

# Actuarial Section



*Kids on the Slopes*

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One North Dearborn, Suite 1100  
Chicago, Illinois 60602-4336

January 30, 2003

The Retirement Board  
Public School Employees'  
Retirement System of Pennsylvania  
P.O. Box 125  
Harrisburg, Pennsylvania 17108

Ladies and Gentlemen:

This report presents the results of the revised annual actuarial valuation of the Public School Employees' Retirement System of Pennsylvania as of June 30, 2002.

The valuation takes into account all of the promised benefits to which members are entitled, including pension and survivor benefits and establishes the contribution rate for the 2003/2004 fiscal year in conformance with the Retirement Code.

The valuation was based on the actuarial assumptions and methods as adopted by the Board of Trustees, including a valuation interest rate of 8½% per annum compounded annually. The actuarial assumptions are unchanged from the prior valuation. The increase in liability due to the cost-of-living adjustment provided by Act 38 is reflected in the valuation.

The actuarial assumptions and methods comply with the parameters set forth in Governmental Accounting Standards No. 25.

### **Assets and Membership Data**

The Retirement System reported the individual data for members of the System as of the valuation date to the actuary. While we did not verify the data at their source, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared for us by the Retirement System.

### Funding Adequacy

The valuation results determine that the employer contribution rate for fiscal year 2003/2004 is 3.77%. The funded status of the plan determined as of June 30, 2002 based on the accrued liability and the actuarial value of assets is 104.8%.

### Financial Results and Membership Data

Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are shown in the valuation report. The actuary prepared supporting schedules included in the Actuarial and Statistical Section of PSERS Comprehensive Annual Financial Report. The actuary prepared the trend data schedules included in the Financial Section of PSERS Comprehensive Annual Financial Report.

Qualified actuaries completed the valuations in accordance with accepted actuarial procedures as prescribed by the Actuarial Standards Board. The qualified actuaries are members of the American Academy of Actuaries and are experienced in performing actuarial valuations of public employee retirement systems. To the best of our knowledge, this report is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practice.

Respectfully submitted,



Kim M. Nicholl, F.S.A.  
Principal, Consulting Actuary



S. Lynn Hill  
Associate Principal, Retirement Consulting

## Executive Summary

This report presents the actuarial valuation as of June 30, 2002 for the Public School Employees' Retirement System of Pennsylvania.

The principal valuation results include:

- The employer contribution rate for fiscal year 2003/2004 which is 3.77%.
- The funded status of the plan determined as of June 30, 2002 based on the accrued liability and the actuarial value of assets as of that date which is 104.8%.
- The determination of the actuarial gain or loss as of June 30, 2002 which is a loss of \$3.1 billion.
- Annual disclosure as of June 30, 2002 as required by Statement No. 25 of the Governmental Accounting Standards Board.

The valuation was completed based upon membership and financial data submitted by the Retirement System. Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are included in the valuation report. The actuary prepared supporting schedules included in the Actuarial and Statistical Section of PSERS Comprehensive Annual Financial Report. The actuary prepared the trend data schedules included in the Financial Section of PSERS Comprehensive Annual Financial Report.

## Changes Since Last Year

### Legislative and Administrative Changes

Act 38 provides for a split COLA to be paid commencing July 1, 2002 for members retired before July 2, 1990 and commencing July 1, 2003 for members retired from July 2, 1990 through July 1, 2002. Funding for the cost of the COLA will commence July 1 following each effective date.

The benefit provisions and contribution provisions are summarized in Table 13.

### Actuarial Assumptions and Methods

The actuarial assumptions and methods are outlined in Table 12.

### Contribution Rates

The results of the valuation as of June 30, 2002 determine the employer contribution rate for fiscal year 2003/2004. The total contribution rate payable by the employer is 3.77% of payroll. This includes 2.98% of payroll for pension benefits plus 0.79% of payroll for the health insurance premium assistance program.

