MICHIGAN STATE EMPLOYEES RETIREMENT SYSTEM

Report on Actuarial Valuation as of September 30, 2003

SEGAL

MICHIGAN
STATE EMPLOYEES
RETIREMENT SYSTEM

Report on Actuarial Valuation
as of September 30, 2003

Submitted by
The Segal Company
March, 2004

SEGAL

March, 2004

The Retirement Board
Michigan State Employees' Retirement System
General Office Building, Third Floor
P.O. Box 30171
Lansing, Michigan 48909

Dear Board Members:

We are pleased to present this report on our actuarial valuation of the Michigan State Employees' Retirement System (the "System") as of September 30, 2003, the sixtieth annual actuarial valuation of the System.

Our 2003 actuarial valuation of the System is based on the present provisions of the State Employees' Retirement Act; membership and financial data as of September 30, 2003; and the actuarial assumptions and cost methods described in Section V.

This report on our 2003 actuarial valuation of the System is presented in the following sections:

We look forward to meeting with you to review this report on our 2003 actuarial valuation of the System.

Sincerely,

The Segal Company

Michael Karlin, F.S.A., M.A.A.A.
Senior Vice President & Actuary

I. INTRODUCTION

Actuarial valuations of the Michigan State Employees' Retirement System (the "System") are prepared annually to determine the actuarial condition of the System and the employer contribution rates required to fund the System on an actuarial reserve basis. The calculated employer contribution rates derived from this actuarial valuation as of September 30, 2003 are based on the present provisions of the State Employees' Retirement Act.

A total of 89,555 System members are included in this 2003 actuarial valuation. The total membership is comprised of 36,536 active members, 7,528 inactive vested members, and 45,491 retirants and beneficiaries. As of September 30, 2003, the assets of the System amounted to almost $8.97 billion at market value. Of this amount, the portion used to fund pension benefits was $8.92 billion at market value and $10.44 billion at actuarial value.

In addition to utilizing current membership and financial data, an actuarial valuation requires the use of a series of assumptions regarding uncertain future events. The assumptions used in the 2003 actuarial valuation of the System are the same as those used since 1998. These assumptions were first adopted by the Retirement Board and the Department of Management and Budget for the 1998 valuation, as a result of an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997.

Based on our actuarial valuation as of September 30, 2003, the calculated employer contribution rate for pension benefits increased by 5.49% of payroll, from 8.63% to 14.12%. More details concerning these calculations are shown in Section II.

II. RESULTS OF ACTUARIAL VALUATION

Our actuarial valuation of the Michigan State Employees' Retirement System as of September 30, 2003 is based on four major elements:

1. The present benefit provisions of the System, as governed by Act 240 of 1943, as amended (see Section VI).
2. The characteristics of active and inactive System members as of September 30, 2003 (see Section IV).
3. The pension assets attributable to System members, which amounted to a total of approximately \$8.97 billion at market value (\$8.92 billion for pension benefits and \$42.3 million for retiree health) as of September 30, 2003 (see Section III).
4. The actuarial assumptions and funding method, which include an investment yield rate of 8% and the entry age actuarial cost method (see Section V). New actuarial assumptions were adopted for the 1998 valuation, based on the results of an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997. These assumptions remain in effect for the 2003 valuation.

Employer contributions are calculated separately for three groups of covered employees: (1) Corrections Officers; (2) Conservation Officers; and (3) all other employees. Table 1 presents the actuarially-determined employer contribution rates for the current and prior year, with the additional requirement for Corrections Officers and Conservation Officers identified.

The employer contribution rate has been determined based on the entry age normal funding method. Under the entry age normal cost funding method, the total employer contribution is comprised of the normal cost plus the level annual percentage of payroll payment required to amortize the unfunded actuarial accrued liability over 40 years from October 1, 1996 (33 years remaining from October 1, 2003). The employer normal cost is, for each employee, the level percentage of payroll contribution (from entry age to retirement) required to accumulate sufficient assets at the member's retirement to pay for his or her projected benefit.

The actuarial accrued liability represents the difference between the present value of all future benefits and the present value of future normal costs. The unfunded (or overfunded) actuarial accrued liability (*i.e.*, the actuarial accrued liability less assets accumulated as of the valuation date), is then amortized as noted above. Each of these components of the employer contribution rate (*i.e.*, normal cost and amortization payment) is shown separately in Table 1.

The total employer contribution rate (for pension benefits) for all employees increased from 8.63% to 14.12% of total payroll between the 2002 and 2003 actuarial valuations. The 5.49% of payroll increase in the total rate resulted from a 0.08% increase in the normal cost rate (8.10% to 8.18%) and a 5.41% increase in the amortization payment as a percentage of payroll (from 0.53% to 5.94%). Table 1 provides further details concerning the components of the employer contribution rate for the 2002 and 2003 valuations.

Under the entry age funding method, actuarial gains or losses affect the actuarial accrued liability and, therefore, the amortization payment on the unfunded actuarial accrued liability. Table 2 shows the unfunded actuarial accrued liability for each of the past two fiscal years, and the derivation of the actuarial gain or loss for each year. Note that, for fiscal 2003, an experience loss of $460.9 million was realized (consisting of a $442.9 million loss due to investments, along with a loss of $18.0 million due to demographic factors). This compares to a loss of $553.5 million in the prior year (consisting of a $523.6 million loss due to investments, along with a loss of $29.9 million due to demographic factors).

Table 3 shows the actuarially-determined percent of payroll employer contribution rates over the past 16 years. Also shown are the actual contribution and actual payroll for each year. Table 4 presents an actuarial balance sheet for the System (pension benefits) as of September 30, 2003 (and 2002).

There is no single all-encompassing test for measuring a retirement system's funding progress and current funded status. However, some common indicators of the progress that a system has achieved in funding their obligations include observing the changes over time in the following items:

1. The ratio of valuation assets to actuarial accrued liabilities.

2. The pattern of the unfunded actuarial accrued liability as a percentage of active payroll.

3. The ratio of valuation assets to the actuarial present value of vested benefits (computed as if the system were terminated on the valuation date).

4. A comparison of the plan's present assets (at actuarial value) with (1) active member contributions on deposit, (2) liabilities for future benefits to retired lives, and (3) the actuarial accrued liabilities for service already rendered by active members.

Table 5 presents the historical changes in the first two funding measures over the past 16 years. Table 6 shows the funding progress achieved in measure 3 indicated above. Finally, Table 7 indicates the historical change in funding measure 4.

Table 1

Contribution Rates as a Percentage of Payroll
Pension Benefits Only

	October 1, 2003 Valuation	October 1, 2002 Valuation
Normal Cost		
a) Regular Benefits	7.73 %	7.60 %
b) Additional for Corrections Officers	1.51	1.86
c) Additional for Conservation Officers	3.58	3.58
d) Total	8.18 %	8.10 %
Amortization Payment		
a) Regular Benefits	5.64%	0.51%
b) Additional for Corrections Officers	0.96	0.09
c) Additional for Conservation Officers	2.68	0.21
d) Total	5.94%	0.53%
Total Contribution Requirement		
a) Regular Benefits	13.37 %	8.10 %
b) Additional for Corrections Officers	2.47	1.95
c) Additional for Conservation Officers	6.26	3.79
d) Total	14.12 %	8.63 %
Payroll Used in Deriving Contribution Rates*		
a) All Employees	$1,859,555,375	$2,133,476,688
b) Corrections Officers Only	535,989,177	560,788,800
c) Conservation Officers Only	10,519,385	9,703,135

* Based on greater of rate and prior year actual earnings

Table 2

Unfunded Actuarial Accrued Liability and Actuarial Gain (Loss)
Pension Benefits Only

	Unfunded Actuarial Accrued Liability	
	September 30, 2003	**September 30, 2002**
1. Actuarial accrued liability......................	$ 11,761,146,746	$ 10,752,684,307
2. Valuation assets	10,440,610,630	10,616,278,373
3. Future reconciliation contribution	-0-	-0-
4. Unfunded (overfunded) actuarial accrued liability = (1) - (2) - (3)	$ 1,320,536,116	$ 136,405,934
	Derivation of Actuarial Gain (Loss) Years Ended September 30	
	2003	**2002**
5. Unfunded actuarial accrued liability (UAAL) at start of year	$ 136,405,934	$ (754,516,394)
6. Normal cost	172,886,429	173,847,614
7. Actual employer pension contributions	79,291,845	87,486,128
8. Transfer from (to) stabilization subaccount...	(17,364,626)	(87,486,128)
9. Expected UAAL at end of year = (5) + (6) - (7) – (8), adjusted for interest..	269,631,444	(627,122,282)
10. Estimated change due to early retirement window..	590,000,000	210,000,000
11. Expected UAAL after changes = (9) + (10)	859,631,444	(417,122,282)
12. Actual UAAL at end of year	1,320,536,116	136,405,934
13. Gain (loss) = (11) - (12)	$ (460,904,673)	$ (553,528,216)
14. Gain (loss) as percent of pension actuarial accrued liabilities at start of year ($10,752,684,307 and $9,878,160,747 as of September 30, 2002 and September 30, 2001)	(4.29%)	(5.60%)

