87,913,481	20.22%	310.0%
2013	451,089,203	1,364,156,664	91,210,237	20.22%	302.4%
2014	468,005,048	1,378,227,634	94,630,621	20.22%	294.5%
2015	485,555,237	1,389,766,761	98,179,269	20.22%	286.2%
2016	503,763,558	1,398,426,692	101,860,991	20.22%	277.6%
2017	522,654,691	1,403,826,223	105,680,779	20.22%	268.6%
2018	542,254,242	1,405,547,315	109,643,808	20.22%	259.2%
2019	562,588,776	1,403,131,851	113,755,451	20.22%	249.4%
2020	583,685,855	1,396,078,120	118,021,280	20.22%	239.2%
2021	605,574,075	1,383,837,002	122,447,078	20.22%	228.5%
2022	628,283,103	1,365,807,833	127,038,843	20.22%	217.4%
2023	651,843,719	1,341,333,918	131,802,800	20.22%	205.8%
2024	676,287,858	1,309,697,665	136,745,405	20.22%	193.7%
2025	701,648,653	1,270,115,310	141,873,358	20.22%	181.0%
2026	727,960,477	1,221,731,195	147,193,608	20.22%	167.8%
2027	755,258,995	1,163,611,567	152,713,369	20.22%	154.1%
2028	783,581,207	1,094,737,853	158,440,120	20.22%	139.7%
2029	812,965,502	1,013,999,369	164,381,625	20.22%	124.7%
2030	843,451,708	920,185,422	170,545,935	20.22%	109.1%
2031	875,081,147	811,976,741	176,941,408	20.22%	92.8%
2032	907,896,690	687,936,195	183,576,711	20.22%	75.8%
2033	941,942,816	546,498,730	190,460,837	20.22%	58.0%
2034	977,265,672	385,960,466	197,603,119	20.22%	39.5%
2035	1,013,913,135	204,466,881	205,013,236	20.22%	20.2%
2036	1,051,934,878	0	212,701,232	20.22%	0.0%

**GASB No. 25**  
**SCHEDULE OF FUNDING PROGRESS\***  
**JUNE 30, 2006**

<b>Year Ending June 30</b>	<b>Actuarial Asset Value</b>	<b>Accrued Liability – Entry Age</b>	<b>Unfunded Accrued Liability (UAAL)</b>	<b>Funded Ratio</b>	<b>Estimated Covered Payroll</b>		<b>UAAL as a Percentage of Covered Payroll</b>
1991	\$ 560,976,822	\$ 841,195,967	\$ 280,219,145	66.69%	\$ 220,856,988	**	126.88%
1992	622,018,133	904,097,721	282,079,588	68.80%	220,919,382		127.68%
1993	688,963,225	1,000,704,491	311,741,266	68.85%	228,032,159		136.71%
1994	746,946,221	1,204,313,635	457,367,414	62.02%	236,748,214		193.19%
1995	931,031,253	1,330,909,279	499,878,026	69.95%	243,561,510		205.24%
1996	916,553,828	1,429,910,844	513,357,016	64.10%	254,712,739		201.54%
1997	1,015,906,708	1,651,811,690	635,904,982	61.50%	271,070,643		234.59%
1998	1,126,961,804	1,744,052,411	617,090,607	64.62%	278,690,426		221.43%
1999 +	1,242,744,403	2,052,700,427	809,956,023	60.54%	288,068,083	**	281.17%
2000 #	1,422,796,011	2,188,826,322	766,030,311	65.00%	301,421,805	**	254.14%
2001	1,520,800,409	2,301,402,527	780,602,118	66.08%	323,400,023	**	241.37%
2002	1,450,507,432	2,358,452,163	907,944,731	61.50%	308,654,239	**	294.16%
2003	1,363,952,522	2,418,145,741	1,054,193,219	56.20%	319,345,949	**	330.11%
2004	1,331,588,207	2,492,918,976	1,161,330,769	53.41%	316,224,468	**	367.25%
2005 #	1,417,348,982	2,627,409,025	1,210,060,043	53.94%	334,030,151	**	362.26%
2006	1,521,142,953	2,740,437,837	1,219,294,884	55.51%	341,227,890	**	357.33%

\* Prior to 2003 this schedule was not required for the LTD Plan because it used the aggregate funding method. Therefore the assets and liabilities were excluded prior to 2003. In 2003 the LTD Plan was merged into the base plan. Assets and liabilities for existing LTD members are included beginning in 2003.

\*\* Values are estimated from contribution rate and amount.

+ Introduction of Year 2000 Plan; Change in Actuary.

# New assumptions adopted.

**GASB No. 25**  
**SCHEDULE OF EMPLOYER CONTRIBUTIONS\***  
**NON-UNIFORMED GROUP ##**  
**JUNE 30, 2006**

<b>Fiscal Year Ending June 30,</b>	<b>Estimated Covered Payroll</b>		<b>Actual Employer Contributions</b>	<b>Actual Employer Contribution %</b>	<b>Annual Required Contribution (ARC) %</b>		<b>Annual Pension Cost</b>	<b>Percentage of APC Contributed</b>
1991	\$ 190,667,552	**	\$ 35,864,567	18.81%	18.81%	\$	35,864,567	100.00%
1992	190,312,781		37,929,337	19.93%	19.93%		37,929,337	100.00%
1993	197,027,356		41,454,556	21.04%	21.04%		41,454,556	100.00%
1994	204,032,785		40,949,380	20.07%	20.07%		40,949,380	100.00%
1995	208,329,222		56,144,725	26.95%	26.95%		56,144,725	100.00%
1996	215,155,118		56,842,321	26.42%	26.42%		56,842,321	100.00%
1997	228,828,537		59,838,662	26.15%	26.15%		59,838,662	100.00%
1998	234,703,387		61,140,232	26.05%	26.05%		61,140,232	100.00%
1999 +	244,185,511	**	54,990,577	22.52%	22.52%		54,990,577	100.00%
2000 #	257,124,568	**	56,567,405	22.00%	22.00%		56,567,405	100.00%
2001	273,311,348	**	63,654,213	23.29%	23.29%		63,654,213	100.00%
2002	260,972,727	**	60,780,548	23.29%	23.29%	@	60,780,548	100.00%
2003	271,173,431	**	63,156,292	23.29%	23.29%	@	63,156,292	100.00%
2004	269,890,983	**	68,932,856	25.54%	25.54%		68,932,856	100.00%
2005	283,070,661	**	80,052,383	28.28%	28.28%		80,052,383	100.00%
2006	286,784,251	**	87,440,518	30.49%	30.49%		87,440,518	100.00%

\* Prior to 2003 this schedule was not required for the LTD Plan because it used the aggregate funding method. Therefore the assets and liabilities were excluded prior to 2003. In 2003 the LTD Plan was merged into the base plan. Assets and liabilities for existing LTD members are included beginning in 2003.

\*\* Values are estimated from contribution rate and amount.

+ Introduction of Year 2000 Plan; Change in Actuary.

# New assumptions adopted.

@ The ARC is the rate adopted by the Retirement Board. This rate exceeded the actuarially calculated rate.

## Includes non-uniformed employees of MoDOT, Patrol, and MPERS.

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

**GASB No. 25**  
**SCHEDULE OF EMPLOYER CONTRIBUTIONS\***  
**UNIFORMED PATROL GROUP**  
**JUNE 30, 2006**

<b>Fiscal Year Ending June 30,</b>	<b>Estimated Covered Payroll</b>		<b>Actual Employer Contributions</b>	<b>Actual Employer Contribution %</b>	<b>Annual Required Contribution (ARC) %</b>		<b>Annual Pension Cost</b>	<b>Percentage of APC Contributed</b>
1991	\$ 30,189,436	**	\$ 10,545,170	34.93%	34.93%		\$ 10,545,170	100.00%
1992	30,606,601		11,101,014	36.27%	36.27%		11,101,014	100.00%
1993	31,004,803		9,868,829	31.83%	31.83%		9,868,829	100.00%
1994	32,715,429		9,739,383	29.77%	29.77%		9,739,383	100.00%
1995	35,232,287		14,462,854	41.05%	41.05%		14,462,854	100.00%
1996	39,557,621		15,743,114	39.80%	39.80%		15,743,114	100.00%
1997	42,242,106		16,546,233	39.17%	39.17%		16,546,233	100.00%
1998	43,987,039		16,600,708	37.74%	37.74%		16,600,708	100.00%
1999 +	43,882,573	**	13,901,999	31.68%	31.68%		13,901,999	100.00%
2000 #	44,297,237	**	13,484,079	30.44%	30.44%		13,484,079	100.00%
2001	50,088,675	**	17,500,983	34.94%	34.94%		17,500,983	100.00%
2002	47,681,512	**	16,659,920	34.94%	34.94%	@	16,659,920	100.00%
2003	48,172,519	**	16,831,478	34.94%	34.94%	@	16,831,478	100.00%
2004	46,333,484	**	17,792,058	38.40%	38.40%		17,792,058	100.00%
2005	50,959,490	**	22,187,762	43.54%	43.54%		22,187,762	100.00%
2006	54,443,639	**	24,102,199	44.27%	44.27%		24,102,199	100.00%

\* Prior to 2003 this schedule was not required for the LTD Plan because it used the aggregate funding method. Therefore the assets and liabilities were excluded prior to 2003. In 2003 the LTD Plan was merged into the base plan. Assets and liabilities for existing LTD members are included beginning in 2003.

\*\* Values are estimated from contribution rate and amount.

+ Introduction of Year 2000 Plan; Change in Actuary.

# New assumptions adopted.

@ The ARC is the rate adopted by the Retirement Board. This rate exceeded the actuarially calculated rate.

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

**DEVELOPMENT OF GAIN/(LOSS)**  
**JULY 1, 2005 TO JUNE 30, 2006**

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	UAAL =	AAL -	Assets
Beginning of Year Values (at July 1)	\$ 1,210,060,043	\$ 2,627,409,025	\$ 1,417,348,982
Normal Cost	45,262,824	45,262,824	0
Contributions	(111,542,717)	0	111,542,717
Disbursements	0	(166,924,777)	(166,924,777)
Interest	97,095,908	211,742,689	114,646,781
Net Change in LTD Assets	(127,497)	0	127,497
Expected Value Before Any Changes	1,240,748,561	2,717,489,761	1,476,741,200
Effect of Changes in Assumptions & Methods	14,793,159	14,793,159	0
Expected Value After Changes	1,255,541,720	2,732,282,920	1,476,741,200
End of Year Values (at June 30)	1,219,294,884	2,740,437,837	1,521,142,953
Aggregate Gain/(Loss) for Year	\$ 36,246,836	\$ (8,154,917)	\$ 44,401,753

**DEVELOPMENT OF GAIN/(LOSS)**  
**JULY 1, 2005 TO JUNE 30, 2006**

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	<b>Total</b>	<b>Non-Uniform</b>	<b>Uniform</b>
Beginning of Year UAAL (at July 1)	\$ 1,210,060,043	\$ 940,955,041	\$ 269,105,002
Normal Cost	45,262,824	37,546,735	7,716,089
Contributions	(111,542,717)	(87,350,094)	(24,192,623)
Interest	97,095,908	75,574,402	21,521,506
Net Change in LTD Assets	(127,497)	(97,624)	(29,873)
Expected Value Before Any Changes	1,240,748,561	966,628,460	274,120,101
Effect of Changes in Assumptions & Methods	14,793,159	13,397,640	1,395,519
Expected Value After Changes	1,255,541,720	980,026,100	275,515,620
End of Year UAAL (at June 30)	1,219,294,884	952,752,165	266,542,719
Aggregate Gain/(Loss) for Year	\$ 36,246,836	\$ 27,273,935	\$ 8,972,901
Gain/(Loss) as a % of BOY Liabilities	1.38%	1.35%	1.49%
Asset Gain/(Loss) for Year	\$ 44,401,753	\$ 33,870,254	\$ 10,531,499
Liability Gain/(Loss) for Year	(8,154,917)	(6,596,319)	(1,558,598)
Aggregate Gain/(Loss) for Year	\$ 36,246,836	\$ 27,273,935	\$ 8,972,901

## **Section B**



### **Summary of Benefits**

**MISSOURI DEPARTMENT OF TRANSPORTATION AND  
HIGHWAY PATROL EMPLOYEES' RETIREMENT SYSTEM**

**SUMMARY OF BENEFIT PROVISIONS EVALUATED  
AS OF JUNE 30, 2006**

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**Closed Plan**

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**Year 2000 Plan**

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**Participation**

Participants include:

All MPERS active members, vested terminated members, disability recipients, retirees and survivors who first became members prior to July 1, 2000 and who do not elect to transfer to the Year 2000 Plan.