The average contribution rate payable by the members is 7.08%. Effective January 1, 2002 the employee contribution rate for members who elect to have prior school service and intervening military service converted to Class T-D service will increase by 1.25%. The average member contribution rate of 7.08% represents an average of the member rates that vary based on date of hire and Class T-D election.

## Reasons for Change in the Rate

The employer contribution rate increased from 1.15% for fiscal year 2002/2003 to 3.77% for fiscal year 2003/2004. The increase of 2.62% is due to the following reasons:

• Increase due to change in normal rate	.05%
• Decrease for members who did not elect T-D service	(.19)
• Increase due to payroll growth	.31
• Increase due to July 1, 2002 COLA under Act 38	.73
• Increase due to actuarial loss on assets	4.85
• Increase due to actuarial loss on liabilities	.06
• Decrease due to change in health insurance contribution rate	(.18)
• Decrease due to floor and cap on contribution rate under Act 38	<u>(3.01)</u>
• Total	2.62%

## Summary of Principal Results

Summarized below are the principal financial results for the Public School Employees' Retirement System based upon the actuarial valuation as of June 30, 2002. Comparable results from the June 30, 2001 valuation are also shown.

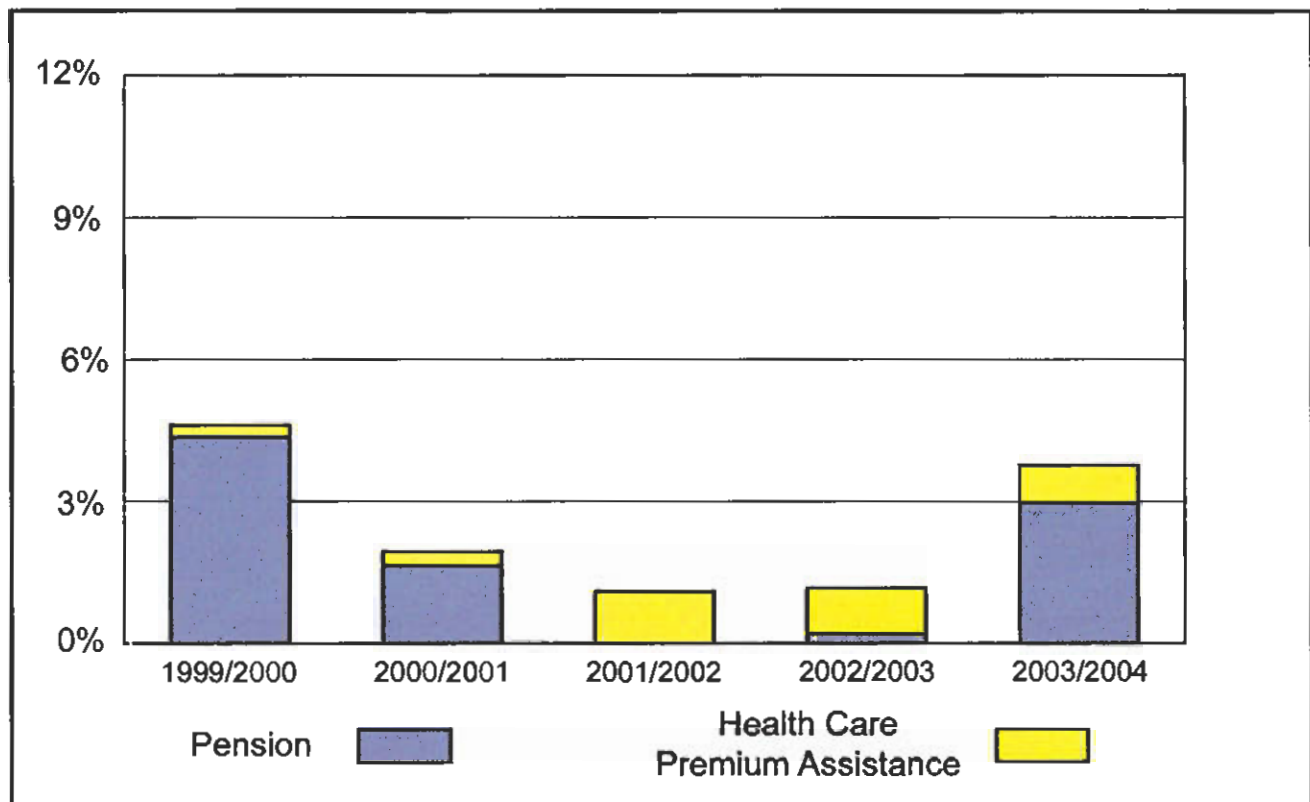
Item	June 30, 2002	June 30, 2001
<b>Demographics</b>		
Active Members		
• Number	242,616	243,311
• Average Annual Pay	\$ 38,658	\$ 38,695
Annuitants		
• Number	141,414	132,716
• Average Annual Benefit Payment	\$ 15,899	\$ 14,105
<b>Contribution Rates (as a Percentage of Payroll)</b>	(Fiscal Year 2003/2004)	(Fiscal Year 2002/2003)
Employer Contribution Rate:		
• Total Pension Contribution Rate	2.98%	0.18%
• Health Insurance Contribution Rate	<u>0.79</u>	<u>0.97</u>
• Total	3.77%	1.15%
Member Average Contribution Rate	<u>7.08</u>	<u>7.10</u>
• Total Rate	10.85%	8.25%
<b>Actuarial Funded Status</b>		
• Accrued Liability	\$ 51,796.5 Mil	\$ 47,917.3 Mil
• Actuarial Value of Assets	<u>54,296.4</u>	<u>54,830.3</u>
• Unfunded Accrued Liability	\$ (2,499.9)	\$ (6,913.0)
• Funded Ratio	104.8%	114.4%