Table 3

Recommended and Actual State Contributions

Fiscal Year	Valuation Date September 30	Actual Contributions[6]	Actual Payroll	% of Payroll Contribution Computed: Regular Benefits	% of Payroll Contribution Computed: Including Supplemental	% of Payroll Contribution Computed: Actual[6]
1987-1988	1987	$164,587,715	$1,945,713,552	6.04%	6.65%	8.46%
1988-1989	1988	-	-	6.47	7.16	-
1988-1989	1988[1]	113,410,605	2,058,967,359	6.47	6.89	5.51
1989-1990	1989	123,967,810	2,205,886,704	6.80	7.27	5.62
1990-1991	1990	-	-	8.10	8.61	-
1990-1991	1990[3]	154,027,600	2,261,157,940	8.10	8.65	6.81
1991-1992	1991	-	-	8.64	9.24	-
1991-1992	1991[3]	187,004,712	2,289,803,397	8.81	9.41	8.17
1992-1993	1992	-	-	12.02	12.64	-
1992-1993	1992[2]	-	-	9.74	10.36	-
1992-1993	1992[5]	247,047,499	2,257,823,941	9.12	9.74	10.94
1993-1994	1993	-	-	9.35	10.03	-
1993-1994	1993[4]	263,791,739	2,327,924,221	9.21	9.89	11.33
1994-1995	1994	-	-	9.39	10.02	-
1994-1995	1994[1]	306,488,437	2,434,824,614	10.15	10.71	12.59
1995-1996	1995	285,766,953	2,528,503,514	9.72	10.38	11.30
1996-1997	1996	288,366,799	2,458,227,626	9.30	9.93	11.73
1997-1998	1997	-	-	9.81	10.51	-
1997-1998	1997[1,4]	145,734,677	2,282,056,831	5.09	5.56	6.39
1998-1999	1998	-	-	4.92	5.41	-
1998-1999	1998[1]	121,119,857	2,125,707,551	4.77	5.29	5.70
1999-2000	1999	121,817,366[1]	2,153,964,222	4.94	5.46	5.66
2000-2001	2000	112,299,808[1]	2,204,452,791	4.06	4.57	5.09
2001-2002	2001	-[7]	2,165,589,882	4.51	5.00	0.00
2002-2003	2002	61,927,219[8]	1,859,884,999	8.10	8.63	3.33
2003-2004	2003	-	-	8.18	14.12	-

[1] Revised actuarial assumptions. [2] After reversion to 50-year amortization of unfunded actuarial accrued liabilities. [3] Benefit changes. [4] Revised asset valuation method. [5] After elimination of advance-funding for dental/vision benefits (1992-93 fiscal year). [6] Actual contributions above are State contributions net after deduction of health insurance premiums and special contributions funding the 1984 "early out" program. Beginning with the 1982-83 fiscal year, a statutory reconciliation process ensures that contribution shortfalls or overages will be corrected by special contribution rate adjustments in the second succeeding fiscal year. [7]. 2001-2002 employer contributions ($87,486,128) were transferred to the Advanced Health Funding Subaccount. [8] Net after transfer of $17, 364,626 to the Advanced Health Funding Subaccount.

Table 4

Actuarial Balance Sheet as of September 30, 2003 and 2002
Pension Benefits Only

Present Resources and Expected Future Resources		
	2003	**2002**
A. Valuation assets		
1. Net assets from system financial statements (market value)	$ 8,924,266,601	$ 8,274,112,215
2. Valuation asset adjustment	1,516,344,029	2,342,166,158
3. Valuation assets	$ 10,440,610,630	$ 10,616,278,373
B. Present value of expected future contributions		
1. For normal costs	1,306,673,279	1,466,225,686
2. For unfunded (overfunded) actuarial accrued liabilities	1,320,536,116	136,405,934
3. Total	$ 2,627,209,395	$ 1,602,631,620
C. Present value of expected future member contributions	-0-	-0-
D. Future reconciliation contributions	-0-	-0-
E. Total Present and Expected Future Resources	$ 13,067,820,025	$ 12,218,909,993
Present Value of Expected Future Benefit Payments and Reserves		
A. To retirants and beneficiaries	$ 7,386,462,403	$ 5,511,997,642
B. To vested terminated members	429,371,452	459,664,956
C. To present active members		
1. Allocated to service rendered prior to valuation date	3,945,312,891	4,781,021,709
2. Allocated to service projected to be rendered after valuation date	1,306,673,279	1,466,225,686
3. Total	$ 5,251,986,170	$ 6,247,247,395
D. Total Present Value of Expected Future Benefit Payments	13,067,820,025	12,218,909,993
E. Reserves		
1. Allocated to retirants and beneficiaries	-0-	-0-
2. Unallocated investment income & adjustments	-0-	-0-
3. Total	-0-	-0-
F. Total Present Value of Expected Future Benefit Payments and Reserves	$ 13,067,820,025	$ 12,218,909,993

Table 5

Historical Funding Levels for Actuarial Accrued Liabilities
Pension Benefits Only

Valuation Date September 30	Actuarial Accrued Liability	Valuation Assets	Funded Ratio	Unfunded (Overfunded) Accrued Liability[3]	Active Member Payroll	Unfunded (Overfunded) As % of Active Payroll
($ in thousands)						
1988[1]	$3,575,992	$3,641,723	101.8%	$ (65,731)	$1,926,833	(3.4)%
1989	3,966,631	3,927,648	99.0	38,983	2,065,901	1.9
1990[2]	4,463,561	4,105,717	92.0	357,844	2,305,726	15.5
1991[2]	4,939,084	4,346,586	88.0	592,498	2,314,608	25.6
1992	5,480,459	4,533,757	82.7	946,702	2,266,394	41.8
1993[4]	6,172,846	5,043,880	81.7	1,128,966	2,261,476	49.9
1994[1]	6,559,708	5,475,533	83.5	1,084,175	2,350,649	46.1
1995	6,861,422	6,090,002	88.8	771,420	2,430,733	31.7
1996	7,147,279	6,678,011	93.4	469,268	2,515,420	18.7
1997	8,213,429	7,515,869	91.5	697,561	2,273,203	30.7
1997[5]	8,100,552	8,834,424	109.1	(733,872)	2,273,203	(32.3)
1998	8,373,977	9,108,985	108.8	(735,008)	2,107,996	(34.9)
1998[1]	8,496,974	9,108,985	107.2	(612,012)	2,107,996	(29.0)
1999	9,028,621	9,648,383	106.9	(619,762)	2,213,851	(28.0)
2000	9,473,873	10,336,872	109.1	(863,000)	2,253,818	(38.3)
2001	9,878,161	10,632,677	107.6	(754,516)	2,230,562	(33.8)
2002	10,752,684	10,616,278	98.7	136,406	2,133,477	6.4
2003	11,761,147	10,440,611	88.8	1,320,536	1,859,555	71.0

[1] Revised actuarial assumptions. [2] Benefit changes. [3] Excludes reduction in unfunded due to future Act No. 3 funding and future reconciliation contributions.
[4] Revised asset valuation method. [5] Revised actuarial assumptions and revised asset valuation method.

Table 6
Funding Objective Achievement Indicators - Historical Comparison
(Dollar Amounts in Thousands)

Valuation September 30	Valuation Assets	Termination Indicator: Actuarial Present Value of Vested Benefits	Termination Indicator: Funded Ratio	Experience Indicator: Actuarial Gain (Loss)
1980[1]	$1,175,815	$1,071,464	109.7%	$ (22,472)
1981	1,373,884	1,106,535	124.2	(4,548)
1982	1,550,724	1,177,418	131.7	69,789
1983	1,752,080	1,305,929	134.2	20,800
1984	1,986,943	1,430,295	138.9	90,065
1985	2,240,372	1,642,733	136.4	(27,338)
1986	2,462,088	1,799,034	136.9	(144,372)
1986[2]	2,462,088	1,802,008	136.6	(144,372)
1986[3]	2,918,006	1,802,008	161.9	311,546
1986[2]	2,918,006	2,342,101	124.6	311,546
1986[1]	2,918,006	1,962,483	148.7	311,546
1987	3,402,870	2,340,877	145.4	58,935
1988	3,662,723	2,553,111	143.5	(96,061)
1988[1]	3,662,723	2,553,111	143.5	(96,061)
1989	3,957,648	2,917,202	135.7	(75,317)
1990	4,143,717	3,378,475	122.7	(306,981)
1990[2]	4,143,717	3,383,615	122.5	(306,981)
1991	4,392,586	3,735,240	117.6	(137,271)
1991[2]	4,392,586	3,766,794	116.6	(137,271)
1992	4,583,777	4,287,004	106.9	(300,607)
1993	5,004,990	4,394,179	113.9	(286,259)
1993[3]	5,089,835	4,394,179	115.8	(286,259)
1994	5,514,735	4,731,537	116.6	23,872
1994[1]	5,514,735	5,066,906	108.8	23,872
1995	6,132,233	5,255,984	116.7	333,511
1996[4]	6,678,011	5,337,969	125.1	308,146
1997	7,515,869	6,528,114	115.1	279,245
1997[5]	8,834,424	6,528,114	135.3	279,245
1998	9,108,985	6,607,380	137.9	(8,425)
1998[1]	9,108,985	6,696,390	136.0	(8,425)
1999	9,648,383	7,351,103	131.2	6,923
2000	10,336,872	7,535,245	137.2	252,243
2001	10,632,677	7,917,271	134.3	(106,544)
2002	10,616,278	8,861,608	119.8	(553,528)
2003	10,440,611	10,146,046	102.9	(460,905)

[1] Revised actuarial assumptions. [2] Benefit changes. [3] Revised asset valuation method.
[4] Excludes health and dental/vision benefits beginning in 1996 (prior years included dental/vision).
[5] Revised actuarial assumptions and revised asset valuation method.