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**Participation**

Participants include:

1. All new employees who first become members on or after July 1, 2000.
2. MPERS active members and vested former members who elect to transfer to the Year 2000 Plan at retirement.
3. MPERS retirees who elected to transfer to the Year 2000 Plan during the election window from July 1, 2000 through July 1, 2001, and their survivors.
4. MPERS members who left state employment prior to becoming vested (not eligible for a future retirement benefit) and return to work in a benefit eligible position on or after July 1, 2000.

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**Normal Retirement Eligibility (unreduced benefit)**

*All Employees:* The earlier of attaining:

1. Age 65 with at least 4 years of creditable service.
2. Age 60 with at least 15 years of creditable service.
3. Age 48 with age plus creditable service equal to 80 or more.

*Uniformed Patrol Employees Only:* The earlier of attaining:

1. Age 55 with at least 4 years of creditable service.
2. Mandatory retirement at age 60 with 5 or more years of creditable service.

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**Final Average Pay Used for Benefit Determination**

Final Average Pay is the average annual pay of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining average pay). Employees retiring from active service will receive 1/12 of a year of creditable service for every 168 hours of unused sick leave (usable only for benefit computation, not eligibility).

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**Normal Retirement Eligibility (unreduced benefit)**

*All Employees:* The earlier of attaining:

1. Age 62 with at least 5 years of creditable service.
2. Age 48 with age plus creditable service equal to 80 or more.

*Uniformed Patrol Employees Only:*

1. Age 60 with at least 5 years of creditable service.

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**Final Average Pay Used for Benefit Determination**

Final Average Pay is the average annual pay of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining average pay). All members will receive 1/12 of a year of creditable service for every 168 hours of unused sick leave (usable only for benefit computation, not eligibility).



**SUMMARY OF BENEFIT PROVISIONS EVALUATED**  
**AS OF JUNE 30, 2006**  
**(CONTINUED)**

<b>Closed Plan</b>	<b>Year 2000 Plan</b>
<b>Normal Retirement Benefit Amount</b>	<b>Normal Retirement Benefit Amount</b>
<i>Non-Uniformed Employees:</i> Life Benefit: 1.6% of final average pay times years of creditable service.	<i>All Employees:</i> Life Benefit: 1.7% of final average pay times years of creditable service.
<i>Uniformed Patrol Employees:</i> Life Benefit: 2.1333% of final average pay times years of creditable service. Special Benefit: \$90 per month payable until age 65. Offset by any amount earned from gainful employment. This benefit does not apply to uniformed members hired on or after January 1, 1995.	Temporary Benefit: If member retires between ages 48 and 62 with age plus creditable service equal to 80 or more, a temporary benefit is payable in the amount of 0.8% of final average pay times years of creditable service until attainment of the minimum age at which reduced social security benefits are payable or death, whichever occurs first.
<b>Early Retirement (reduced benefit)</b>	<b>Early Retirement (reduced benefit)</b>
<i>Eligibility: Non-Uniformed Employees</i> Age 55 with at least 10 years of creditable service.  <i>Amount:</i> Normal retirement amount reduced by 0.6% for each month that retirement precedes eligibility for normal retirement.  <i>Uniformed Patrol</i> members are not eligible for early retirement.	<i>Eligibility: All Employees</i> Age 57 with at least 5 years of creditable service.  <i>Amount:</i> Normal retirement amount reduced by 0.5% for each month that retirement precedes eligibility for normal retirement.
<b>Vested Deferred Benefits</b>	<b>Vested Deferred Benefits</b>
<i>Eligibility: All Employees</i> Fully vested in accrued pension with 5 years of creditable service. The benefit will commence at the age the individual is for early or normal retirement, considering years of creditable service.	<i>Eligibility: All Employees</i> Fully vested in accrued pension with 5 years of creditable service. The benefit will commence at the age the individual is eligible for early or normal retirement considering years of creditable service.

**SUMMARY OF BENEFIT PROVISIONS EVALUATED**  
**AS OF JUNE 30, 2006**  
**(CONTINUED)**

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**Closed Plan**

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**Year 2000 Plan**

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**Death Prior to Retirement**

A death benefit is payable to the surviving spouse or eligible children of the member who dies after earning 3 years of creditable service. The survivor annuity shall be the total monthly payment equal to twenty-five percent of the deceased member's accrued annuity calculated as if the member was of normal retirement age as of the date of death.

The spouse of the member who dies after accruing 5 years of creditable service may elect to receive an annuity as if the employee had retired on the date of death and elected a joint and 100% survivor annuity.

If no eligible spouse survives or upon the death of the spouse, 80% of the member's accrued annuity will be paid to eligible children until age 21.

If the death is duty-related, there is no service requirement and the minimum annuity is 50% of the final average pay (FAP) to the surviving spouse or eligible children.

**Death After Retirement**

The benefit payable is 50% of the benefit the retired member was receiving on the date of death (the normal form of payment), or the benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement.

A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary within one year of the marriage. Additionally, a member may designate a new spouse as beneficiary in the event of the death of the spouse the member was married to at the date of retirement.

For period certain annuities, beneficiaries may be changed at any time.

**Death Prior to Retirement**

The spouse of the member who dies after accruing 5 years of creditable service may elect to receive an annuity as if the employee had retired on the date of death and elected a joint and 100% survivor annuity.

If no eligible spouse survives or upon the death of the spouse, 80% of the member's accrued annuity will be paid to eligible children until age 21.

If the death is duty related, there is no service requirement and the minimum annuity is 50% of the final average pay (FAP) to the surviving spouse or eligible children.

**Death After Retirement**

The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement.

A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary. Additionally, a member may designate a new spouse as beneficiary in the event of the death of the spouse the member was married to at the date of retirement. The election must be completed within one year of the date of marriage.

For period certain annuities, beneficiaries may be changed at any time.

**SUMMARY OF BENEFIT PROVISIONS EVALUATED**  
**AS OF JUNE 30, 2006**  
**(CONTINUED)**

<b>Closed Plan</b>	<b>Year 2000 Plan</b>
<p><b>Pop-Up Provision</b></p> <p>Benefits to members who choose a reduced survivor form of payment and whose spouse precedes the member in death, will “pop-up” or revert to the amount the member would have received had he/she not elected a reduced survivor option.</p>	<p><b>Pop-Up Provision</b></p> <p>Same.</p>
<p><b>\$5,000 Death Benefit</b></p> <p>MPERS provides a \$5,000 death benefit for a designated beneficiary(ies) of members who retire from service or elect normal or work-related disability benefits after September 28, 1985.</p>	<p><b>\$5,000 Death Benefit</b></p> <p>MPERS provides a \$5,000 death benefit for a designated beneficiary(ies) of members who retire from service or elect work-related disability benefits.</p>
<p><b>Purchase of Service</b></p> <p><b>Military:</b> Prior to retirement, qualifying members may purchase up to a maximum of 4 years military service that includes active service, and/or active and inactive duty training from which they were honorably discharged. All months the member is eligible for must be purchased. This service credit <b>can</b> be used to satisfy the vesting requirement. Periods of military service cannot coincide with employment in a state agency.</p> <p><b>Police Service:</b> Prior to retirement, uniformed patrol members only, may purchase up to a maximum of 4 years police service. Members must purchase all months of service they are eligible for.</p> <p><b>Portability:</b> Section 105.691 allows vested members to acquire (purchase/transfer) service credit for any non-federal, full-time public sector employment within Missouri.</p> <p>Service may be purchased/transferred by using the member’s own money and/or using the value of the retirement benefit in the prior retirement plan if that plan has an agreement with MPERS. Any non-federal public employment <b>not covered</b> by a retirement plan must be purchased.</p> <p><b>Full-time Non-federal public service:</b> Allows patrol members to purchase a maximum of 4 years public service. Members must purchase all months of service they are eligible for and the purchase cost will be figured as a military purchase calculation.</p>	<p><b>Purchase of Service</b></p> <p><b>Military:</b> Prior to retirement, qualifying members may purchase up to a maximum of 4 years military service that includes active service from which they were honorably discharged. All months the member is eligible for must be purchased. This service credit <b>cannot</b> be used to satisfy the vesting requirement. Periods of military service cannot coincide with employment in a state agency.</p> <p><b>Police Service:</b> Not available.</p> <p><b>Portability:</b> Same as Closed Plan Section 105.691.</p> <p>In addition, Section 104.1090 provides that in-state vested service with another retirement system may be granted after 10 years of state service if the other retirement plan agrees to transfer assets equal to the accrued liability to MPERS.</p> <p><b>Full-time Non-federal public service:</b> Not available</p>

**SUMMARY OF BENEFIT PROVISIONS EVALUATED**  
**AS OF JUNE 30, 2006**  
**(CONTINUED)**

<b>Closed Plan</b>	<b>Year 2000 Plan</b>
<p><b>Disability</b></p> <p>Benefits that may be payable during the period of disability (whether Normal, Work-related, or LTD) are administered through a separate program and were not considered for purposes of the valuation.</p> <p>Normal retirement benefits become payable at the time a disabled member becomes eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability.</p> <p><b>Post-Retirement Benefit Adjustments</b></p> <p>For active and inactive employees hired prior to August 28, 1997 and current retirees, the benefits of pensioners and their beneficiaries are increased annually by 80% of the increase in the Consumer Price Index (subject to a maximum increase of 5% and a minimum of 4%). These increases are made until the total of the increases reaches 65% of initial benefit at which time the increases will have the minimum removed.</p> <p>For employees hired on or after August 28, 1997 the annual percentage increase is equal to the lesser of:</p> <ul style="list-style-type: none"> <li>i) 80% of the CPI-U increase, or</li> <li>ii) 5%.</li> </ul> <p><b>Member Contributions</b></p> <p>None</p>	<p><b>Disability</b></p> <p>Same.</p> <p><b>Post-Retirement Benefit Adjustments</b></p> <p>Benefits are increased to retired members (including survivors) annually in accordance with the following:</p> <p>Annual benefit percentage increase equal to the lesser of:</p> <ul style="list-style-type: none"> <li>i) 80% of the CPI-U increase, or</li> <li>ii) 5%.</li> </ul> <p><b>Member Contributions</b></p> <p>None</p>

**SUMMARY OF BENEFIT PROVISIONS EVALUATED**  
**AS OF JUNE 30, 2006**  
**(CONTINUED)**

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**The Closed Plan & Year 2000 Plan  
BackDROP Option**

Legislation effective January 1, 2002 provides a Deferred Retirement Option Provision (BackDROP) to members of MPERS. It is available in both the Closed Plan and the Year 2000 Plan.

To be eligible to participate in the BackDROP, a member must have been eligible to retire under normal age and/or service conditions for at least two years. A retroactive starting date is established for BackDROP purposes which is the later of: 1) the member's normal retirement date, or 2) five years prior to the annuity starting date under the retirement plan selected by the member.

The BackDROP period for the accumulation of the BackDROP account is from the retroactive starting date to the annuity starting date. This results in a BackDROP period of one to five years depending upon the individual situation.

A theoretical BackDROP account is accumulated that includes 90% of the value of the benefit payments that would have been paid during the BackDROP period had the member retired at the retroactive starting date. These payments include applicable post-retirement benefit increases. These payments do not include any reduction for spouse options during the BackDROP period. The member may choose the BackDROP period in twelve-month increments or their maximum period, not to exceed 60 months.

The member is paid the resulting lump sum value of the BackDROP account as of the annuity starting date or as three equal annual installments beginning at the annuity starting date.

The annuity benefit payable from the actual retirement date is computed with years of service and final average pay as of the retroactive starting date for the BackDROP. Post-retirement benefit increases that occurred during the BackDROP period are applied in the calculation of the monthly annuity.

**SAMPLE BENEFIT COMPUTATION FOR CLOSED PLAN MEMBERS**  
**RETIRING JULY 1, 2006**  
**NON-UNIFORMED EMPLOYEE**

	<b>Data</b>	<b>Description</b>
A.	\$40,000	Final Average Pay
B.	20	Years of Creditable Service
C.	60	Age of Retiree
D.	50%	Automatic percentage to continue to spouse after retirant's death

**Sample Computation Steps**

E. Retirement Benefit Formula:  $0.016 \times 20 \times \$40,000 = \$12,800$

**Benefit payable to:**

F. Retiree while spouse is alive (E)	\$ 12,800
G. Spouse after retiree's death (D x E)	\$ 6,400
H. Retiree after spouse's death	\$ 12,800

<b>Year Ended June 30</b>	<b>Annual Amount Payable if Price Inflation is 3.25% and Post-Retirement Increases are 2.6%</b>
2007	\$12,800
2008	13,133
2009	13,474
2010	13,825
2011	14,184
2012	14,553
2013	14,931
2014	15,319
2015	15,718
2016	16,126

**SAMPLE BENEFIT COMPUTATION FOR CLOSED PLAN MEMBERS**  
**RETIRING JULY 1, 2006**  
**UNIFORMED PATROL**

	<b>Data</b>	<b>Description</b>
A.	\$40,000	Final Average Pay
B.	20	Years of Creditable Service
C.	60	Age of Retiree
D.	50%	Automatic percentage to continue to spouse after retirant's death

**Sample Computation Steps**

E. Retirement Benefit Formula: 0.021333 x 20 x \$40,000 = \$17,066

**Benefit payable to:**

F. Retiree while spouse is alive (E)	\$ 17,066
G. Spouse after retiree's death (D x E)	\$ 8,533
H. Retiree after spouse's death	\$ 17,066

Amounts shown below do not include the \$1,080 annual supplementary benefit payable to age 65.