### Five-Year History of Principal Financial Results

#### Five-Year History of Contribution Rates (As a % of Payroll)

Fiscal Year	Member Contributions	Employer Contributions			
		Normal Cost	Unfunded Accrued Liability	Health Care	Total
2003/2004	7.08%	7.25%	(4.27)%	.79%	3.77%
2002/2003	7.10	7.20	(10.03)	.97	1.15
2001/2002	6.43	5.63	(6.05)	1.09	1.09
2000/2001	5.77	6.29	(4.65)	.30	1.94
1999/2000	5.72	6.40	(2.04)	.25	4.61

The following chart shows a five-year history of employer contribution rates:



## **Funded Ratio**

The financing objective of the System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method; and
- Liquidate the unfunded accrued liability based on the amortization schedules as required by the retirement code, i.e., a schedule of 10 years for each change in the unfunded accrued liability.

The total contribution rate of 3.77% of payroll payable by employers, when taken together with the contributions payable by the members and asset returns, is sufficient to achieve the financing objective.

The System's funded status on the funding basis is measured by comparing the actuarial value of assets (based on a 5-year moving average market value) with the accrued liability. The accrued liability is the present value of benefits accumulated to date under the System's funding method and reflects future pay increases for active employees.

On this basis, the System's funded ratio is 104.8% as of June 30, 2002. The funded ratio is based on an actuarial value of assets of \$54.3 billion and an accrued liability of \$51.8 billion.

### **Reasons for Change in the Funded Ratio**

The funded ratio decreased from 114.4% as of June 30, 2001 to 104.8% as of June 30, 2002. The decrease is due to the net effect of the COLAs provided by Act 38 and asset and experience losses.