Table 7

<u>Historical Funding Levels for Actuarial Accrued Liability</u>
<u>Pension Benefits Only</u>

	Actuarial Accrued Liability ($ in Millions)				Portion of Actuarial Accrued Liability Covered by Assets			
Valuation Date September 30	(1) Active Member Contributions	(2) Retirants and Beneficiaries	(3) Active and Inactive Members (Employer Financed Portion)	Valuation Assets ($ in Millions)	(1)	(2)	(3)	(4)**
1987	$82	$1,216	$2,053	$3,403	100%	100%	102.5%	101.6%
1988@	89	1,341	2,146	3,642	100	100	103.1	101.8
1989	83	1,551	2,333	3,928	100	100	98.3	99.0
1990#	83	1,715	2,666	4,106	100	100	86.6	92.0
1991#	82	1,870	2,987	4,347	100	100	80.2	88.0
1992	83	2,413	2,984	4,533	100	100	68.3	82.7
1993+	72	2,561	3,540	5,043	100	100	68.1	81.7
1994@	73	2,778	3,709	5,476	100	100	70.8	83.5
1995	72	2,751	4,038	6,090	100	100	80.9	88.8
1996	55	2,844	4,248	6,678	100	100	89.0	93.4
1997	3	4,300	3,910	7,516	100	100	82.2	91.5
1997@+	3	4,300	3,798	8,834	100	100	119.3	109.0
					100	100	118.4	108.8
1998	27	4,360	3,987	9,109				
1998@	27	4,484	3,986	9,109	100	100	115.4	107.2
1999	35	4,538	4,456	9,648	100	100	113.9	106.9
2000	29	4,659	4,786	10,337	100	100	118.0	109.1
2001	34	4,677	5,167	10,633	100	100	114.6	107.6
2002	123	5,512	5,118	10,616	100	100	97.3	98.7
2003	57	7,386	4,318	10,441	100	100	69.4	88.8

@ Revised actuarial assumptions
# Benefits amended
+ Revised asset valuation method
** Percent funded on a total valuation asset and total actuarial accrued liability basis.

III. FINANCIAL EXPERIENCE

As of September 30, 2003, the market value of the total assets of the System amounted to nearly $8.97 billion. Of this total, $42.3 million was reserved for health benefits, leaving $8.92 billion in pension assets. Table 8 shows the distribution of assets by type of investment as of the current and preceding valuation dates. Table 9 shows the historical growth in market value of the System's assets.

During 1998, the Department of Management and Budget approved the use of market value of assets as of September 30, 1997 for actuarial valuation purposes. For investment gains or losses that occur after that date, a 5-year smoothing technique is being used. This is the same procedure as was in effect prior to September 30, 1997, and is described below.

The actuarial value of assets is determined on the basis of a valuation method that assumes the fund earns the expected rate of return of 8.0%, and includes an adjustment to reflect market value. This procedure is applied as follows:

(i) Preliminary value is determined by taking the sum of actuarial value at the beginning of the year and the excess of income over expenses during the year, assuming that the fund earns the assumed rate of 8% during the year.

(ii) This value is written-up or written-down by taking 20% of each year's difference between actual and expected return for the next five years. Actual return for the year includes net interest, dividends, and asset appreciation or depreciation.

For the September 30, 2003 valuation, the actuarial value of assets is $10.44 billion for pension benefits, which is $1.52 billion (*i.e.*, 16.99%) more than the market value of $8.92 billion. Table 10 presents the determination of the actuarial value of assets for the current and prior years.

Table 8

Assets and Fund Balances at Market Value

Reported Assets (Market Value)		
Type of Asset	Assets September 30, 2003	2002
Cash	$ 41,464,748	$ 20,223,518
Receivables	114,178,314	97,780,461
Short Term Investments	428,164,047	136,852,909
Bonds and Notes	1,527,090,095	2,009,533,466
Common and Preferred Stock	3,973,715,495	3,412,414,158
Real Estate	853,356,337	869,008,086
Alternative Investments	1,181,377,358	1,219,655,746
International Investments	855,654,706	619,221,734
Collateral on Loaned Securities	219,483,789	366,352,026
Total Assets	$9,194,484,889	$8,751,042,104
Less: Current Liabilities	(227,959,096)	(379,515,790)
Net Assets Available for Benefits	$ 8,966,525,793	$ 8,371,526,314

Reported Fund Balance (Market Value)		
	Balance September 30, 2003	2002
Reserve for Employees' Contributions (Employee Savings Fund)	$ 152,471,433	$ 199,489,598
Reserve for Employer Contributions (Employer Accumulation Fund)	3,025,491,222	3,563,969,678
Reserve for Retired Benefit Payments (Pension Reserve Fund)	5,223,067,079	4,547,823,172
Reserve for Health Benefits	42,259,192	97,414,099
Reserve for Undistributed Investment Income (Income Fund)	523,236,867	(37,170,233)
Total Fund Balances	$ 8,966,525,793	$ 8,371,526,314

Table 9: Historical Growth of Assets at Market Value

Year Ended September 30	Revenues			Expenses			
	Member Contributions	Employer Contributions	Investment Income	Benefit Payments	Contribution Refunds and Transfers	Administrative Expenses	Net Assets at Market Value
1978	$ -	$ -	N/A	$ -	$ -	$ -	N/A
1979	2,228,493	107,078,586	N/A	51,506,719	1,434,766	948,330	N/A
1980	1,775,856	137,910,541	N/A	57,873,992	1,043,174	1,003,575	N/A
1981	1,580,234	141,975,446	N/A	66,576,515	1,014,194	1,107,743	N/A
1982	1,293,905	129,506,058	N/A	85,798,259	745,613	1,234,169	N/A
1983	2,343,258	132,445,312	N/A	100,929,944	559,716	1,387,266	N/A
1984	3,790,259	170,758,774	N/A	117,779,562	327,454	1,727,470	N/A
1985	1,398,082	220,640,888	N/A	152,351,357	231,382	2,373,482	N/A
1986	1,701,945	229,871,765	N/A	215,829,738	314,808	2,405,064	N/A
1987	2,404,944	227,689,118	N/A	225,372,098	190,867	2,524,823	$3,596,084,688
1988	4,595,524	198,535,629	$ (74,763,613)	180,131,209	196,462	2,583,564	3,541,540,993
1989	3,066,178	162,046,885	547,233,053	231,499,226	204,889	2,461,918	4,019,721,076
1990	2,733,598	188,863,034	(125,829,295)	246,339,702	125,828	2,993,159	3,836,029,724
1991	4,416,336	227,348,243	662,492,977	271,569,767	126,407	4,339,321	4,454,251,785
1992	4,810,700	285,424,632	397,363,808	333,082,769	123,793	5,223,109	4,803,421,254
1993	4,068,697	371,902,232	563,222,953	394,557,538	99,369	4,198,410	5,343,759,819
1994	2,257,176	389,728,590	128,583,844	409,975,307	92,153	5,101,168	5,449,160,801
1995	2,260,510	422,294,609	920,176,637	405,682,086	80,453	5,518,735	6,382,611,283
1996	2,619,067	431,094,371	959,236,243	439,056,604	30,082	6,721,163	7,329,753,115
1997	12,230,090	410,008,211	1,681,527,984	484,817,137	7,868,296	5,247,943	8,935,586,024
1998	11,549,990	257,934,304	686,386,228	593,453,929	134,441,035	4,248,894	9,159,312,688
1999	11,047,646	265,806,232	1,471,196,655	630,346,729	728,366	4,330,879	10,271,957,247
2000	9,663,634	289,224,539	1,363,375,124	667,431,376	222,171	3,954,992	11,262,612,005
2001	9,134,665	361,926,010	(1,263,116,077)	726,771,708	91,700	4,149,284	9,639,543,901
2002	179,559,102	345,216,945	(1,003,890,272)	782,452,212	18,331	6,432,819	8,371,526,314
2003	91,330,212	400,130,385	1,164,600,217	1,055,749,270	120,026	5,192,039	8,966,525,793

Above figures include supplemental payments and health insurance premiums. Assets include pension and health.