<b>Year Ended June 30</b>	<b>Annual Amount Payable if Price Inflation is 3.25% and Post-Retirement Increases are 2.6%</b>
2007	\$17,066
2008	17,510
2009	17,965
2010	18,432
2011	18,912
2012	19,403
2013	19,908
2014	20,426
2015	20,957
2016	21,501

**SAMPLE BENEFIT COMPUTATION FOR YEAR 2000 PLAN MEMBERS  
RETIRING JULY 1, 2006**

	<b>Data</b>	<b>Description</b>
A.	\$40,000	Final Average Pay
B.	20	Years of Creditable Service
C.	60	Age of Retiree
D.	0%	Automatic percentage to continue to spouse after retirant's death

E1. Retirement Benefit Formula:  $0.017 \times 20 \times \$40,000 = \$13,600$   
 E2. Supplemental Benefit Formula:  $.008 \times 20 \times \$40,000 = \$6,400$

**Benefit payable to:**

F1. Retiree prior to age 62 (E1+E2)	\$ 20,000
F2. Retiree after age 62 (E1)	\$ 13,600
G. Spouse after retiree's death (D x E)	\$ 0

<b>Year Ended June 30</b>	<b>Annual Amount Payable if Price Inflation is 3.25% and Post-Retirement Increases are 2.6%</b>
2007	\$20,000
2008	20,520
2009	14,316
2010	14,689
2011	15,071
2012	15,462
2013	15,864
2014	16,277
2015	16,700
2016	17,134



# **Section C**



## **Financial Information**

## SUMMARY OF FUND OPERATIONS

	2006	2005
Market Value of Fund Beginning of Fiscal Year	\$ 1,441,054,574	\$ 1,353,136,400
Post Valuation Audit Adjustment	0	300,105
Contributions		
Employer	111,271,679	102,240,145
Transfer from MOSERS	0	0
Service Purchase (Employee)	271,038	364,681
Total Contributions	<u>\$ 111,542,717</u>	<u>\$ 102,604,826</u>
Investment Return		
Interest	\$ 9,998,328	\$ 12,784,637
Dividends	11,570,031	12,028,955
Realized Capital Gains	241,281,087	126,010,671
Realized Capital Losses	(78,658,101)	(30,584,853)
Miscellaneous Income	5,212	9,500
Securities Lending Income	710,139	506,678
Other	4,533,446	344,492
Total Investment Return	<u>\$ 189,440,142</u>	<u>\$ 121,100,080</u>
Other Income (Rental Income and Misc)	41,542	31,104
Increase (Decrease) in Unrealized Appreciation	35,229,468	31,809,291
Benefit Payments		
Retirement Payments	\$ 152,533,614	\$ 146,132,833
Retirement Payments - BackDROP	9,721,059	8,880,770
Death Benefits	455,000	415,000
Long-Term Disability Payments	386,026	475,948
Insured Disability Program	1,796,075	1,837,786
Refund and Final Settlement	105,409	0
Total Benefits Payments	<u>\$ 164,997,183</u>	<u>\$ 157,742,337</u>
Expenses		
Investment	\$ 12,247,291	\$ 8,268,303
Actuarial	122,240	75,800
Other	1,805,354	1,840,792
Total Expenses	<u>\$ 14,174,885</u>	<u>\$ 10,184,895</u>
Market Value of Fund End of Fiscal Year	\$ 1,598,136,375	\$ 1,441,054,574

**MISSOURI MPERS**  
**DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS**

Valuation Date of June 30	2003	2004	2005	2006	2007	2008
<b>A. Actuarial value at beginning of year</b>	\$ 1,458,914,009	\$ 1,364,305,996	\$ 1,353,436,505 #	\$ 1,417,476,479		
<b>B. Market value at end of year</b>	1,241,550,328	1,353,136,400	1,441,054,574	1,598,136,375		
<b>C. Market value at beginning of year</b>	1,268,238,498	1,241,550,328	1,353,436,505	1,441,054,574		
<b>D. Cash flow</b>						
D1. Contributions	79,987,770	87,567,578	102,604,826	111,542,717		
D2. Benefit Payments	(144,334,345)	(155,139,923)	(157,742,337)	(164,997,183)		
D3. Administrative Expenses	(1,451,855)	(1,639,133)	(1,916,592)	(1,927,594)		
D4. Non-Investment Net Cash Flow	(65,798,430)	(69,211,478)	(57,054,103)	(55,382,060)		
<b>E. Investment income</b>						
E1. Market total (B - C - D4)	39,110,260	180,797,550	144,672,172	212,463,861		
E2. Assumed Rate of Return	8.25%	8.25%	8.25%	8.25%		
E3. Amount for Immediate Recognition (A+.5xD4)xE2	117,646,221	109,700,271	109,305,030	114,657,300		
E4. Amount for Phased-In Recognition	(78,535,961)	71,097,279	35,367,142	97,806,561		
<b>F. Phased in recognition of investment income</b>						
F1. F1. Current Year (33 1/3% of E4)	(26,178,654)	23,699,093	11,789,047	32,602,187		
F2. First Prior Year	(70,486,690)	(26,178,654)	0	11,789,047	\$ 32,602,187	
F3. Second Prior Year	(49,790,460)	(70,486,689)	0	0	\$ 11,789,048	\$ 32,602,187
F4. Total Phase-ins (F1 + F2 + F3)	(146,455,804)	(72,966,250)	11,789,047	44,391,234	44,391,235	32,602,187
F5. Phase-In of Initial (BOY) difference between MVA and AVA	0	0	0	0		
<b>G. Actuarial value at end of year (A + D4 + E3 + F4)</b>	1,364,305,996	1,331,828,539	1,417,476,479	1,521,142,953		
<b>Less LTD Assets</b>	353,474	240,332	127,497	0	0	0
<b>H. Preliminary Plan AVA</b>	1,363,952,522	1,331,588,207	1,417,348,982	1,521,142,953		
<b>I. Corridor (Maximum of 120% of Market Value)</b>	N/A	N/A	1,729,265,489	1,917,763,650		
<b>J. Corridor (Minimum of 80% of Market Value)</b>	N/A	N/A	1,152,843,659	1,278,509,100		
<b>K. Final Plan AVA after corridor adjustment, if any</b>	1,363,952,522	1,331,588,207	1,417,348,982	1,521,142,953		
<b>Difference between market and actuarial values</b>	(122,755,668)	21,307,861	23,578,095	76,993,422		
<b>Market Rate of Return</b>	3.17%	14.98%	10.92%	15.03%		
<b>Ratio of Funding Value to Market Value</b>	109.86%	98.41%	98.35%	95.18%		

# Actuarial value reset to market value as of the beginning of year, including a post 6/30/2004 valuation audit adjustment.

## ALLOCATION OF ASSETS BETWEEN GROUPS

---

The division between the Uniformed Patrol and Non-Uniformed Employee groups is in proportion to their market value of assets, as shown below:

	as of June 30	
	2006	2005
1. Other Income	\$ 41,542	\$ 31,104
2. Investment Income		
a) Uniformed Patrol	44,702,631	28,217,691
b) Non-Uniformed Employees	144,858,854	92,921,549
c) Total	189,561,485	121,139,240
3. Other Income Split		
a) Uniformed Patrol		
(2a) / (2c) x (1)	9,796	7,245
b) Non-Uniformed Employees		
(2b) / (2c) x (1)	31,746	23,859
c) Total	41,542	31,104
4. Funding Value of Assets	1,521,142,953	1,417,348,982
5. Market Value of Assets (less LTD assets)		
a) Uniformed Patrol	379,031,285	337,550,739
b) Non-Uniformed Employees	1,218,998,584	1,103,085,396
c) Total	1,598,029,869	1,440,636,135
6. Funding Value of Assets Split		
a) Uniformed Patrol		
(5a) / (5c) x (4)	360,794,684	332,094,360
b) Non-Uniformed Employees		
(5b) / (5c) x (4)	1,160,348,269	1,085,254,622
Total Assets Allocated	\$ 1,521,142,953	\$ 1,417,348,982

# **Section D**



## **Summary of Member Data**

**CIVILIAN PATROL CLOSED ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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		17	1					18	\$ 587,955
30-34		34	15	1				50	1,621,367
35-39		34	37	16	1			88	3,010,263
40-44		31	38	32	30	1		132	4,639,144
45-49		23	27	33	36	41	2	162	5,901,751
50		4	6	5	6	10	6	37	1,357,072
51		5	8	5	5	6	4	33	1,236,168
52		4	2	3	4	6	2	21	822,161
53		6	4	7	4	5	7	33	1,273,577
54		6	2	5	4	4	4	25	917,022
55		3	6	5	3	6	6	29	1,007,388
56		1	2	4	5	2	6	20	724,118
57		4	8	1	3	5	1	22	780,507
58		2	2	12	5	5	1	27	904,687
59		3	3	2	2		2	12	372,509
60		4	1	3				8	226,414
61		3	3	3	2			11	290,963
62		1	1		1			3	112,170
63				1				1	24,246
64			1	1				2	78,163
65				1				1	26,748
66				1				1	30,840
67									
68							1	1	28,116
69									
70									
Over 70				1			1	2	60,634
<b>Totals</b>	<b>0</b>	<b>185</b>	<b>167</b>	<b>142</b>	<b>111</b>	<b>91</b>	<b>43</b>	<b>739</b>	<b>\$ 26,033,983</b>

Average Age: 47.1 years  
Average Service: 16.9 years  
Average Pay: \$35,229

**CIVILIAN PATROL YEAR 2000 ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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	1							1	\$ 17,399
20-24	45	1						46	1,125,581
25-29	63	12						75	2,121,815
30-34	44	11						55	1,604,513
35-39	38	6						44	1,123,428
40-44	33	7						40	1,062,378
45-49	33	5						38	992,577
50	3							3	67,992
51	4	1						5	147,687
52	5	2						7	185,188
53	2	3						5	152,715
54	5							5	133,461
55	3							3	59,109
56	5	3						8	193,031
57	8							8	237,016
58	3	1						4	88,614
59	4	2						6	157,153
60	2	1						3	83,863
61	2							2	46,361
62	3	1						4	99,858
63									
64	4							4	86,739
65									
66									
67									
68									
69									
70	1							1	21,752
Over 70									
<b>Totals</b>	<b>311</b>	<b>56</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>367</b>	<b>\$ 9,808,230</b>

Average Age: 38.0 years

Average Service: 2.9 years

Average Pay: \$26,725

**MoDOT CLOSED ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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		2						2	\$ 63,644
25-29		129	10					139	4,618,854
30-34		240	165	3				408	15,459,541
35-39		191	306	127	15			639	25,000,176
40-44		184	211	232	226	9		862	35,358,928
45-49		149	192	171	290	240	14	1,056	42,798,739
50		21	29	29	41	48	19	187	7,872,682
51		21	33	22	30	42	17	165	6,768,430
52		13	26	28	33	37	24	161	6,598,532
53		19	25	32	29	21	24	150	6,066,567
54		16	24	17	29	19	18	123	5,001,209
55		14	20	15	34	17	21	121	4,957,225
56		12	21	21	16	11	13	94	3,729,448
57		14	11	17	17	5	21	85	3,588,651
58		8	16	14	14	9	14	75	2,982,710
59		11	12	19	11	4	14	71	2,825,758
60		8	9	11	4	5	9	46	1,848,240
61		6	6	10	5	2	5	34	1,313,745
62		2	3	5	6	1	10	27	1,174,941
63		2	2	2	1	2	2	11	411,308
64		8	1	3		2	3	17	653,974
65			2	1	1	1	1	6	260,168
66			2					2	94,563
67			1	1	1		1	4	179,654
68				1			2	3	107,633
69			1	1				2	65,287
70									
Over 70		2	1			2		5	179,037
<b>Totals</b>	<b>0</b>	<b>1,072</b>	<b>1,129</b>	<b>782</b>	<b>803</b>	<b>477</b>	<b>232</b>	<b>4,495</b>	<b>\$ 179,979,644</b>