Table 10: Derivation of Valuation Assets (Pension Only)

	Year Ending September 30				
	2003	**2002**	**2001**	**2000**	**1999**
1. Beginning of Year Assets					
a) Market Value	$ 8,274,112,215	$ 9,616,516,845	$11,247,932,422	$10,224,880,350	$ 9,092,703,614
b) Valuation Assets	10,616,278,373	10,632,677,141	10,336,872,252	9,648,383,481	9,108,985,457
2. End of Year Assets at Market Value	8,924,266,601	8,274,112,215	9,616,516,845	11,247,932,422	10,224,880,350
3. Net Additions to Market Value					
a) Member Contributions	80,185,475	173,232,835	3,341,381	4,606,662	6,186,018
b) Employer Contributions	79,291,845	87,486,128	112,299,808	121,817,366	121,119,857
c) Investment Income	1,215,018,189	(1,005,732,436)	(1,264,290,454)	1,359,608,973	1,456,149,360
d) Benefit Payments	(701,664,432)	(503,453,879)	(478,525,328)	(458,803,774)	(446,219,254)
e) Contribution Refunds/Transfers	(120,026)	(18,331)	(91,700)	(222,163)	(728,366)
f) Administrative Expenses	(5,192,039)	(6,432,819)	(4,149,284)	(3,954,992)	(4,330,879)
g) Transfers to Advanced Funding Subaccount	(17,364,626)	(87,486,128)	N/A	N/A	N/A
h) Total Additions to Market Value	$650,154,386	$(1,342,404,630)	$(1,631,415,577)	$1,023,052,072	$1,132,176,736
4. Summary of Additions to Market Value					
a) Net Contributions = (3a) + (3b) + (3e) + (3g)	141,992,668	173,214,504	115,549,489	126,201,865	126,577,509
b) Net Investment Income = (3c) + (3f)	1,209,826,150	(1,012,165,255)	(1,268,439,738)	1,355,653,981	1,451,818,481
c) Benefit Payments = (3d)	(701,664,432)	(503,453,879)	(478,525,328)	(458,803,774)	(446,219,254)
d) Total Additions to Market Value	650,154,386	(1,342,404,630)	(1,631,415,577)	1,023,052,072	1,132,176,736
5. Average Valuation Assets = (1b) + .5 x [(4a) + (4c)]	10,336,442,491	10,467,557,453	10,155,384,333	9,482,082,527	8,949,164,585
6. Imputed Income at Valuation Rate = 8.0% x (5)	826,915,399	837,404,596	812,430,747	758,566,602	715,933,167
7. Gain (loss) from Investments = (4b) - (6)	382,910,751	(1,849,569,851)	(2,080,870,485)	597,087,379	735,885,314
8. Portion of Gains (Losses) Recognized					
a) From this year = .2 x (7)	76,582,150	(369,913,970)	(416,174,097)	119,417,476	147,177,063
b) From one year ago	(369,913,970)	(416,174,097)	119,417,476	147,177,063	(4,070,461)
c) From two years ago	(416,174,097)	119,417,476	147,177,063	(4,070,461)	N/A
d) From three years ago	119,419,476	147,177,063	(4,070,461)	N/A	N/A
e) From four years ago	147,177,063	(4,070,461)	N/A	N/A	N/A
f) Total	(442,911,378)	(523,563,989)	(153,650,019)	262,524,078	143,106,602
9. Change in Valuation Assets = (4a) + (4c) + (6) + (8f)	(175,667,743)	(16,398,768)	295,804,889	688,488,771	539,398,024
10. End of Year Assets					
a) Market Value = (2)	8,924,266,601	8,274,112,215	9,616,516,845	11,247,932,422	10,224,880,350
b) Valuation Assets = (1b) + (9)	10,440,610,630	10,616,278,373	10,632,677,141	10,336,872,252	9,648,383,481
11. Actuarial Rate of Return	3.72%	3.00%	6.49%	10.77%	9.60%

IV. MEMBERSHIP CHARACTERISTICS

A total of 89,555 active, inactive vested, and retired members of the Michigan State Employees' Retirement System are included in this 2003 actuarial valuation.

Computer tapes containing membership data as of September 30, 2003 were provided to us by the Office of Retirement Services. For purposes of the actuarial valuation, we prepared various tabulations of the membership data recorded on the computer tapes. Summaries of these tabulations are presented in this section and in the tables which follow.

Active Employees

The 36,536 active employees covered by the System as of September 30, 2003 had a total reported payroll of approximately $1.86 billion (down 12.8% from $2.13 billion last year) and an average annual salary of $50,897. Between the 2002 and 2003 actuarial valuations, the number of active members decreased by 6,528 or 15.2%. Average age, average service and average salary each changed, as shown below:

	September 30	
	2003	**2002**
Number of Active Members	36,536	43,064
Number of Corrections Officers	10,590	11,400
Number of Conservation Officers	155	169
Average Age	47.7	48.0
Average Service	17.9	18.6
Reported Payroll	$1,859,555,375	$2,133,476,688
Average Annual Pay	$50,897	$49,542
Payroll for Corrections Officers	$535,989,177	$560,788,800
Average Annual Pay for Corrections Officers	$50,613	$49,192
Payroll for Conservation Officers	$10,519,385	$9,703,135
Average Annual Pay Conservation Officers	$67,867	$57,415

Table 11 shows the average age, average years of service, and average salary of active employees as of September 30, 2003. Table 12 shows the distribution of employees as of September 30, 2003 by annual salary.

Inactive Members

The 2003 actuarial valuation also takes account of the actuarial liabilities for 7,528 reported vested members, as compared to 7,917 in the 2002 valuation.

Table 13 presents a historical comparison of the number and characteristics of active and inactive vested members reported for actuarial valuations since 1945.

Pensioners and Beneficiaries

As of September 30, 2003, the System was paying retirement benefits to a total of 45,491 retirants and beneficiaries. During fiscal 2003, the total number of benefit recipients increased by 5,825 as shown below:

	September 30,	
	2002	2002
Retirement Annuities	36,324	30,737
Survivor Annuities*	5,691	5,541
Disability Annuities	3,476	3,388
Total benefit recipients	45,491	39,666

* Includes survivors of disability retirants.

Table 14 shows a distribution of the 45,491 System retirees as of September 30, 2003, by age, type and amount of benefit. Table 15 shows a similar distribution, by type of benefit and monthly amount categories. The average annual benefit for all retirees was $15,577 as of September 30, 2003, after adjustment for optional benefit forms. During fiscal 2003, the average annual benefit for all System retirees increased from $13,789 to $15,577, or by 13.0%.

Table 16 shows the number and annual allowances as of September 30, 2003 for each specific type of pension in force. Finally, Table 17 presents a historical development of the growth in number and amount of pensioners in force, as well as the present value of pensioner liabilities, since the 1945 valuation.

Table 11

Number and Average Salaries for Employees in Active Service as of September 30, 2003 by Age and by Years of Service

Age	Total	Years of Service: 0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 and over
Total	36,536	547	5,796	8,158	8,395	5,873	5,834	1,671	230	32
	$50,897	$41,883	$47,910	$49,657	$51,640	$50,837	$53,205	$57,421	$58,690	$60,464
Under 25	4	3	1							
	21,517	20,931	23,277							
25 - 29	272	61	211							
	43,261	38,598	44,609							
30 - 34	1,842	66	1,367	393	16					
	48,080	41,981	48,109	49,032	47,366					
35 - 39	3,916	58	1,235	1,794	821	7	1			
	48,958	39,398	47,933	49,453	49,981	61,717	50,674			
40 - 44	6,198	51	980	1,943	2,270	777	174	3		
	49,465	41,216	47,364	49,388	51,439	47,428	47,946	48,115		
45 - 49	9,633	122	804	1,623	2,223	2,369	2,279	209	4	
	50,612	44,058	47,544	50,338	52,389	50,873	50,246	50,369	57,765	
50 - 54	9,095	82	604	1,365	1,823	1,868	2,525	776	49	3
	52,158	41,405	48,219	49,836	51,510	51,407	54,866	54,914	53,398	45,018
55 - 59	4,251	53	392	787	970	674	683	572	112	8
	53,515	42,638	50,211	49,269	51,479	52,139	57,128	62,384	58,334	58,141
60 - 64	1,092	23	154	209	243	159	144	93	56	11
	54,348	52,544	49,112	49,897	53,372	54,478	57,316	63,647	65,389	61,956
65 - 69	165	11	32	35	24	17	19	14	6	7
	52,910	39,373	49,453	52,131	57,685	49,679	57,093	60,593	43,913	66,344
70 & over	68	17	16	9	5	2	9	4	3	3
	49,136	39,019	43,245	44,144	61,144	43,957	66,589	53,656	64,132	62,914

Table 12

Employees in Active Service as of September 30, 2003 by Annual Salary

Salary	All Employees	Corrections Officers	Conservation Officers
Total	36,536	10,590	155
Less than $10,000	118	23	1
$10,000 - 14,999	21	2	-
15,000 - 19,999	48	1	-
20,000 - 24,999	73	-	-
25,000 - 29,999	233	1	-
30,000 - 34,999	835	25	-
35,000 - 39,999	5,346	436	-
40,000 - 44,999	6,461	2,023	-
45,000 - 49,999	7,219	3,843	2
50,000 - 54,999	5,994	1,799	6
55,000 - 59,999	4,012	1,175	20
60,000 - 64,999	2,135	606	30
65,000 - 69,999	1,286	276	29
70,000 - 74,999......	879	124	37
75,000 - 79,999	450	91	17
80,000 - 84,999	288	34	5
85,000 - 89,999	263	28	5
90,000 - 94,999	250	44	1
95,000 - 99,999	112	23	-
100,000 and over.......	513	36	2

Table 13
Active and Inactive Members Reported for Valuation
Historical Comparison

Valuation Date	Active Members: Number	Reported Payroll (Thousands)	Average Ann. Pay	Average Age	Average Service	Number of Inactive Members
6-30-1945	13,833	$ 30,043	$ 2,164			--
6-30-1950	21,633	61,722	2,853			26
6-30-1955	24,436	102,534	4,196			49
6-30-1960	29,638	162,654	5,488			60
6-30-1965	31,675	194,114	6,128			84
6-30-1968	39,145	287,500	7,344	41.3	8.3	107
6-30-1969	42,209	331,726	7,859	40.9	8.1	101
6-30-1970	46,435	420,018	9,045	39.8	7.6	108
6-30-1971	47,893	470,972	9,834	39.6	7.6	108
6-30-1972	51,341	533,925	10,400	39.0	7.4	110[2]
6-30-1973	53,132	577,479	10,869	38.9	7.6	115[2]
6-30-1974	55,485	612,975	11,048	38.7	7.6	138
6-30-1975	56,236	671,893	11,948	38.6	7.7	182
9-30-1976	55,630	690,119	12,406	38.8	8.0	278
9-30-1977	56,250	810,031	14,401	39.2	8.3	337[2]
9-30-1978	75,158[1]	1,103,569	14,683	37.4	6.8	396
9-30-1979	67,064[1]	1,130,420	16,856	38.6	7.7	461
9-30-1980	71,380[1]	1,306,959	18,310	38.3	7.6	508
9-30-1981	62,963[1]	1,333,673	21,182	39.5	8.9	745
9-30-1982	59,145	1,304,315	22,053	40.3	9.7	915
9-30-1983	58,650	1,361,648	23,217	40.7	10.3	927
9-30-1984	57,362	1,405,394	24,500	40.5	10.1	968
9-30-1985	59,850	1,504,409	25,136	40.6	10.2	971
9-30-1986	61,174	1,677,066	27,415	40.8	10.5	913
9-30-1987	63,548	1,794,213	28,234	40.8	10.6	863
9-30-1988	63,511	1,861,675	29,313	41.1	10.9	811
9-30-1989	66,388	1,996,039	30,066	40.9	10.7	753
9-30-1990	69,558[1]	2,227,755	32,027	41.2	10.9	2,458[2]
9-30-1991	65,595	2,236,336	34,093	42.1	11.9	3,030
9-30-1992	64,248	2,189,752	34,083	42.2	11.9	4,367
9-30-1993	63,906	2,185,036	34,191	42.6	12.1	4,359
9-30-1994	64,923	2,271,158	34,982	43.1	12.6	4,540
9-30-1995	65,133	2,348,534	36,058	43.2	12.7	5,276
9-30-1996	63,807	2,515,420	39,422	43.8	13.0	6,667
9-30-1997	55,434	2,273,203	41,007	43.7	13.1	7,656
9-30-1998	49,717	2,107,996	42,400	44.8	14.8	8,021
9-30-1999	49,612	2,213,851	44,623	45.9	15.8	7,376
9-30-2000	47,778	2,253,818	47,173	46.7	16.7	7,556
9-30-2001	45,852	2,230,562	48,647	47.4	17.7	8,809
9-30-2002	43,064	2,133,477	49,542	48.0	18.6	7,917
9-30-2003	36,536	1,859,555	50,897	47.7	17.9	7,528

[1] Data reporting correction. [2] Estimated.

Table 14

Pensions in Force on September 30, 2003
By Age, Type and Amount of Pension*

Attained Age Groups	All Pensioners		Age and Service Retirants		Disability Retirants		Beneficiaries**	
	No.	Annual Allowances	No.	Annual Allowances	No.	Annual Allowances	No.	Annual Allowances
Total	45,491	$708,606,856	36,324	$628,809,117	3,476	$31,069,563	5,691	$48,728,175
15 – 19	3	37,733	-	-	-	-	3	37,733
20 – 24	42	183,122	-	-	-	-	42	183,122
25 – 29	43	27,662	-	-	-	-	43	27,662
30 – 34	73	139,220	1	3,428	5	29,157	67	106,635
35 – 39	99	238,345	1	1,345	17	111,171	81	125,829
40 – 44	196	1,399,370	9	177,221	98	744,268	89	477,881
45 – 49	802	9,444,757	196	4,726,947	437	3,544,216	169	1,173,594
50 – 54	3,785	84,615,617	2,810	75,246,812	721	6,864,296	254	2,504,509
55 – 59	7,117	164,222,583	5,923	151,937,483	834	8,283,729	360	4,001,371
60 – 64	7,283	134,985,402	6,407	125,524,526	474	4,597,338	402	4,863,538
65 – 69	7,112	103,640,411	6,230	94,369,728	325	2,855,922	557	6,414,760
70 – 74	5,870	79,508,934	4,896	69,809,629	228	1,941,631	746	7,757,673
75 – 79	5,413	64,787,749	4,305	55,419,621	142	967,981	966	8,400,147
80 – 84	4,191	40,600,033	3,109	32,750,004	130	823,441	952	7,026,588
85 – 89	2,396	18,316,304	1,709	14,247,937	54	266,200	633	3,802,167
90 – 94	868	5,375,070	579	3,787,602	11	40,213	278	1,547,256
95 – 99	164	962,433	125	726,393	-	-	39	236,041
100 & over	34	122,111	24	80,441	-	-	10	41,669
Average Annual Benefit		$15,576.86		$17,311.12		$8,938.31		$8,562.32

* Amounts may not add due to rounding.
** Includes survivors of disability retirants.

Table 15

Pensions in Force on September 30, 2003
by Monthly Amount and Type of Pension

Monthly Amount	Type of Pension			
	Total	Retiree	Disability	Beneficiaries*
Total	45,491	36,324	3,476	5,691
Less than $200	1,324	487	74	763
$ 200 - 399	3,847	2,489	304	1,054
400 - 599	5,726	3,559	1,098	1,069
600 - 799	4,902	3,381	722	799
800 - 999	4,201	3,091	514	596
1,000 - 1,199	3,863	3,020	396	447
1,200 - 1,399	3,893	3,339	189	365
1,400 - 1,599	3,273	2,968	88	217
1,600 - 1,799	2,930	2,730	56	144
1,800 - 1,999	2,668	2,565	20	83
2,000 - 2,199	2,209	2,147	4	58
2,200 - 2,399	1,843	1,806	2	35
2,400 - 2,599	1,384	1,345	7	32
2,600 - 2,799	925	916	1	8
2,800 - 2,999	694	688	0	6
3,000 – 3,199	521	511	0	10
3,200 – 3,399	334	331	0	3
3,400 – 3,599	257	254	1	2
3,600 – 3,799	160	160	0	0
3,800 – 3,999	129	129	0	0
4,000 – 4,199	100	100	0	0
4,200 – 4,399	80	80	0	0
4,400 – 4,599	65	65	0	0
4,600 – 4,799	51	51	0	0
4,800 – 5,000	31	31	0	0
5,000 & over	81	81	0	0
Average monthly benefit	$1,298.07	$1,442.59	$744.86	$713.53

* Includes survivors of disability retirants.

Table 16

Retirants and Beneficiaries Reported September 30, 2003
By Type of Allowance

Type of Allowance	Number	Annual Allowances*
AGE AND SERVICE		
Straight Life	15,994	$245,873,309
Survivor Pension – 100%	7,598	142,650,553
Survivor Pension – 50%	6,614	124,696,015
Survivor Pension – 75%	1,035	25,810,103
Soc. Sec. Equated		
- Straight Life	3,035	47,784,446
- Survivor Pension – 100%	760	14,970,471
- Survivor Pension – 50%	1,127	22,514,483
- Survivor Pension – 75%	161	4,509,738
Beneficiaries	3,606	31,294,447
Totals	39,930	$660,103,565
DISABILITY		
Duty	477	$2,682,661
Non-Duty	1,645	15,448,942
Survivor Pension – 100%	957	8,889,684
Survivor Pension – 50%	359	3,644,386
Survivor Pension – 75%	38	403,889
Beneficiaries	797	4,983,559
Totals	4,273	$36,053,121
SURVIVORS OF MEMBERS		
Duty	22	$45,639
Non-Duty	1,266	12,404,528
Totals	1,288	$12,450,167
TOTAL ALLOWANCES	45,491	$708,606,853

* Allowances may not add due to rounding.