Average Age: 45.6 years

Average Service: 16.5 years

Average Pay: \$40,040



**MoDOT YEAR 2000 ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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	15							15	\$ 399,161
20-24	308	8						316	10,322,851
25-29	399	85						484	16,893,262
30-34	312	78						390	13,279,225
35-39	256	58						314	9,851,078
40-44	225	59						284	9,109,234
45-49	207	49						256	8,251,804
50	25	8						33	1,102,836
51	28	9						37	1,213,665
52	31	7						38	1,133,528
53	34	4						38	1,385,334
54	26	6						32	968,578
55	18	2						20	572,844
56	14	6						20	603,987
57	16	1						17	653,568
58	15	4						19	593,488
59	12	5						17	579,975
60	7	1						8	349,596
61	6	2						8	435,511
62	7	2						9	380,503
63	4	1						5	108,159
64	1	2						3	114,295
65	1	2						3	82,834
66									
67	1	1						2	89,320
68	2							2	35,601
69	1							1	19,761
70	1							1	68,606
Over 70									
<b>Totals</b>	<b>1,972</b>	<b>400</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,372</b>	<b>\$ 78,598,604</b>

Average Age: 36.6 years

Average Service: 2.4 years

Average Pay: \$33,136

**UNIFORMED PATROL CLOSED ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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		21						21	\$ 909,219
30-34		101	51					152	6,984,396
35-39		50	157	35				242	11,900,213
40-44		16	43	82	25	2		168	9,188,049
45-49		5	6	38	37	30	4	120	7,405,341
50				3	2	18	4	27	1,818,742
51				1	4	10	2	17	1,202,097
52					2	10	11	23	1,598,441
53					1	4	11	16	1,131,276
54					2	4	8	14	1,001,467
55					2	1	6	9	638,988
56						2	10	12	856,037
57							7	7	527,850
58							2	2	145,073
59							2	2	138,802
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
Over 70									
<b>Totals</b>	<b>0</b>	<b>193</b>	<b>257</b>	<b>159</b>	<b>75</b>	<b>81</b>	<b>67</b>	<b>832</b>	<b>\$ 45,445,991</b>

Average Age: 41.4 years  
Average Service: 16.3 years  
Average Pay: \$54,623

**UNIFORMED PATROL YEAR 2000 ACTIVE MEMBERS**  
**AS OF JUNE 30, 2006**  
**BY ATTAINED AGE AND YEARS OF SERVICE**

Attained Age	Count by Complete 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	44							44	\$ 1,505,331
25-29	83	23						106	4,182,637
30-34	41	16						57	2,234,337
35-39	8	6						14	571,877
40-44	3	1						4	139,684
45-49	1							1	41,383
50									
51	1							1	41,594
52	1							1	31,404
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
Over 70									
<b>Totals</b>	<b>182</b>	<b>46</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>228</b>	<b>\$ 8,748,247</b>

Average Age: 29.0 years  
Average Service: 3.1 years  
Average Pay: \$38,370

## GROWTH OF ACTIVE MEMBER PAYROLL

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Actuarial Valuation for June 30,	Number	Covered Payroll	Average Pay	% Change in Average Pay from Prior Year
1989	8,181	\$194,452,400	\$23,769	(0.5)%
1990	8,256	211,414,753	25,607	7.7%
1991	8,308	220,856,988	26,584	3.8%
1992	8,591	228,503,592	26,598	0.1%
1993	8,658	236,236,082	27,285	2.6%
1994	8,849	242,864,780	27,445	0.6%
1995	8,904	250,529,253	28,137	2.5%
1996	9,023	264,196,115	29,280	4.1%
1997	8,997	280,209,116	31,145	6.4%
1998	8,871	284,889,796	32,115	3.1%
1999	9,140	298,673,247	32,678	1.8%
2000	9,171	312,532,009	34,078	4.3%
2001	9,087	327,049,257	35,991	5.6%
2002	8,695	312,747,492	35,969	(0.1)%
2003	8,892	318,744,192	35,846	(0.3)%
2004	9,002	328,210,887	36,460	1.7%
2005	9,193	345,695,867	37,604	3.1%
2006	9,033	348,614,699	38,593	2.6%
		Ten-Year Average		2.8%

**COUNT AND TOTAL MONTHLY BENEFITS OF  
CIVILIAN PATROL CLOSED RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

---

Age	Number	Monthly Benefit Amount
Less than 20		
20-24		
25-29		
30-34		
35-39		
40-44		
45-49	1	\$ 1,210
50-54	5	5,103
55-59	11	15,003
60-64	36	47,052
65-69	97	152,112
70-74	107	159,367
75-79	76	104,557
80-84	46	47,573
85-89	24	25,196
90 & Over	4	4,625
<b>TOTAL</b>	<b>407</b>	<b>\$ 561,798</b>

**COUNT AND TOTAL MONTHLY BENEFITS OF  
CIVILIAN PATROL YEAR 2000 RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

---

Age	Number	Monthly Benefit Amount
Less than 20		
20-24		
25-29		
30-34		
35-39		
40-44		
45-49	1	\$ 3,066
50-54	33	81,759
55-59	69	164,888
60-64	91	177,558
65-69	21	19,105
70-74	3	1,131
75-79	6	8,370
80-84	8	10,439
85-89		
90 & Over	2	1,979
<b>TOTAL</b>	<b>234</b>	<b>\$ 468,295</b>

**COUNT AND TOTAL MONTHLY BENEFITS OF  
MoDOT CLOSED RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

---

Age	Number	Monthly Benefit Amount
Less than 20	11	\$ 3,505
20-24	4	1,241
25-29	1	667
30-34	2	520
35-39	7	4,945
40-44	12	7,576
45-49	29	20,700
50-54	40	39,069
55-59	95	85,251
60-64	315	454,004
65-69	826	1,547,722
70-74	907	1,718,949
75-79	723	1,231,365
80-84	516	601,765
85-89	304	235,013
90 & Over	141	70,037
<b>TOTAL</b>	<b>3,933</b>	<b>\$ 6,022,329</b>

**COUNT AND TOTAL MONTHLY BENEFITS OF  
MoDOT YEAR 2000 RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

---

Age	Number	Monthly Benefit Amount
Less than 20	7	\$ 3,192
20-24		
25-29		
30-34	1	2,067
35-39		
40-44		
45-49	4	5,535
50-54	150	370,608
55-59	515	1,326,659
60-64	504	1,009,027
65-69	124	164,809
70-74	37	46,859
75-79	49	83,959
80-84	49	59,310
85-89	45	53,797
90 & Over	16	18,167
<b>TOTAL</b>	<b>1,501</b>	<b>\$ 3,143,989</b>



**COUNT AND TOTAL MONTHLY BENEFITS OF  
UNIFORMED PATROL CLOSED RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

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Age	Number	Monthly Benefit Amount
Less than 20	1	\$ 1,943
20-24		
25-29		
30-34	3	5,296
35-39		
40-44	2	2,372
45-49	8	16,728
50-54	35	109,108
55-59	128	439,408
60-64	163	638,973
65-69	119	483,268
70-74	93	386,559
75-79	75	304,710
80-84	48	120,074
85-89	26	55,467
90 & Over	22	26,104
<b>TOTAL</b>	<b>723</b>	<b>\$ 2,590,010</b>

**COUNT AND TOTAL MONTHLY BENEFITS OF  
UNIFORMED PATROL YEAR 2000 RETIRED (NON-DISABLED)  
MEMBERS AND SURVIVORS  
AS OF JUNE 30, 2006  
BY ATTAINED AGE**

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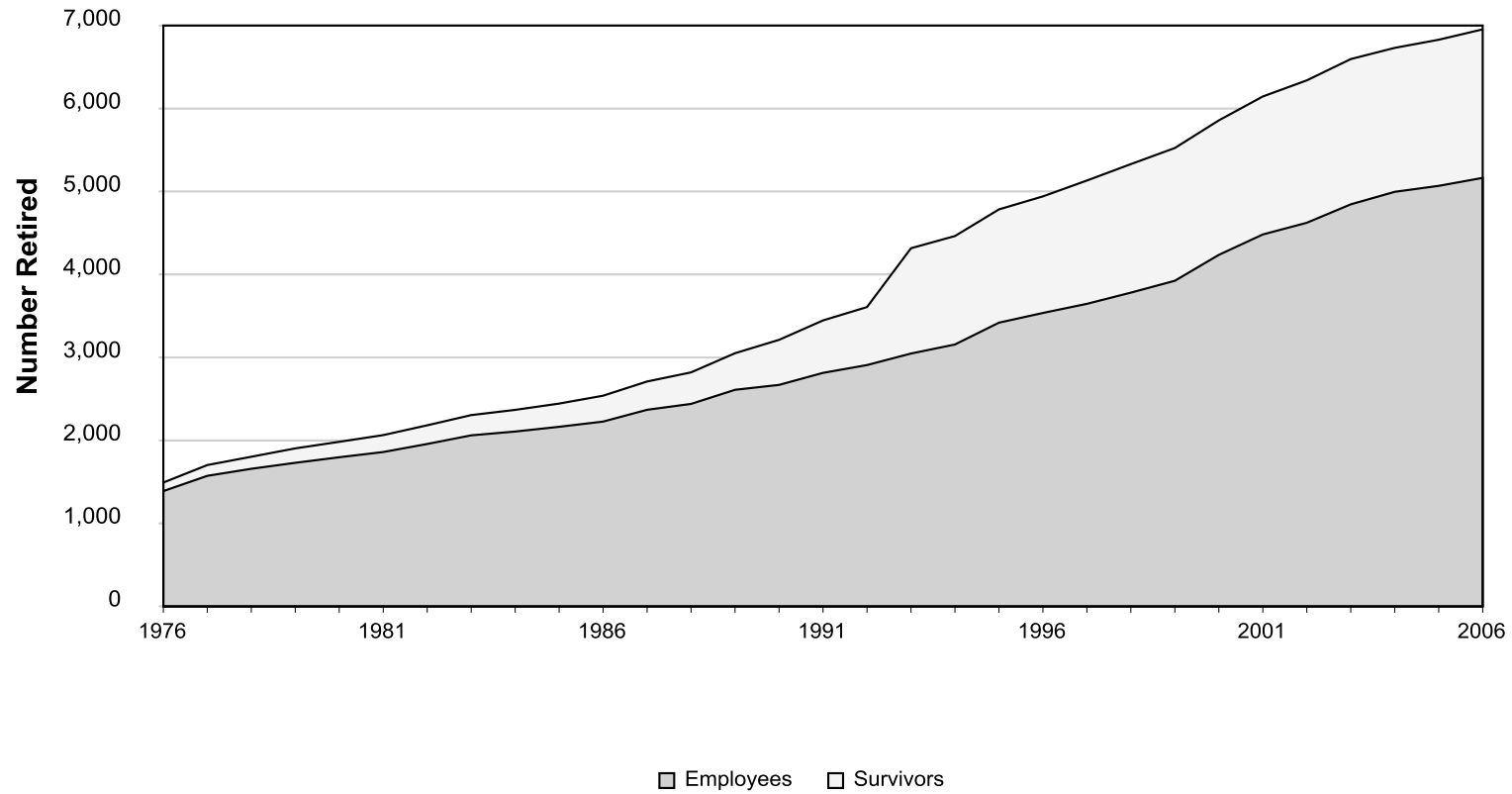
Age	Number	Monthly Benefit Amount
Less than 20		
20-24		
25-29		
30-34	1	\$ 1,420
35-39		
40-44		
45-49		
50-54		
55-59		
60-64		
65-69		
70-74		
75-79		
80-84		
85-89		
90 & Over		
<b>TOTAL</b>	<b>1</b>	<b>\$ 1,420</b>

## GROWTH OF PENSION POPULATION BY YEAR

Year	Retired Employees	Survivors	Total	% Increase	Annual Benefits	Active Payroll	Benefits as a % of Payroll
1976	1,389	103	1,492	4.8%			
1977	1,573	130	1,703	14.1%			
1978	1,658	145	1,803	5.9%			
1979	1,730	174	1,904	5.6%			
1980	1,797	186	1,983	4.1%			
1981	1,860	204	2,064	4.1%			
1982	1,957	225	2,182	5.7%			
1983	2,061	244	2,305	5.6%			
1984	2,107	261	2,368	2.7%			
1985	2,164	280	2,444	3.2%			
1986	2,227	312	2,539	3.9%			
1987	2,369	341	2,710	6.7%			
1988	2,440	380	2,820	4.1%			
1989	2,610	441	3,051	8.2%			
1990	2,669	543	3,212	5.3%			
1991	2,814	632	3,446	7.3%			
1992	2,908	699	3,607	4.7%			
1993	3,047	1,269	4,316	19.7%			
1994	3,156	1,307	4,463	3.4%			
1995	3,419	1,365	4,784	7.2%			
1996	3,536	1,405	4,941	3.3%			
1997	3,646	1,486	5,132	3.9%			
1998	3,781	1,549	5,330	3.9%	\$80,686,152	\$284,889,796	28.3%
1999	3,924	1,600	5,524	3.6%	91,512,311	298,673,247	30.6%
2000	4,236	1,621	5,857	6.0%	100,794,676	312,532,009	32.3%
2001	4,482	1,663	6,145	4.9%	115,998,915	327,049,257	35.5%
2002	4,623	1,716	6,339	3.2%	125,623,460	312,747,492	40.2%
2003	4,845	1,751	6,596	4.1%	136,320,125	318,744,192	42.8%
2004	4,996	1,735	6,731	2.0%	142,359,307	328,210,887	43.4%
2005	5,068	1,761	6,829	1.5%	148,340,170	345,695,867	42.9%
2006	5,164	1,790	6,954	1.8%	155,230,301	348,614,699	44.5%

# GROWTH OF PENSION POPULATION BY YEAR

## Number of Pensioners by Year



**SELF INSURED DISABLED RETIRED MEMBERS  
AS OF JUNE 30, 2006**

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Age	Number	Monthly Benefit Amount
Less than 20		
20-24		
25-29	1	\$ 429
30-34	1	2,502
35-39	4	2,170
40-44	11	6,243
45-49	25	20,288
50-54	26	24,171
55-59	32	27,839
60-64	14	11,297
65-69	5	5,432
70-74	3	3,541
75-79	3	1,243
80-84	2	1,387
85-89	2	487
90 & Over	1	557
<b>TOTAL</b>	<b>130</b>	<b>\$ 107,586</b>

These members became disabled prior to outsourcing disability claims. Liabilities for these members include benefits payable during and after the period of disability.