Table 17

Retirants and Beneficiaries - Historical Comparison

	Allowances on Rolls						
			Annual Increase[1]			Discounted Value of Allowances[3]	
Valuation Date	No.	Annual Amount[2]	No.	Amount	Average Allowance	Total[2]	Average
6-30-1945	347	$ 164	-	-	$ 473	$ -	, -
6-30-1950	1,580	747	39.7%	37.9%	473	-	-
6-30-1955	2,222	1,380	7.1	13.1	621	13,150	5,918
6-30-1960	3,602	3,155	10.3	18.3	876	34,001	9,439
6-30-1965	5,335	6,469	7.2	12.2	1,213	70,966	13,302
6-30-1968	6,467	9,474	5.9	17.4	1,465	91,468	14,144
6-30-1969	6,920	10,593	7.0	11.8	1,531	102,987	14,883
6-30-1970	7,358	11,827	6.3	11.6	1,607	115,731	15,729
6-30-1971	7,859	13,275	6.8	12.2	1,689	125,852	16,014
6-30-1972	8,477	15,957	7.9	20.2	1,882	151,771	17,904
6-30-1973	8,884	17,429	4.8	9.2	1,962	166,284	18,717
6-30-1974	9,600	21,588	8.1	23.9	2,249	205,748	21,432
6-30-1975	10,439	25,375	8.7	17.5	2,431	241,658	23,150
9-30-1976	11,537	30,742	10.5	21.2	2,665	293,738	25,461
9-30-1977	12,340	34,645	7.0	12.7	2,808	332,759	26,966
9-30-1978	13,105	41,659	6.2	20.0	3,179	400,505	30,561
9-30-1979	13,990	46,622	6.8	11.9	3,333	451,606	32,281
9-30-1980	14,860	52,030	6.2	11.6	3,501	435,672	29,318
9-30-1981	15,947	58,706	7.3	12.8	3,681	495,437	31,068
9-30-1982	16,867	65,563	5.8	11.7	3,887	555,559	32,938
9-30-1983	17,788	73,529	5.5	12.2	4,134	625,038	35,138
9-30-1984	19,423	93,251	9.2	26.8	4,801	790,929	40,721
9-30-1985	20,869	111,708	7.4	19.8	5,353	947,265	45,391
9-30-1986	21,271	115,279	1.9	3.2	5,420	978,079	45,982
9-30-1987	21,873	121,033	2.8	5.0	5,533	1,173,492	53,650
9-30-1988	23,008	149,237	5.2	23.3	6,486	1,341,152	58,291
9-30-1989	24,187	168,795	5.1	13.1	6,979	1,551,324	64,139
9-30-1990	24,863	180,696	2.8	7.1	7,268	1,714,914	68,975
9-30-1991	25,566	194,928	2.8	7.9	7,624	1,870,737	73,173
9-30-1992	28,856	243,612	12.9	25.0	8,442	2,413,082	83,625
9-30-1993	29,175	257,193	1.1	5.6	8,816	2,679,949	91,858
9-30-1994	29,962	273,387	2.7	6.3	9,124	2,906,035	96,991
9-30-1995	30,562	290,694	2.0	6.3	9,512	2,887,202	94,470
9-30-1996	31,093	307,933	1.7	5.9	9,904	2,843,976[4]	91,467[4]
9-30-1997	36,123	421,060	16.2	36.7	11,656	4,299,696	119,029
9-30-1998	36,185	432,456	0.2	2.7	11,951	4,483,898	123,916
9-30-1999	36,346	444,167	0.4	2.7	12,221	4,537,846	124,851
9-30-2000	36,705	463,969	1.0	4.5	12,640	4,659,321	126,940
9-30-2001	37,111	471,407	1.1	1.6	12,703	4,677,147	126,031
9-30-2002	39,666	546,968	6.9	16.0	13,789	5,511,998	138,960
9-30-2003	45,491	708,607	14.7	29.6	15,577	7,386,462	162,372

[1] For 1950, 1955 and 1960 the increase is the average of the 5 annual increases ending with the year shown. [2] In thousands of dollars.

[3] Discounted values are calculated by discounting all expected future payments to the valuation date at the valuation interest rate (including dental/vision benefits). [4] Excludes health and dental/vision benefits beginning in 1996.

V. ACTUARIAL ASSUMPTIONS AND FUNDING METHOD

Actuarial Assumptions

To calculate System contribution requirements, assumptions are made about all of the future events that could affect the amount and timing of benefits to be paid and the assets to be accumulated. The assumptions include several economic and demographic predictions such as:

- An assumed rate of investment return which is used to discount liabilities and project what plan assets will earn.
- A mortality table projecting the number of employees who will die before retirement and the duration of benefit payments after retirement.
- Assumed retirement rates projecting when employees will retire and commence receiving retirement benefits.
- Withdrawal and disability rates to estimate the number of employees who will leave the work force before retirement.
- Assumed rates of salary increases to project employees' compensation in future years.

Based on an actuarial experience investigation covering the period from September 30, 1992 through September 30, 1997, several changes in actuarial assumptions were adopted for use beginning with the 1998 valuation. The actuarial assumptions used in connection with this 2003 actuarial valuation of the System are identical to those used since 1998, and are summarized in the following paragraphs.

Investment Yield

Funding the System on an actuarial reserve basis involves the accumulation of substantial reserves to pay benefits in the future. These reserves are invested and the net rate of investment earnings is a major factor in determining the contributions required to support the ultimate cost of benefits.

The net rate of investment yield is comprised of imputed income at the valuation interest rate, plus a write-up (down). This write-up (down) reflects 20% of the actual investment return (including interest, dividends, and asset appreciation or depreciation, less administrative expenses) in excess of (less than) this assumption, over each year during the current year and the subsequent four-year period.

For the 2003 actuarial valuation of the System, the long-term net investment yield rate is assumed to be 8.0%. This is the same assumption as used in 2002.

The schedule below shows the approximate net investment yield rate on average total assets at actuarial value for each of the past 16 fiscal years (determined as (i) investment income net of expenses, divided by (ii) the average actuarial value of assets during the year):

Fiscal Year Ended September 30	Net investment yield rate
2003	3.72%
2002	3.00
2001	6.49
2000	10.77
1999	9.60
1998	7.95
1997*	13.59
1996	10.82
1995	10.84
1994	8.72
1993	11.47
1992	5.36
1991	7.00
1990	6.13
1989	9.96
1988	6.94

* Note that the above yield for 1997 excludes the additional write up due to the resetting of actuarial value to market value as of September 30, 1997. If included, the net investment yield rate for fiscal 1997 would be 19.84% higher, or 33.43%.

Salary Increases

Because System benefits are based on a member's final average compensation, it is necessary to make an assumption with respect to the salary progression of employees in the future. The salary increase assumption used in this 2003 actuarial valuation projects annual salary increases of 4%, representing inflation, plus a percentage based on an age-related scale to reflect merit, longevity and promotional salary increases.

The salary increase assumption projects the following salary increases for selected ages:

Age	Assumed Percentage Increase in Salary
20	16.00%
25	11.50
30	7.35
35	5.70
40	5.03
45	4.75
50	4.52
55	4.24
60	4.00
65	4.00

Withdrawal Rates

The withdrawal rates used in an actuarial valuation project the percentage of employees at each age who are assumed to terminate employment before qualifying for retirement benefits. The withdrawal rates do not apply to members eligible to retire, and do not include separation on account of death or disability.

The assumed rates of withdrawal applied in the current valuation have been in effect since the 1998 valuation and are as follows:

Sample Ages	Years of Service	Percent Separating Within Next Year
All	0	20.00%
	1	14.00
	2	9.00
	3	7.00
	4	5.50
20	5 & over	6.00
25		5.50
30		4.50
35		3.50
40		2.75
45		2.25
50		2.00
55		1.75
60		1.75

Disability Rates

The assumed rates of disablement (in effect since the 1994 valuation) are shown below at various ages:

Sample Ages	Percent Becoming Disabled Within Next Year
20	0.01%
25	0.01
30	0.02
35	0.04
40	0.11
45	0.26
50	0.45
55	0.65
60	0.90

It is assumed that 85% of disabilities will be non-duty related and 15% duty related (in effect since the 1998 valuation).

The mortality table used for disabled lives is a table based primarily on 1992-97 Michigan experience (also in effect since 1998).

Retirement Age

A schedule of retirement rates is used to measure the probability of eligible members retiring during the next year. The following retirement rates apply to members eligible for normal retirement (*i.e.*, with an unreduced benefit):

	Percent Retiring Each Year		
Retirement Age	Conservation Officers	Corrections Officers	Others
45	16%	-%	-%
46	16	-	-
47	16	-	-
48	16	-	-
49	16	-	-
50	16	-	-
51	16	25	-
52	16	18	-
53	16	12	-
54	16	15	-
55	16	15	20
56	16	25	15
57	15	12	15
58	15	12	15
59	15	12	15
60	18	18	18
61	15	15	15
62	30	30	30
63	22	22	22
64	22	22	22
65	35	35	35
66	25	25	25
67	25	25	25
68	25	25	25
69	25	25	25
70	50	50	50
71	60	60	60
72	70	70	70
73	80	80	80
74	90	90	90
75	100	100	100

A Conservation Officer is eligible for retirement after 25 years of service regardless of age, or after attaining age 60 with 10 or more years of service.

A Corrections Officer is eligible for retirement after attaining age 51 with 25 or more years of covered service, or after attaining age 56 with 10 or more years of covered service.

Other members are eligible for full retirement after attaining age 55 with 30 or more years of service, or after attaining age 60 with 10 or more years of service.

For members eligible for early retirement (*i.e.*, age 55 with 15 years of service), but not yet eligible for an unreduced retirement benefit, the following rates apply:

Age	Percent Retiring Each Year
55	3.5%
56	2.2
57	3.4
58	3.5
59	3.8

The current retirement age assumption was first used for the 1998 valuation.

Mortality

In estimating the amount of the reserves required at the time of retirement to pay an employee's benefit for the remainder of his or her lifetime, it is necessary to make an assumption with respect to expected mortality after retirement. In addition, the same assumption is used to measure the probability of members dying before retirement.

The mortality table used to project the mortality experience of System members is the 1994 Group Annuity Mortality Table, set forward one year for both men and women (first used in the 1998 valuation).

The life expectancies projected by the assumed mortality table for male and female System retirees are shown below for selected ages, along with the present value of $1 payable monthly for life (at an 8% interest rate):

	Expected Years of Life Remaining		Present Value of $1 Monthly for Life	
Age	**Men**	**Women**	**Men**	**Women**
50	29.81	33.98	$133.78	$139.77
55	25.31	29.28	125.93	133.49
60	21.04	24.74	116.20	125.33
65	17.14	20.50	104.97	115.57
70	13.67	16.58	92.65	104.12
75	10.57	12.94	79.03	90.41
80	7.93	9.76	64.93	75.42

Funding Method

Funding the System on an actuarial reserve basis seeks to achieve the following major objectives:

- Level required contribution rates as a percentage of payroll;
- Finance benefits earned by present employees on a current basis;
- Accumulate assets to enhance members' benefit security;
- Produce investment earnings on accumulated assets to help meet future benefit costs;
- Make it possible to estimate the long-term actuarial cost of proposed amendments to System provisions; and
- Assist in maintaining the System's long-term financial viability.

The basic funding objective is a level pattern of cost as a percentage of salary throughout an employee's working lifetime. The funding method used in this actuarial valuation - the entry age normal cost method - is intended to meet this objective and result in a relatively level long-term contribution requirement as a percentage of salary.

Under the entry age normal cost method, the total actuarially-determined contribution requirement is the sum of the normal cost and the payment required to amortize the unfunded accrued liability over the adopted amortization period of 40 years from October 1, 1996 (33 years remaining as of the valuation date).

Normal Cost

In general terms, the normal cost is the cost of benefit rights accruing on the basis of current service. Technically, the normal cost rate is the level percentage-of-salary contribution required each year, with respect to each employee, to accumulate over his or her projected working lifetime the reserves needed to meet the cost of earned benefits. The normal cost represents the ultimate cost of the System if the unfunded liability is paid up and the actual experience of the System conforms to the assumptions.

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

Actuarial Accrued Liabilities

The total actuarial present value of future benefits is computed as the current discounted value of all benefits expected to be paid in the future to all active, retired and inactive vested members. Subtracting the present value of future normal costs results in the actuarial accrued liability.

The total actuarial accrued liability essentially represents the amount that would have been accumulated as of September 30, 2003 if contributions sufficient to meet the normal costs of the System had been made each year in the past, and if the actual experience of the System had never deviated from the assumptions. If assets equalled the total accrued liability, there would be no unfunded liability and future contribution requirements would consist solely of the calculated normal cost rates.

Amortization of Unfunded Actuarial Accrued Liabilities

Unfunded (overfunded) actuarial accrued liabilities are amortized by level percent of payroll contributions over a 40-year period from October 1, 1996 (33 years remaining from October 1, 2003). Active member payroll is not assumed to increase for the purpose of determining the level percent contributions.

VI. SUMMARY OF SYSTEM PROVISIONS

Our actuarial valuation of the System as of September 30, 2003 is based on the present provisions of the State Employees' Retirement Act, which are summarized in this section.

Regular Retirement (no reduction factor for age):

Eligibility - Age 55 with 30 years service; or age 60 with 10 or more years service. Corrections Officers may retire at age 51 with 25 or more years service; or age 56 with 10 or more years service. Conservation Officers may retire after 25 years of service regardless of age.

Final Average Compensation - Regular retirement benefit is based on final average compensation (FAC), which is usually the average of highest 3 consecutive years (2 years for Conservation Officers).

Annual Amount - Total service times 1.5% of FAC. For members with 20 or more years of service, a $3,000 minimum annual benefit is payable. Corrections Officers receive an additional temporary supplement to age 62 equal to the product of supplemental service times 0.5% of FAC. Conservation Officers retiring after 25 years receive a benefit equal to 60% of FAC.

Early Retirement (age reduction factor used):

Eligibility - Age 55 with 15 or more years service.

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

Deferred Retirement (vested benefit):

Eligibility - 10 years of service (5 years for unclassified persons in the executive or legislative branch). Benefit commences at age 60.

Annual Amount - Computed as regular retirement benefit based on service and FAC at termination.

Duty Disability Retirement:

Eligibility - No age or service requirement.

Annual Amount - Disability after age 60: Computed as regular retirement benefit with minimum benefit based on 10 years service. Disability prior to age 60: To age 60, benefit is 2/3 of FAC but limited to $6,000 per year. Additional limitation such that benefit plus workers' compensation does not exceed final compensation. After age 60, benefit is recomputed as a regular retirement benefit with service granted for period in receipt of disability benefit before age 60 (benefit not reduced after age 60).

Non-Duty Disability Retirement:

Eligibility - 10 years of service.

Annual Amount - Computed as regular retirement benefit based on service and FAC at time of disability. Minimum annual benefit is $600.

Duty Death Before Retirement:

Eligibility: No age or service requirement. Also applies to duty disability retirant who dies within 3 years of disability and before age 60.

Annual Amount - Accumulated employee contributions are refunded. Surviving spouse receives annual benefit of 1/3 of final compensation until death. Unmarried children under age 18 each receive an equal share of 1/4 of final compensation (if no spouse each child receives 1/4, to a maximum of 1/2 for all children). If no spouse or eligible children, each dependent parent receives 1/6 of final compensation. Total benefits payable are limited to $2,400 per year. Additional limitation such that benefits plus workers' compensation does not exceed final compensation.

Non-Duty Death Before Retirement:

Eligibility - 10 years of service. In the case of a deceased vested former member, the survivor benefit commences when the deceased former member would have attained age 60.

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

Post-Retirement Cost-of-Living Adjustments: One-time upward adjustments have been made in 1972, 1974, 1976, 1977 and 1987. Beginning in 1983 some benefit recipients share in a distribution of a portion of investment income earned in excess of 8% annually (supplemental payment). Beginning in 1988 all benefit recipients are eligible for automatic 3% annual (non-compounded) benefit increases, with a maximum $300 annual increase. Eligibility for the above benefits:

> Retired before October 1, 1987 - greater of supplemental payment or the combination of the 1987 one-time adjustment and the automatic increases.
>
> Retired on or after October 1, 1987 - automatic increases only.

Post-Retirement Health Insurance Coverage: Persons in receipt of retirement allowances (including members who did not retire directly from the System, but come from a vested deferred status), and their dependents, are eligible for 95% State-paid health insurance coverage and 90% State-paid dental and vision insurance.

Member Contributions: None

Defined Contribution Legislation (Public Act 487 of 1996):
New employees hired on or after March 31, 1997 become participants in Tier 2 (*i.e.*, a defined contribution plan) rather than Tier 1 (*i.e.*, the above described defined benefit plan).

Active members on March 30, 1997 were able to irrevocably elect to terminate membership in Tier 1 and become participants in Tier 2. Elections had to be in writing and submitted between January 2, 1998 and April 30, 1998. Such members became Tier 2 participants on June 1, 1998, and were to have the actuarial present value of their Tier 1 accrued benefit transferred into Tier 2 by November 30, 1998.

2002 Early Out Window
Members retiring between April 1, 2002 and November 1, 2002 whose combined age and service equals 80 points, or who are age 60 or older with 10 or more years of service are eligible to receive a benefit equal to 1.75% of final average compensation multiplied by years of credited service. Members who had previously transferred to the Defined Contribution plan, are eligible to receive a benefit equal to 0.25% of final average compensation multiplied by years of credited service.

VII. ACCOUNTING INFORMATION

The Governmental Accounting Standards Board (GASB) has changed the way governmental entities account for their pension plans. The new standards, GASB Statements Nos. 25 and 27, replace the prior reporting requirements under GASB Statement No. 5.

GASB Statement No. 25

For plan years commencing after June 15, 1996, the plan is subject to the disclosure requirements of Statement No. 25 of the Governmental Accounting Standards Board (GASB).

Statement No. 25 establishes financial reporting standards for defined benefit pension plans as they relate to the Plan's financial accounting. As used in Statement No. 25, pension benefits include retirement income as well as other types of postemployment benefits (disability, death benefits, life insurance) but exclude postemployment healthcare.

Statement No. 25 for defined benefit plans requires two plan financial statements on an accrual basis (statement of plan net assets and a statement of changes in plan net assets). The statement now requires the fair value of assets for those financial statements where previously cost or amortized cost could be used.

Statement No. 25 also requires notes to the Financial Statements including plan description, classes of employees covered, brief description of benefit provisions and a summary of significant accounting policies (including funding policy).

Also required (after the notes) is supplementary information ("Required Supplementary Information") including a schedule of funding progress and a schedule of employer contributions. The actuarial information to be shown must be determined under certain parameters. These parameters are the same as those required under GASB Statement No. 27, and are summarized below:

> **Actuarial Valuations**: Must occur at least every two years and the results must be applied within 12 months (24 months for biennial valuations) for plans and 24 months for employers.

Actuarial Assumptions: Best estimate of individual assumptions and consistency of all assumptions. Investment return assumption (discount rate) based on estimated long-term investment yield for plan.

Actuarial Cost Method: Entry age, frozen entry age, attained age, frozen attained age, aggregate or projected unit credit are acceptable.

Actuarial Value of Assets: Market-related.

Annual Required Contributions of Employers: Must include normal (current service) cost and amortization of the plan's total unfunded actuarial liability (UAL).

Amortization Period: Periods of up to 40 years will be acceptable for the first 10 years after the effective date of Statement No. 25. After that, periods cannot exceed 30 years. Significant decreases in UAL caused by changing actuarial methods must be amortized over at least 10 years.

Amortization Method: Level dollar or level percentage of projected payroll, open or closed basis.

It is important to note that GASB Statement No. 25 eliminates the need to report actuarial accrued liabilities on a standardized basis (*i.e.*, pension benefit obligation) and instead substitutes all actuarially determined information based on the plan's funding method (*e.g.*, Entry Age Normal Actuarial Cost for the Michigan State Employees' Retirement System).

Paragraph 39 states that the required "Schedules of Funding Progress" and "Employer Contributions" should include information for the current year and as many of the prior years as information, according to the parameters, is available.

The "Schedule of Funding Progress" is presented in Table 5, which appears in Section II.