**FULLY INSURED DISABLED RETIRED MEMBERS**  
**AS OF JUNE 30, 2006**

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Age	Number	Monthly Benefit Amount
Less than 20		
20-24		
25-29		
30-34		
35-39	1	\$ 1,863
40-44	3	6,418
45-49	7	14,848
50-54	7	11,581
55-59	6	5,267
60-64	1	481
65-69		
70-74		
75-79		
80-84		
85-89		
90 & Over		
<b>TOTAL</b>	<b>25</b>	<b>\$ 40,458</b>

These members became disabled after disability claims became outsourced. Liabilities for these members during the period of disability are an obligation of the insurance company and not included in this valuation. Liabilities for these members after the period of disability are included in the valuation.

## **Section E**



### **Assumptions Used in the Valuation**

**APPENDIX**  
**SUMMARY OF VALUATION METHOD AND ASSUMPTIONS**  
**JUNE 30, 2006**

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*The actuarial assumptions used* in the valuation are shown in this Appendix of the report. The assumptions were established for the June 30, 2005 actuarial valuation, following a five-year actuarial investigation. They were adopted by the Board after obtaining the advice of the Actuary and other professionals.

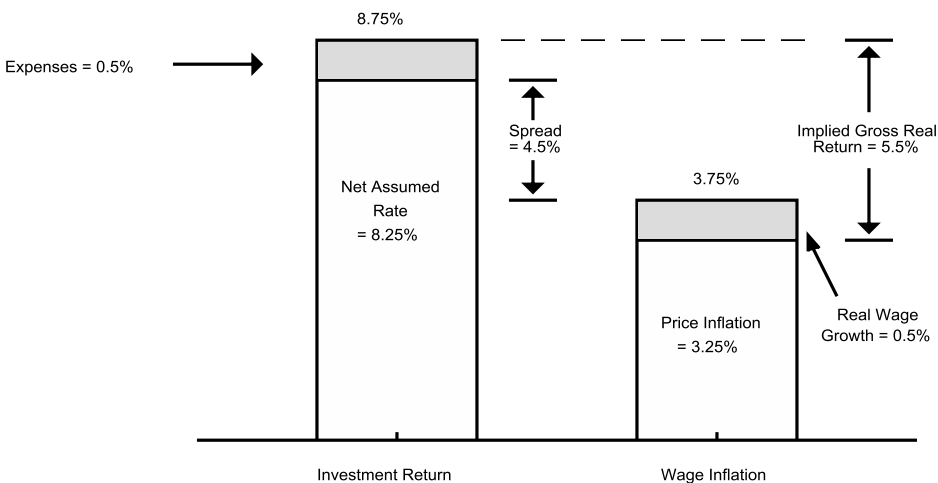
**Economic Assumptions**

*The investment return rate* used in making the valuations was 8.25% per year, compounded annually (net after investment expenses). The *wage inflation rate* was assumed to be 3.75%. The real rate of return over wage growth is defined to be the portion of total investment return, which is more than the rate of wage inflation. The 8.25% investment return rate and 3.75% wage inflation rate translates to an assumed real rate of return over wage growth net of expenses of 4.5%. Based upon other assumptions, the real rate of return over price inflation is 5%.

*Pay increase assumptions for merit and seniority* for individual active members are shown on page E-3. Part of the total assumed pay increase at each age is for merit and/or seniority, and the other 3.75% recognizes wage inflation. *The active member payroll* is assumed to increase 3.75% annually.

*The price inflation rate* is assumed to be 3.25% annually. This is the inflation rate upon which the post-retirement increases are based. The difference between wage and price inflation of 0.5% is attributable to overall productivity increases and macro economic factors.

*The number of active members* is assumed to continue at the present number.





**SUMMARY OF VALUATION METHOD AND ASSUMPTIONS**  
**JUNE 30, 2006**  
**(CONTINUED)**

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**Non-Economic Assumptions**

*The mortality tables*, for post-retirement mortality, used in evaluating allowances to be paid to non-disabled pensioners were the 1971 Group Annuity Mortality Tables projected to the year 2000 set back 1 year for males and 7 years for females. Pre-retirement mortality used was 50% of the 71GAM2000 tables set back 1 year for males and 7 years for females. Disabled pension mortality was based on PBGC Disabled Mortality tables. Related values are shown on page E-4.

*The probabilities of age and service retirement* are shown on page E-6.

*The probabilities of withdrawal from service* are shown on pages E-8 and E-9. *The probabilities of disability* are shown on page E-7.

*The entry age normal actuarial cost method of valuation* was used in determining liabilities and normal cost. The normal cost was calculated as if everyone were in the Year 2000 Plan.

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

Unfunded actuarial accrued liabilities are amortized to produce payments (principal & interest) which are level percents of payroll contributions.

*Employer contributions* were assumed to be *paid in equal installments* throughout the employer fiscal year.

*Present assets (cash & investments)* were used with a market value adjustment. Assets may be used in the valuation prior to the final audit. The exact method is shown on page C-2.

*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.) who has experience performing public plan valuations.

## AGE BASED SALARY SCALE

Age	Salary Increase Assumptions for an Individual Member					
	Non-Uniformed			Uniformed		
	Merit & Seniority	Base (Economic)	Increase Next Year	Merit & Seniority	Base (Economic)	Increase Next Year
20	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
21	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
22	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
23	7.30%	3.75%	11.05%	5.80%	3.75%	9.55%
24	6.52%	3.75%	10.27%	5.60%	3.75%	9.35%
25	5.66%	3.75%	9.41%	5.40%	3.75%	9.15%
26	4.72%	3.75%	8.47%	5.20%	3.75%	8.95%
27	4.50%	3.75%	8.25%	5.00%	3.75%	8.75%
28	4.10%	3.75%	7.85%	4.50%	3.75%	8.25%
29	3.70%	3.75%	7.45%	4.00%	3.75%	7.75%
30	3.30%	3.75%	7.05%	3.50%	3.75%	7.25%
31	2.90%	3.75%	6.65%	3.00%	3.75%	6.75%
32	2.50%	3.75%	6.25%	2.50%	3.75%	6.25%
33	2.35%	3.75%	6.10%	2.25%	3.75%	6.00%
34	2.20%	3.75%	5.95%	2.00%	3.75%	5.75%
35	2.05%	3.75%	5.80%	1.75%	3.75%	5.50%
36	1.90%	3.75%	5.65%	1.50%	3.75%	5.25%
37	1.75%	3.75%	5.50%	1.25%	3.75%	5.00%
38	1.65%	3.75%	5.40%	1.20%	3.75%	4.95%
39	1.55%	3.75%	5.30%	1.15%	3.75%	4.90%
40	1.45%	3.75%	5.20%	1.10%	3.75%	4.85%
41	1.35%	3.75%	5.10%	1.05%	3.75%	4.80%
42	1.25%	3.75%	5.00%	1.00%	3.75%	4.75%
43	1.15%	3.75%	4.90%	0.88%	3.75%	4.63%
44	1.05%	3.75%	4.80%	0.76%	3.75%	4.51%
45	0.95%	3.75%	4.70%	0.64%	3.75%	4.39%
46	0.85%	3.75%	4.60%	0.52%	3.75%	4.27%
47	0.75%	3.75%	4.50%	0.40%	3.75%	4.15%
48	0.70%	3.75%	4.45%	0.39%	3.75%	4.14%
49	0.65%	3.75%	4.40%	0.38%	3.75%	4.13%
50	0.60%	3.75%	4.35%	0.37%	3.75%	4.12%
51	0.55%	3.75%	4.30%	0.36%	3.75%	4.11%
52	0.50%	3.75%	4.25%	0.35%	3.75%	4.10%
53	0.46%	3.75%	4.21%	0.33%	3.75%	4.08%
54	0.42%	3.75%	4.17%	0.31%	3.75%	4.06%
55	0.38%	3.75%	4.13%	0.29%	3.75%	4.04%
56	0.34%	3.75%	4.09%	0.27%	3.75%	4.02%
57	0.30%	3.75%	4.05%	0.25%	3.75%	4.00%
58	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%
59	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%
60	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%

## POST-RETIREMENT MORTALITY

Age	Regular		Disabled		Age	Regular		Disabled	
	Male	Female	Male	Female		Male	Female	Male	Female
21	0.00042	0.00035	0.04830	0.02630	61	0.01086	0.00646	0.06240	0.03390
22	0.00043	0.00036	0.04830	0.02630	62	0.01195	0.00705	0.06430	0.03470
23	0.00045	0.00037	0.04830	0.02630	63	0.01313	0.00767	0.06570	0.03550
24	0.00047	0.00038	0.04830	0.02630	64	0.01441	0.00831	0.06680	0.03620
25	0.00049	0.00039	0.04830	0.02630	65	0.01593	0.00901	0.06780	0.03700
26	0.00051	0.00040	0.04610	0.02570	66	0.01770	0.00987	0.06870	0.03780
27	0.00054	0.00042	0.04360	0.02530	67	0.01974	0.01086	0.06970	0.03860
28	0.00057	0.00043	0.04110	0.02470	68	0.02204	0.01195	0.07090	0.03940
29	0.00060	0.00045	0.03880	0.02420	69	0.02451	0.01313	0.07230	0.04020
30	0.00063	0.00047	0.03620	0.02370	70	0.02740	0.01441	0.07390	0.04110
31	0.00067	0.00049	0.03390	0.02320	71	0.03068	0.01593	0.07570	0.04210
32	0.00071	0.00051	0.03200	0.02270	72	0.03419	0.01770	0.07760	0.04330
33	0.00076	0.00054	0.03020	0.02220	73	0.03768	0.01974	0.07960	0.04470
34	0.00081	0.00057	0.02880	0.02180	74	0.04106	0.02204	0.08180	0.04650
35	0.00087	0.00060	0.02780	0.02140	75	0.04455	0.02451	0.08420	0.04920
36	0.00093	0.00063	0.02720	0.02120	76	0.04837	0.02740	0.08690	0.05290
37	0.00100	0.00067	0.02710	0.02100	77	0.05286	0.03068	0.09080	0.05780
38	0.00107	0.00071	0.02730	0.02080	78	0.05835	0.03419	0.09620	0.06310
39	0.00116	0.00076	0.02760	0.02080	79	0.06463	0.03768	0.10430	0.06860
40	0.00125	0.00081	0.02820	0.02090	80	0.07136	0.04106	0.11280	0.07460
41	0.00135	0.00087	0.02880	0.02100	81	0.07875	0.04455	0.12210	0.08130
42	0.00148	0.00093	0.02970	0.02130	82	0.08647	0.04837	0.13220	0.08850
43	0.00166	0.00100	0.03050	0.02160	83	0.09449	0.05286	0.14320	0.09620
44	0.00187	0.00107	0.03140	0.02190	84	0.10293	0.05835	0.15510	0.10430
45	0.00213	0.00116	0.03220	0.02240	85	0.11166	0.06463	0.16810	0.11280
46	0.00242	0.00125	0.03300	0.02290	86	0.12064	0.07136	0.18250	0.12210
47	0.00275	0.00135	0.03400	0.02350	87	0.12994	0.07875	0.19800	0.13220
48	0.00311	0.00148	0.03530	0.02420	88	0.13951	0.08647	0.21500	0.14320
49	0.00350	0.00166	0.03670	0.02490	89	0.14955	0.09449	0.23300	0.15510
50	0.00392	0.00187	0.03830	0.02570	90	0.16012	0.10293	0.25250	0.16820
51	0.00437	0.00213	0.04010	0.02640	91	0.17131	0.11166	0.27390	0.18250
52	0.00486	0.00242	0.04200	0.02720	92	0.18291	0.12064	0.29720	0.19800
53	0.00536	0.00275	0.04390	0.02810	93	0.19478	0.12994	0.32260	0.21500
54	0.00590	0.00311	0.04600	0.02880	94	0.20690	0.13951	0.34950	0.23300
55	0.00646	0.00350	0.04820	0.02950	95	0.22134	0.14955	0.37890	0.25250
56	0.00705	0.00392	0.05060	0.03010	96	0.23700	0.16012	0.41090	0.27390
57	0.00767	0.00437	0.05310	0.03070	97	0.25325	0.17131	0.44580	0.29720
58	0.00831	0.00486	0.05550	0.03150	98	0.27090	0.18291	0.48380	0.32260
59	0.00901	0.00536	0.05810	0.03230	99	0.29016	0.19478	0.52430	0.34950
60	0.00987	0.00590	0.06030	0.03310	100	0.30913	0.20690	0.56840	0.37890

Pre-Retirement mortality is 50% of the regular post-retirement mortality values.