The "Schedule of Employer Contributions" is presented in Table 3, which also appears in Section II. Each applicable computed contribution (or the annual required contribution) is based on the actuarial valuation for that year. Actual contributions shown are based on data provided by the System

Additional "Required Supplementary Information" is shown in Table 18.

GASB Statement No. 27

GASB Statement No. 27 establishes the standards of accounting and financial reporting for pension expenditures/expense and related pension liabilities, pension assets, note disclosures and required supplementary information in the financial reports of governmental employers. (The financial reporting for the pension trust funds is covered by GASB Statement No. 25 as described above.)

GASB Statement No. 27 does not mandate or require the employer to fund (contribute) any specific amount. Rather it determines the standards (parameters) to be used for the purpose of expensing the cost of pension benefits on the employer's financial statements. To the extent that an employer wants to fund (contribute) the same amount that it expenses, the amount contributed must be determined under certain parameters. When the funding methods and assumptions meet the parameters, the same methods and assumptions are used for both funding and expensing (accounting). If they do not, the employer/entity must choose between making two calculations at each actuarial valuation - one for funding and one for accounting - or modifying the funding approach to meet the parameters. Using different methods for accounting and funding may result in increasing employer liabilities (Net Pension Obligation).

Statement No. 27 uses some new terms, including:

Net Pension Obligation (NPO) - Represents the employer's transition obligation/asset for past underfunding/overfunding of contribution amounts compared to those actuarially determined. After the effective date of Statement No. 27, it will include the cumulative difference between annual pension cost (ARC) and the employer's contributions.

In determining the NPO at transition, paragraph 30 of GASB 27 refers to the "employer's required contributions in accordance with the plan's actuarially determined funding requirements. . ." We have determined the "required contribution" for prior years based on the actuarial valuation results for such applicable year. The determination of the NPO as of September 30, 2003 is shown in Table 19. The table shows that, as of September 30, 2003, the employer has a transition obligation of $132,400,622.

Actuarial Required Contribution (ARC) - Represents the contribution amount that can also be used for purposes of reporting annual pension expense/accounting. If an employer has an NPO, an adjustment to the ARC is needed to be used for expense/accounting purpose. In determining the ARC amount, certain actuarial parameters must be met. The parameters are the same as those for GASB 25.

The actuarial assumptions and methods currently employed for purposes of actuarially determining the System's annual contribution are, in our opinion, within the required GASB parameters.

We have determined the Actuarial Required Contribution (ARC) and Pension Cost (after adjustment to the ARC as a result of the NPO) for the fiscal year ending September 30, 2004 in Table 20.

Table 18

Required Supplementary Information
- GASB Statement Nos. 25 and 27

Valuation date	9/30/2003
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, closed
Remaining amortization period	33 years
Asset valuation method	5 year smoothed market
Actuarial assumptions:	
Investment rate of return	8.00%
Projected salary increases	4-16%
Cost-of-living adjustments	3% Annual Non-Compounded With Maximum Annual Increase of $300 For Those Eligible

Table 19: Development of GASB Statement No. 27 Net Pension Obligation (NPO)

(1) Fiscal Year Ending Sept. 30	(2) Valuation Date Sept. 30	(3) Actuarial Required Contribution	(4) Interest on BOY NPO [(10) x (9)]	(5) Adjustment to "(3)" [BOY NPO x (11)]	(6) Pension Cost [(3) + (4) - (5)]	(7) Actual Employer Contribution	(8) Change in NPO [(6)-(7)]	(9) Net Pension Obligation [BOY NPO + (8)]	(10) Interest Rate	(11) Amort. Factor
1988	1987	$129,389,951	$ -0-	$ -0-	$129,389,951	$164,587,715	$(35,197,764)	$ (35,197,764)	8.00%	.038087
1989	1988	141,862,851	(2,815,821)	(1,340,577)	140,387,607	113,410,605	26,977,002	(8,220,762)	8.00	.038087
1990	1989	160,367,963	(657,661)	(313,104)	160,023,406	123,967,810	36,055,596	27,834,834	8.00	.038087
1991	1990	195,590,162	2,226,787	1,060,145	196,756,804	154,027,600	42,729,204	70,564,038	8.00	.038087
1992	1991	215,470,500	5,645,123	2,687,573	218,428,050	187,004,712	31,423,338	101,987,376	8.00	.038087
1993	1992	219,912,052	8,158,990	3,884,393	224,186,649	247,047,499	(22,860,850)	79,126,526	8.00	.038087
1994	1993	230,231,706	6,330,122	3,013,692	233,548,136	263,791,739	(30,243,603)	48,882,923	8.00	.038087
1995	1994	260,769,716	3,910,634	1,989,193	262,691,157	306,488,437	(43,797,280)	5,085,643	8.00	.040693
1996	1995	262,458,665	406,851	203,649	262,661,867	285,766,953	(23,105,086)	(18,019,453)	8.00	.040044
1997	1996	244,102,003	(1,441,555)	(792,783)	243,453,231	288,366,799	(44,913,658)	(62,933,021)	8.00	.043996
1998	1997	126,396,181	(5,034,642)	(5,098,015)	126,459,554	145,734,677	(19,275,123)	(82,208,144)	8.00	.081007
1999	1998	111,415,984	(6,576,652)	(6,687,438)	111,526,770	121,119,857	(9,593,087)	(91,801,231)	8.00	.081348
2000	1999	120,906,261	(7,344,098)	(7,501,863)	121,064,026	121,817,366	(753,340)	(92,554,571)	8.00	.081719
2001	2000	102,989,963	(7,404,366)	(7,600,854)	103,186,451	112,299,808	(9,113,357)	(101,667,928)	8.00	.082123
2002	2001	111,551,549	(8,133,434)	(8,394,134)	111,812,249	-	111,812,249	10,144,321	8.00	.082564
2003	2002	184,214,419	811,546	842,445	184,183,520	61,927,219	122,256,301	132,400,622	8.00	.083046

Table 20

Actuarial Required Contribution and Pension Cost
For Fiscal Year Ending September 30, 2004
- GASB Statement No. 27

1.	Net Pension Obligation (asset) as of September 30, 2003	$ 132,400,622
2.	Actuarial Required Contribution (ARC) for fiscal year ending September 30, 2004	262,546,900
3.	Interest on NPO: 8.00% x item 1	10,592,050
4.	Adjustment to ARC due to NPO: 0.083573 x item 1	11,065,117
5.	Pension Cost (GASB Statement No. 27) for fiscal year ending September 30, 2004 (2 + 3 - 4)	262,073,833

Note: Pension Cost is the expense to be reported on the employer's financial statement for the fiscal year.

APPENDIX

ACTUARIAL VALUATION STATEMENT

March, 2004

MICHIGAN STATE EMPLOYEES RETIREMENT SYSTEM

Actuarial Valuation Statement

This is to certify that we have prepared an actuarial valuation of the Michigan State Employees' Retirement System (the "System") as of September 30, 2003.

Actuarial calculations were made with respect to a total of 89,555 System members: 36,536 active employees, 7,528 inactive members with vested rights to a deferred pension; and 45,491 retirees and surviving beneficiaries.

The actuarial cost factors for pension benefits for System members are as follows:

1. Actuarial accrued liability - total		$11,761,146,746
Active employees - total		3,945,312,891
Active employees - regular benefits	3,751,812,876	
Additional for employees with Corrections Officer service	183,417,149	
Additional for employees with Conservation Officer service	10,082,866	
Inactive members		429,371,452
Retirees and surviving beneficiaries		7,386,462,403
2. Assets at actuarial value ($8,924,266,601 at market value)		10,440,610,630
3. Future reconciliation contributions		-0-
4. Unfunded (overfunded) actuarial accrued liability = (1) - (2) - (3)		1,320,536,116
5. Payment required to amortize unfunded actuarial accrued liability over 33 years as a level percent of payroll .08357302 x (4)		110,361,194
6. Normal Cost - total		152,185,705
Regular benefits	143,682,934	
Additional for members with Corrections Officer service	8,126,093	
Additional for members with Conservation Officer service	376,678	
7. Total payroll (greater of rate and prior year earnings)		1,859,555,375
8. Normal cost as percentage of payroll		
a) Total		8.18%
b) Employee portion		-0-
c) Employer portion		8.18%
9. Payment required to amortize unfunded actuarial accrued liability as a percentage of payroll		5.94%
10. Total employer cost = (5) + (6)		262,546,900
11. Employer cost as percentage of payroll = (10)/(7)		14.12%

The key actuarial assumptions used in the September 30, 2003 actuarial valuation are summarized below:

Interest Rate:

8.0%

Salary Scale:

Inflation component is 4%; the merit component varies from 12.0% per annum at age 20 to 0.2% per annum at age 59 and 0.0% at ages 60 and later.

Retirement Ages

In accordance with a table of rates, at each age from 55 to 75 (except 45 to 75 for Conservation Officers and 51 to 75 for Corrections Officers).

Termination Rates Before Retirement:

Sample Ages	Years of Service	Percent Separating within Next Year
All	0	20.00%
	1	14.00
	2	9.00
	3	7.00
	4	5.50
20	5 & Over	6.00
25		5.50
30		4.50
35		3.50
40		2.75
45		2.25
50		2.00
55		1.75
60		1.75

Mortality Rates:

In accordance with the 1994 Group Annuity Mortality Table (set forward one year for men and one year for women).

The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, and were based on the actuarial assumptions adopted by the Retirement Board and the Department of Management and Budget upon the recommendation of the actuary.

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