**JOINT LIFE RETIREMENT VALUES**  
**(8.25% INTEREST)**

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<b>Sample Attained</b>	<b>Present Value of \$1 Monthly for Life</b>		<b>Future Life Expectancy (years)</b>	
	<b>Ages</b>	<b>Men</b>	<b>Women</b>	<b>Men</b>
50	\$180.41	\$184.61	29.17	34.67
55	172.88	176.49	24.82	30.06
60	164.59	167.62	20.70	25.67
65	155.53	158.05	16.82	21.50
70	146.09	147.81	13.32	17.57
75	137.04	137.30	10.36	13.99
80	128.32	127.32	7.83	10.91

The present values shown above are for illustrative purposes only and include the value of future post-retirement increases at 2.6% per year and a 50% survivor benefit. Males are assumed to be 3 years older than their spouses.

## RATES OF RETIREMENT

Age	Non-Uniformed				Uniformed	
	Male		Female		Male	Female
	Normal	Early	Normal	Early	Normal	
50	0.1800		0.1800		0.5000	0.5000
51	0.1800		0.1800		0.2500	0.2500
52	0.1800		0.1800		0.2000	0.2000
53	0.1800		0.1800		0.2000	0.2000
54	0.1800		0.1800		0.2000	0.2000
55	0.1800	0.0400	0.1800	0.0400	0.2500	0.2500
56	0.1800	0.0400	0.1800	0.0400	0.3000	0.3000
57	0.1800	0.0400	0.1800	0.0400	0.3500	0.3500
58	0.1800	0.0400	0.1800	0.0400	0.3500	0.3500
59	0.1800	0.0400	0.2000	0.0400	0.3500	0.3500
60	0.1800	0.0400	0.2000	0.0400	1.0000	1.0000
61	0.1800	0.0400	0.2000	0.0400	1.0000	1.0000
62	0.5000	0.3500	0.2500	0.4000	1.0000	1.0000
63	0.4000	0.0400	0.2000	0.3000	1.0000	1.0000
64	0.3000	0.0400	0.2000	0.3000	1.0000	1.0000
65	0.4500		0.4000		1.0000	1.0000
66	0.4000		0.4000		1.0000	1.0000
67	0.3500		0.4000		1.0000	1.0000
68	0.3500		0.4000		1.0000	1.0000
69	0.3500		0.4000		1.0000	1.0000
70	1.0000		1.0000		1.0000	1.0000

## RATES OF DISABILITY

Age	Non-Uniformed		Uniformed		Age	Non-Uniformed		Uniformed	
	Male	Female	Male	Female		Male	Female	Male	Female
21	0.0001	0.0005	0.0002	0.0002	51	0.0042	0.0050	0.0017	0.0017
22	0.0001	0.0005	0.0002	0.0002	52	0.0048	0.0058	0.0019	0.0019
23	0.0001	0.0005	0.0002	0.0002	53	0.0054	0.0069	0.0022	0.0022
24	0.0001	0.0005	0.0002	0.0002	54	0.0060	0.0082	0.0025	0.0025
25	0.0001	0.0006	0.0003	0.0003	55	0.0066	0.0054	0.0000	0.0000
26	0.0001	0.0006	0.0003	0.0003	56	0.0066	0.0067	0.0000	0.0000
27	0.0001	0.0006	0.0003	0.0003	57	0.0066	0.0083	0.0000	0.0000
28	0.0001	0.0006	0.0003	0.0003	58	0.0066	0.0099	0.0000	0.0000
29	0.0001	0.0007	0.0003	0.0003	59	0.0066	0.0115	0.0000	0.0000
30	0.0001	0.0007	0.0003	0.0003	60	0.0000	0.0000	0.0000	0.0000
31	0.0002	0.0008	0.0003	0.0003	61	0.0000	0.0000	0.0000	0.0000
32	0.0003	0.0008	0.0004	0.0004	62	0.0000	0.0000	0.0000	0.0000
33	0.0004	0.0009	0.0004	0.0004	63	0.0000	0.0000	0.0000	0.0000
34	0.0005	0.0010	0.0004	0.0004	64	0.0000	0.0000	0.0000	0.0000
35	0.0006	0.0010	0.0004	0.0004	65	0.0000	0.0000	0.0000	0.0000
36	0.0007	0.0011	0.0005	0.0005	66	0.0000	0.0000	0.0000	0.0000
37	0.0007	0.0012	0.0005	0.0005	67	0.0000	0.0000	0.0000	0.0000
38	0.0008	0.0013	0.0005	0.0005	68	0.0000	0.0000	0.0000	0.0000
39	0.0008	0.0015	0.0005	0.0005	69	0.0000	0.0000	0.0000	0.0000
40	0.0009	0.0016	0.0006	0.0006	70	0.0000	0.0000	0.0000	0.0000
41	0.0011	0.0018	0.0006	0.0006	71	0.0000	0.0000	0.0000	0.0000
42	0.0014	0.0020	0.0007	0.0007	72	0.0000	0.0000	0.0000	0.0000
43	0.0016	0.0023	0.0008	0.0008	73	0.0000	0.0000	0.0000	0.0000
44	0.0019	0.0026	0.0008	0.0008	74	0.0000	0.0000	0.0000	0.0000
45	0.0021	0.0029	0.0009	0.0009	75	0.0000	0.0000	0.0000	0.0000
46	0.0024	0.0032	0.0010	0.0010	76	0.0000	0.0000	0.0000	0.0000
47	0.0027	0.0035	0.0011	0.0011	77	0.0000	0.0000	0.0000	0.0000
48	0.0030	0.0038	0.0013	0.0013	78	0.0000	0.0000	0.0000	0.0000
49	0.0033	0.0041	0.0014	0.0014	79	0.0000	0.0000	0.0000	0.0000
50	0.0036	0.0045	0.0015	0.0015	80	0.0000	0.0000	0.0000	0.0000

**RATES OF SEPARATION FROM ACTIVE EMPLOYMENT  
LESS THAN 5 YEARS OF SERVICE**

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<b>Service</b>	<b>Non-Uniformed</b>		<b>Uniformed</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
0-1	0.2500	0.1800	0.0800	0.0800
1-2	0.1200	0.1100	0.0600	0.0600
2-3	0.0700	0.0900	0.0450	0.0450
3-4	0.0600	0.0700	0.0300	0.0300
4-5	0.0500	0.0600	0.0200	0.0200

**RATES OF SEPARATION FROM ACTIVE EMPLOYMENT  
MORE THAN 5 YEARS OF SERVICE**

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Age	Non-Uniformed		Uniformed	
	Male	Female	Male	Female
25	0.0470	0.0625	0.0450	0.0450
26	0.0470	0.0609	0.0450	0.0450
27	0.0470	0.0593	0.0450	0.0450
28	0.0426	0.0580	0.0426	0.0426
29	0.0402	0.0568	0.0402	0.0402
30	0.0378	0.0555	0.0378	0.0378
31	0.0354	0.0543	0.0354	0.0354
32	0.0340	0.0530	0.0330	0.0330
33	0.0322	0.0514	0.0294	0.0294
34	0.0304	0.0498	0.0258	0.0258
35	0.0286	0.0482	0.0222	0.0222
36	0.0268	0.0466	0.0186	0.0186
37	0.0250	0.0450	0.0150	0.0150
38	0.0232	0.0426	0.0140	0.0140
39	0.0214	0.0402	0.0130	0.0130
40	0.0196	0.0378	0.0120	0.0120
41	0.0178	0.0354	0.0110	0.0110
42	0.0160	0.0330	0.0100	0.0100
43	0.0150	0.0324	0.0094	0.0094
44	0.0140	0.0318	0.0088	0.0088
45	0.0130	0.0312	0.0082	0.0082
46	0.0120	0.0306	0.0076	0.0076
47	0.0110	0.0300	0.0070	0.0070
48	0.0106	0.0300	0.0062	0.0062
49	0.0102	0.0300	0.0054	0.0054
50	0.0098	0.0300	0.0046	0.0046
51	0.0094	0.0300	0.0038	0.0038
52	0.0090	0.0300	0.0030	0.0030
53	0.0082	0.0250	0.0026	0.0026
54	0.0074	0.0200	0.0022	0.0022
55	0.0066	0.0150	0.0018	0.0018
56	0.0058	0.0100	0.0014	0.0014
57	0.0050	0.0050	0.0010	0.0010
58	0.0040	0.0050	0.0010	0.0010
59	0.0030	0.0050	0.0010	0.0010
60	0.0021	0.0050	0.0010	0.0010



## MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

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Administrative Expenses:	0.55% of payroll, based upon actual results from previous year.
Disability Expenses:	0.60% of payroll included in contribution. Retirement system pays premium directly to an outside insurance company or TPA.
Marriage Assumption:	90% of participants are assumed to be married for purposes of death-in-service benefits. Applies to disabled members entitled to future retirement benefits also.
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 directly from the experience study, without adjustment for multiple decrement table effects.
Normal Form of Benefit:	The assumed normal form of benefit is a 50% joint & survivor benefit for married members in the Closed Plan and a straight life for all other members.
Optional Benefit Factors:	Optional Benefit Factors are in accordance with tables adopted by the Board.  The Normal Cost and Actuarial Accrued Liability for the normal, early, and vesting decrements were increased by 1.5% for Uniformed Year 2000 Plan members and 1.0% for Non-Uniformed Year 2000 Plan members to account for subsidized option factors codified in the Statute.
Other:	Disability and turnover decrements do not operate during retirement eligibility.
Miscellaneous Loading Factors:	The calculated normal and early retirement benefits were increased by 4.3% for Uniformed and 2.6% for Non-Uniformed to account for the inclusion of unused sick leave in the calculation of Average Pay. Post disability benefit liabilities were loaded by 150% to account for potential survivor benefits payable by the retirement system during the period of disability.

## **METHOD OF FINANCING FUTURE BENEFITS FOR PRESENT ACTIVE MEMBERS**

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The valuation was prepared in accordance with Section 104.1066 of the Missouri Revised Statutes, which requires the use of the entry-age normal actuarial cost method for determining normal cost and level percent-of-payroll financing of unfunded actuarial accrued liabilities. Details of the application of these methods are described below.

*Normal cost* and the allocation of 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 date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement.
- (ii) for the purposes of determining the normal cost, the benefits of the Year 2000 Plan were used. This creates a normal cost that is a constant percentage of the member's year-by-year projected covered pay even as members transition from the current plan benefits to the Year 2000 Plan benefits.

The *Value of Future Benefits* was calculated using the benefits assumed to be payable in the future to current active, terminated vested and retired members. It was assumed that current active and retired Uniformed Patrol members hired prior to July 1, 2000 would elect to retain the benefits under the current plan. Computed costs were increased in accordance with the loads described on page E-10.

## **METHOD OF FINANCING FUTURE BENEFITS FOR PRESENT ACTIVE MEMBERS (CONCLUDED)**

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The *Present Value of Future Normal Costs* was defined as the average normal cost rate multiplied by the present value of future payroll for the group.

The *Actuarial Accrued Liabilities* were defined as the difference between the present value of future benefits and the present value of future normal costs.

Actuarial Accrued Liabilities, less pension assets as of June 30, 2006 resulted in *Unfunded Actuarial Accrued Liabilities* which were amortized as a level percent of payroll over a period of 30 years. Continued yearly reductions in the amortization period will result in a 29-year period being used for the June 30, 2007 valuation. This is consistent with GASB amortization period requirements.

## JUNE 30, 2006 ACTUARIAL VALUATION

### GLOSSARY

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**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 series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.

**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.

**Actuarial value of assets.** Also referred to as funding 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 3-year period. This treatment helps remove the timing of investment activities from the valuation process. 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.

**Actuary.** A person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation A.S.A. and ultimately to Fellowship with the designation F.S.A.

(Concluded on Next Page)

## JUNE 30, 2006 ACTUARIAL VALUATION

### GLOSSARY (CONCLUDED)

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***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.

***Plan Termination Liability.*** The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a "going concern" basis and is not normally determined in a routine actuarial valuation.

***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 actuarial value of assets. Sometimes referred to as "unfunded accrued liability."

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).

***Valuation Payroll.*** Active member payroll that is intended to reflect the annual salary considered as covered compensation for Retirement System benefits.

## **Section F**



### **Financial Principles and Operational Techniques**

## **FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES OF THE RETIREMENT SYSTEM**

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***Promises Made, and To Be Paid For.*** As each year is completed, the Retirement System in effect hands an “IOU” to each member then acquiring a year of service credit -- the “IOU” says: “The Missouri Department of Transportation and Highway Patrol Employees’ Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

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 objective of level percent-of-payroll financing is that this year’s taxpayers contribute the money to cover the IOUs being handed out this year.*** By following this objective, ***the employer contribution rate will remain approximately level from year to year*** --- and will not have to be increased for future generations of taxpayers. However, “Level percent-of-payroll” does NOT mean “Fixed percent-of-payroll”. The level percent of payroll is an estimate that may change from one year to the next.

(There are systems which have a design for deferring contributions to future taxpayers, lured by a lower contribution rate now and putting aside the consequence that the contribution rate must then relentlessly grow much greater over decades of time.)

An inevitable by-product of the level-cost design is the accumulation of reserve assets, for decades, and the income produced when the assets are invested. ***Invested assets are a by-product and not the objective.*** Investment income becomes the 3rd contributor for benefits to employees, and is interlocked with the contribution amounts required from employees and employer.

(Concluded on Next Page)

## FINANCIAL PRINCIPLES AND OPERATIONAL TECHNIQUES OF THE RETIREMENT SYSTEM (CONCLUDED)

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Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

*Normal Cost* (the value assigned to service being rendered this year)

. . . plus . . .

*Interest on Unfunded Actuarial Accrued Liabilities* (the difference between liabilities for service already rendered and the accrued assets of the Retirement System).

***Computing Contributions To Support System Benefits*** From a given schedule of benefits and from the employee data and asset data furnished by the system, the actuary determines the contribution rates to support the benefits, by means of *an actuarial valuation*.

An actuarial valuation has a number of ingredients such as: the rate of investment return which plan assets will earn; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of pay increases and the assumed age or ages at actual retirement.

In an actuarial valuation the actuary must assume what the above rates will be, for the next year and for decades in the future. Only the subsequent actual experience of the plan can indicate the degree of accuracy of the assumptions.

***Reconciling Differences Between Assumed Experience and Actual Experience*** Once actual experience has occurred and has been observed, it will not coincide exactly with assumed experience, regardless of the skill of the actuary and the many calculations made. Most retirement systems cope with such differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is *continuing adjustments to the financial position*.



## THE ACTUARIAL VALUATION PROCESS

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

- A. ***Covered people data*** furnished by plan administrator, including:
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
  
- B. + ***Asset data*** (cash & investments), furnished by the plan administrator
  
- C. + ***Benefit provisions*** which specify eligibility and amounts of pensions
  
- D. + ***Assumptions concerning future experience in various risk areas***, which are established by the Retirement Board 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/or
  - New Employer Contribution Rate

## MEANING OF "UNFUNDED ACCRUED LIABILITIES"

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*“Actuarial accrued liabilities” are the portion of the present value of plan promises to pay benefits in the future that are 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. Actuarial accrued liabilities are the result of complex mathematical calculations, which are made by the plan’s actuary.

If “actuarial accrued liabilities” exceed the plan’s accrued assets (cash & investments), the difference is *“unfunded actuarial accrued liabilities.”* This is the usual condition. If the plan’s assets equaled the plan’s “actuarial accrued liabilities,” then the plan would be termed “fully funded.” This is an unusual condition.

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Each time a plan adds a new benefit, which applies to service already rendered, an “actuarial accrued liability” is created, which is also an “unfunded actuarial accrued liability” because the plan can’t print instant cash to cover the value of the new benefit promises. Payment for such unfunded actuarial accrued liabilities is spread over a period of years, commonly in the 20-50 year range.

Unfunded actuarial accrued liabilities can occur in another way: if actual plan experience is less favorable than assumed plan experience, the difference is added to unfunded actuarial accrued liabilities. In plans where benefits are directly related to an employee’s pay near time of retirement, unfunded actuarial accrued liabilities rose dramatically during the 1970’s. Unexpected rates of pay increase created additional actuarial accrued liabilities, which could not be matched by reasonable investment results. More recent experience has generally been more favorable with some reductions in unfunded actuarial accrued liabilities.

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*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.*

Even though unfunded actuarial accrued liabilities don’t constitute a bill payable immediately, it is important that policy-makers prevent the amount from becoming unreasonably high and *it is vital for plans to have a sound method for making payments toward them* so that they are controlled.

# **Section G**



## **Supplemental Information for Comprehensive Annual Financial Reporting**



October 10, 2006

The Retirement Board  
Missouri Department of Transportation  
and Highway Patrol Employees' Retirement System  
P.O. Box 1930  
Jefferson City, Missouri 65102-1930

Dear Board Members:

The basic financial objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is to establish and receive contributions which;

- (1) when expressed in terms of percents of active member payroll, will remain approximately level from generation to generation of Missouri citizens, and which
- (2) when combined with present assets and future investment returns, will be sufficient to meet the present and future financial obligations of MPERS.

In order to measure progress toward this fundamental objective, MPERS has annual actuarial valuations performed. The valuations (i) measure present financial position, and (ii) establish contribution rates that provide for the current cost and level percent-of-payroll amortization of unfunded actuarial liabilities over a reasonable period. An actuarial valuation was performed based upon benefit conditions, data and assumptions as of June 30, 2006. This valuation indicates that contribution rates for the period beginning July 1, 2007 that are at least equal to the calculated contributions rates will meet the Board's financial objective. The calculated contribution rates are 31.04% of payroll for the 7,973 Non-Uniformed employees and 42.64% of payroll for the 1,060 Uniformed patrol employees.

The actuarial valuations are based upon financial and participant data (which is prepared by retirement system staff) assumptions regarding future rates of investment return and inflation, and rates of retirement, turnover, death, and disability among MPERS' members and their beneficiaries. We review the data for internal and year-to-year consistency as well as general reasonableness prior to its use in the actuarial valuations. It is also summarized and tabulated for the purpose of analyzing trends. The assumptions were adopted by the Board of Trustees and were based upon actual experience of MPERS during the period July 1, 1999 to June 30, 2004. Assets were valued using a three-year smoothing method. The assumptions and methods utilized in this valuation, in our opinion, meet the parameters established by the Governmental Accounting Standards Board Statement No. 25.

The current benefit structure is outlined in the introductory section. We provided the information used in the supporting schedules in the actuarial section and the Schedules of Funding Progress in the financial section, as well as the employer contribution rates shown in the Schedule of Employer Contributions in the financial section.

The Retirement Board  
Missouri Department of Transportation  
and Highway Patrol Employees' Retirement System  
page 2

**Based upon the valuation results, it is our opinion that the Missouri Department of Transportation and Highway Patrol Employees' Retirement System continues to be in sound condition in accordance with actuarial principles of level percent-of-payroll financing. However, a material decline in the funded status for any reason would lead to a need for increased contributions.**

Respectfully submitted,

Brian B. Murphy, F.S.A.

Kenneth G. Alberts

## SOLVENCY TEST

The MPERS 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 in *the* long term test.

A *solvency test* is one means of checking a system's progress under its funding program. In a solvency test for a non-contributory plan, the plan's present assets (cash and investments) are compared with: 1) The liabilities for future benefits to present retired lives and 2) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent of payroll financing, the liabilities for future benefits to present retired lives (liability 1) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 2) will be partially covered by the remainder of present assets. The larger the funded portion of liability 2, the stronger the condition of the system.

The schedule below illustrates the history of liability 2 of the System. Progress on solvency has been negatively impacted by the 2000-2002 investment market.

Val. Date June 30	(1) Retirees and Benef.	(2) Active and Inactive Members	Present Valuation Assets	Portion of Present Values Covered by Present Assets		
				(1)	(2)	Total
		-----\$ Millions-----				
1999	1,132	921	1,243	100%	12%	61%
2000	1,238	951	1,423	100%	19%	65%
2001	1,375	926	1,521	100%	16%	66%
2002 #	1,470	888	1,451	99%	0%	62%
2003	1,555	863	1,364	88%	0%	56%
2004	1,626	867	1,332	82%	0%	53%
2005 #	1,669	958	1,417	85%	0%	54%
2006	1,734	1,007	1,521	88%	0%	56%

# New Assumptions adopted.

## DERIVATION OF EXPERIENCE GAIN (LOSS)

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

	<b>\$ Millions</b>
UAAL Beginning of Year (at July 1)	\$ 1,210,060,043
Normal Cost	45,262,824
Contributions	(111,542,717)
Interest	97,095,908
Net Change in LTD Assets	(127,497)
Expected UAAL Before Any Changes	1,240,748,561
Effect of Changes in Assumptions & Methods	14,793,159
Expected UAAL After Changes	1,255,541,720
End of Year UAAL (at June 30)	1,219,294,884
Gain/(Loss) for Year	\$ 36,246,836
Gain/(Loss) as a percent of actuarial accrued liabilities at start of year (\$2,627.4 million)	1.38%

<b>Valuation Date June 30</b>	<b>Experience Gain (Loss) as % of Beginning Accrued Liability</b>
1999	(7.7)%
2000	(.1)%
2001	(9.3)%
2002	(4.5)%
2003	(5.2)%
2004	(2.9)%
2005	(1.5)%
2006	1.4%

## Summary of Actuarial Assumptions and Methods

Valuation Date:	June 30, 2006
Actuarial Cost Method:	Entry Age
Amortized Method:	Level percent of payroll
Remaining Amortization Period:	29 years from July 1, 2007
Asset Valuation Method:	3-year smoothing
Actuarial Assumptions:	
Investment Rate of Return:	8.25%
Projected Salary Increase:	3.75% to 11.75%
Cost-of-Living Adjustments:	2.6% Compound
Includes Wage Inflation at:	3.75%

An actuarial valuation is based upon an actuarial cost method, an asset valuation method, and actuarial assumptions. These methods and assumptions are chosen by the Board of Trustees after consultation with the Actuary and other advisors.

The actuarial cost method is called the Entry Age Actuarial Cost Method. This method is consistent with the Board's level percent of payroll funding objective. With this method, the level percent of payroll is determined that will fund a member's retirement benefit over the member's entire working lifetime, from date of hire (Entry Age) to date of exit from the active member population. Differences in the past between assumed and actual experience become part of unfunded actuarial accrued liabilities and are amortized with level percent of payroll contributions. This cost method was first used in the **June 30, 1999** valuation.

The asset valuation method is a three year smoothed market value method in which assumed investment return is recognized immediately each year and differences between actual and assumed investment return are phased in over a closed three year period. This asset valuation method is intended to give recognition to the long term accuracy of market values while filtering out and dampening short term market swings. This method was first used in the **June 30, 1999** valuation.

The actuarial assumptions used in producing the valuation fall into two broad classes: economic assumptions, and demographic assumptions. Economic assumptions refer to long term rates of investment return, wage growth, covered population growth, and inflation. Demographic assumptions refer to retirement rates, turnover rates, disability rates, merit and seniority pay increases, and mortality rates. The current assumptions are based upon a 1999-2004 study of experience of the MPERS. The assumptions are reviewed from time to time to keep them reasonably current with expected experience.

### ***Economic Assumptions***

***The investment return rate*** used in making the valuation was 8.25% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 3.75%, the 8.25% rate translates to an assumed real rate of return of 4.5%. This rate was first used for the **June 30, 2005** valuation.



## Summary of Actuarial Assumptions and Methods (Continued)

*Pay increase assumptions* for individual active members are shown on Tables IV and V. Part of the assumption for each age is for a merit and/or seniority increase, and the other 3.75% recognizes wage inflation. These rates were first used for the **June 30, 2005** valuation.

*Price Inflation* is assumed to be 3.75%. This results in a 2.6% annual COLA assumption. It is assumed that the 2.6% COLA will always be paid.

The Active Member Group size is assumed to remain constant at its present level.

*Total active member payroll* is assumed to increase 3.75% a year, which is the portion of the individual pay increase assumptions attributable to wage inflation. This rate was first used for the **June 30, 2005** valuation.

### *Non Economic Assumptions*

*The mortality table* used to measure retired life mortality was the 1971 Group Annuity Mortality Tables projected to the year 2000 set back 1 year for males and 7 years for females. Related values are shown on Table I. This table was first used for the June 30, 2000 valuation. Disabled pension mortality was based on PBGC Disabled Mortality tables.

*The probabilities of retirement* for members eligible to retire are shown on Tables II and III. The rates for full retirement were first used in the **June 30, 2005** valuation. The rates for reduced retirement were first used in the **June 30, 2005** valuation.

*The probabilities of withdrawal* from service, death in service and disability are shown for sample ages on Tables III and IV. The withdrawal and disability rates were first used in the **June 30, 2005** valuation. The death-in service rates were first used in the **June 30, 2005** 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.

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

**TABLE I**  
**JOINT LIFE RETIREMENT VALUES**  
**8.25% INTEREST**

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Sample Attained	Present Value of \$1 Monthly for Life		Future Life Expectancy (years)	
	Ages	Men	Women	Men
50	\$178.33	\$180.48	29.17	34.67
55	166.67	168.83	24.82	30.06
60	152.89	155.18	20.70	25.67
65	137.02	139.27	16.82	21.50
70	119.73	121.57	13.32	17.57
75	101.90	103.24	10.36	13.99
80	84.30	85.23	7.83	10.91

The present values shown above are for illustrative purposes only and include the value of future post-retirement increases at 2.6% per year and a 50% survivor benefit. Males are assumed to be 3 years older than their spouse.

**TABLE II**  
**RATES OF RETIREMENT**

Age	Non-Uniformed				Uniformed	
	Male		Female		Male	Female
	Normal	Early	Normal	Early	Normal	
50	0.1800		0.1800		0.5000	0.5000
51	0.1800		0.1800		0.2500	0.2500
52	0.1800		0.1800		0.2000	0.2000
53	0.1800		0.1800		0.2000	0.2000
54	0.1800		0.1800		0.2000	0.2000
55	0.1800	0.0400	0.1800	0.0400	0.2500	0.2500
56	0.1800	0.0400	0.1800	0.0400	0.3000	0.3000
57	0.1800	0.0400	0.1800	0.0400	0.3500	0.3500
58	0.1800	0.0400	0.1800	0.0400	0.3500	0.3500
59	0.1800	0.0400	0.2000	0.0400	0.3500	0.3500
60	0.1800	0.0400	0.2000	0.0400	1.0000	1.0000
61	0.1800	0.0400	0.2000	0.0400	1.0000	1.0000
62	0.5000	0.3500	0.2500	0.4000	1.0000	1.0000
63	0.4000	0.0400	0.2000	0.3000	1.0000	1.0000
64	0.3000	0.0400	0.2000	0.3000	1.0000	1.0000
65	0.4500		0.4000		1.0000	1.0000
66	0.4000		0.4000		1.0000	1.0000
67	0.3500		0.4000		1.0000	1.0000
68	0.3500		0.4000		1.0000	1.0000
69	0.3500		0.4000		1.0000	1.0000
70	1.0000		1.0000		1.0000	1.0000

**TABLE III**  
**RATES OF DISABILITY**

Age	Non-Uniformed		Uniformed		Age	Non-Uniformed		Uniformed	
	Male	Female	Male	Female		Male	Female	Male	Female
21	0.0001	0.0005	0.0002	0.0002	51	0.0042	0.0050	0.0017	0.0017
22	0.0001	0.0005	0.0002	0.0002	52	0.0048	0.0058	0.0019	0.0019
23	0.0001	0.0005	0.0002	0.0002	53	0.0054	0.0069	0.0022	0.0022
24	0.0001	0.0005	0.0002	0.0002	54	0.0060	0.0082	0.0025	0.0025
25	0.0001	0.0006	0.0003	0.0003	55	0.0066	0.0054	0.0000	0.0000
26	0.0001	0.0006	0.0003	0.0003	56	0.0066	0.0067	0.0000	0.0000
27	0.0001	0.0006	0.0003	0.0003	57	0.0066	0.0083	0.0000	0.0000
28	0.0001	0.0006	0.0003	0.0003	58	0.0066	0.0099	0.0000	0.0000
29	0.0001	0.0007	0.0003	0.0003	59	0.0066	0.0115	0.0000	0.0000
30	0.0001	0.0007	0.0003	0.0003	60	0.0000	0.0000	0.0000	0.0000
31	0.0002	0.0008	0.0003	0.0003	61	0.0000	0.0000	0.0000	0.0000
32	0.0003	0.0008	0.0004	0.0004	62	0.0000	0.0000	0.0000	0.0000
33	0.0004	0.0009	0.0004	0.0004	63	0.0000	0.0000	0.0000	0.0000
34	0.0005	0.0010	0.0004	0.0004	64	0.0000	0.0000	0.0000	0.0000
35	0.0006	0.0010	0.0004	0.0004	65	0.0000	0.0000	0.0000	0.0000
36	0.0007	0.0011	0.0005	0.0005	66	0.0000	0.0000	0.0000	0.0000
37	0.0007	0.0012	0.0005	0.0005	67	0.0000	0.0000	0.0000	0.0000
38	0.0008	0.0013	0.0005	0.0005	68	0.0000	0.0000	0.0000	0.0000
39	0.0008	0.0015	0.0005	0.0005	69	0.0000	0.0000	0.0000	0.0000
40	0.0009	0.0016	0.0006	0.0006	70	0.0000	0.0000	0.0000	0.0000
41	0.0011	0.0018	0.0006	0.0006	71	0.0000	0.0000	0.0000	0.0000
42	0.0014	0.0020	0.0007	0.0007	72	0.0000	0.0000	0.0000	0.0000
43	0.0016	0.0023	0.0008	0.0008	73	0.0000	0.0000	0.0000	0.0000
44	0.0019	0.0026	0.0008	0.0008	74	0.0000	0.0000	0.0000	0.0000
45	0.0021	0.0029	0.0009	0.0009	75	0.0000	0.0000	0.0000	0.0000
46	0.0024	0.0032	0.0010	0.0010	76	0.0000	0.0000	0.0000	0.0000
47	0.0027	0.0035	0.0011	0.0011	77	0.0000	0.0000	0.0000	0.0000
48	0.0030	0.0038	0.0013	0.0013	78	0.0000	0.0000	0.0000	0.0000
49	0.0033	0.0041	0.0014	0.0014	79	0.0000	0.0000	0.0000	0.0000
50	0.0036	0.0045	0.0015	0.0015	80	0.0000	0.0000	0.0000	0.0000

**TABLE IV**  
**RATES OF SEPARATION FROM ACTIVE EMPLOYMENT**  
**LESS THAN 5 YEARS OF SERVICE**

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Service	Non-Uniformed		Uniformed	
	Male	Female	Male	Female
0-1	0.2500	0.1800	0.0800	0.0800
1-2	0.1200	0.1100	0.0600	0.0600
2-3	0.0700	0.0900	0.0450	0.0450
3-4	0.0600	0.0700	0.0300	0.0300
4-5	0.0500	0.0600	0.0200	0.0200

**TABLE V**  
**RATES OF SEPARATION FROM ACTIVE EMPLOYMENT**  
**MORE THAN 5 YEARS OF SERVICE**

Age	Non-Uniformed		Uniformed	
	Male	Female	Male	Female
25	0.0470	0.0625	0.0450	0.0450
26	0.0470	0.0609	0.0450	0.0450
27	0.0470	0.0593	0.0450	0.0450
28	0.0426	0.0580	0.0426	0.0426
29	0.0402	0.0568	0.0402	0.0402
30	0.0378	0.0555	0.0378	0.0378
31	0.0354	0.0543	0.0354	0.0354
32	0.0340	0.0530	0.0330	0.0330
33	0.0322	0.0514	0.0294	0.0294
34	0.0304	0.0498	0.0258	0.0258
35	0.0286	0.0482	0.0222	0.0222
36	0.0268	0.0466	0.0186	0.0186
37	0.0250	0.0450	0.0150	0.0150
38	0.0232	0.0426	0.0140	0.0140
39	0.0214	0.0402	0.0130	0.0130
40	0.0196	0.0378	0.0120	0.0120
41	0.0178	0.0354	0.0110	0.0110
42	0.0160	0.0330	0.0100	0.0100
43	0.0150	0.0324	0.0094	0.0094
44	0.0140	0.0318	0.0088	0.0088
45	0.0130	0.0312	0.0082	0.0082
46	0.0120	0.0306	0.0076	0.0076
47	0.0110	0.0300	0.0070	0.0070
48	0.0106	0.0300	0.0062	0.0062
49	0.0102	0.0300	0.0054	0.0054
50	0.0098	0.0300	0.0046	0.0046
51	0.0094	0.0300	0.0038	0.0038
52	0.0090	0.0300	0.0030	0.0030
53	0.0082	0.0250	0.0026	0.0026
54	0.0074	0.0200	0.0022	0.0022
55	0.0066	0.0150	0.0018	0.0018
56	0.0058	0.0100	0.0014	0.0014
57	0.0050	0.0050	0.0010	0.0010
58	0.0040	0.0050	0.0010	0.0010
59	0.0030	0.0050	0.0010	0.0010
60	0.0021	0.0050	0.0010	0.0010

**TABLE VI**  
**AGE BASED SALARY SCALE**

Age	Salary Increase Assumptions for an Individual Member					
	Non-Uniformed			Uniformed		
	Merit & Seniority	Base (Economic)	Increase Next Year	Merit & Seniority	Base (Economic)	Increase Next Year
20	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
21	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
22	8.00%	3.75%	11.75%	6.00%	3.75%	9.75%
23	7.30%	3.75%	11.05%	5.80%	3.75%	9.55%
24	6.52%	3.75%	10.27%	5.60%	3.75%	9.35%
25	5.66%	3.75%	9.41%	5.40%	3.75%	9.15%
26	4.72%	3.75%	8.47%	5.20%	3.75%	8.95%
27	4.50%	3.75%	8.25%	5.00%	3.75%	8.75%
28	4.10%	3.75%	7.85%	4.50%	3.75%	8.25%
29	3.70%	3.75%	7.45%	4.00%	3.75%	7.75%
30	3.30%	3.75%	7.05%	3.50%	3.75%	7.25%
31	2.90%	3.75%	6.65%	3.00%	3.75%	6.75%
32	2.50%	3.75%	6.25%	2.50%	3.75%	6.25%
33	2.35%	3.75%	6.10%	2.25%	3.75%	6.00%
34	2.20%	3.75%	5.95%	2.00%	3.75%	5.75%
35	2.05%	3.75%	5.80%	1.75%	3.75%	5.50%
36	1.90%	3.75%	5.65%	1.50%	3.75%	5.25%
37	1.75%	3.75%	5.50%	1.25%	3.75%	5.00%
38	1.65%	3.75%	5.40%	1.20%	3.75%	4.95%
39	1.55%	3.75%	5.30%	1.15%	3.75%	4.90%
40	1.45%	3.75%	5.20%	1.10%	3.75%	4.85%
41	1.35%	3.75%	5.10%	1.05%	3.75%	4.80%
42	1.25%	3.75%	5.00%	1.00%	3.75%	4.75%
43	1.15%	3.75%	4.90%	0.88%	3.75%	4.63%
44	1.05%	3.75%	4.80%	0.76%	3.75%	4.51%
45	0.95%	3.75%	4.70%	0.64%	3.75%	4.39%
46	0.85%	3.75%	4.60%	0.52%	3.75%	4.27%
47	0.75%	3.75%	4.50%	0.40%	3.75%	4.15%
48	0.70%	3.75%	4.45%	0.39%	3.75%	4.14%
49	0.65%	3.75%	4.40%	0.38%	3.75%	4.13%
50	0.60%	3.75%	4.35%	0.37%	3.75%	4.12%
51	0.55%	3.75%	4.30%	0.36%	3.75%	4.11%
52	0.50%	3.75%	4.25%	0.35%	3.75%	4.10%
53	0.46%	3.75%	4.21%	0.33%	3.75%	4.08%
54	0.42%	3.75%	4.17%	0.31%	3.75%	4.06%
55	0.38%	3.75%	4.13%	0.29%	3.75%	4.04%
56	0.34%	3.75%	4.09%	0.27%	3.75%	4.02%
57	0.30%	3.75%	4.05%	0.25%	3.75%	4.00%
58	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%
59	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%
60	0.30%	3.75%	4.05%	0.00%	3.75%	3.75%