### Five-Year History of Funded Ratio

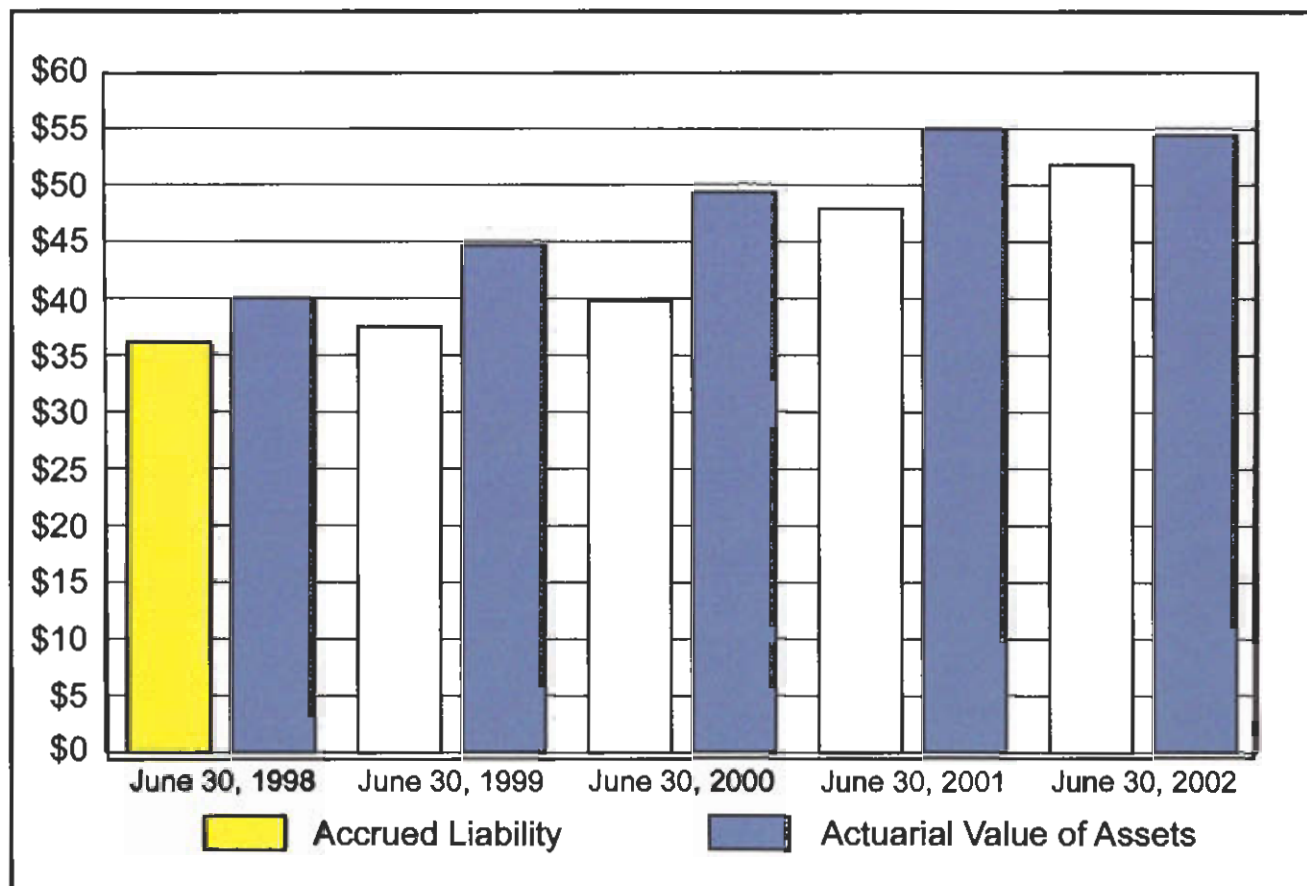
(Dollar Amounts in Millions)

Valuation as of June 30	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio
2002	\$ 51,796.5	\$ 54,296.4	\$ (2,499.9)	104.8%
2001	47,917.3	54,830.3	(6,913.0)	114.4
2000	39,822.8	49,293.0	(9,470.2)	123.8
1999	37,499.1	44,606.5	(7,107.4)	119.0
1998	36,136.2	39,969.0	(3,832.8)	110.6

The following chart shows a five-year history of the accrued liability and the actuarial value of assets:

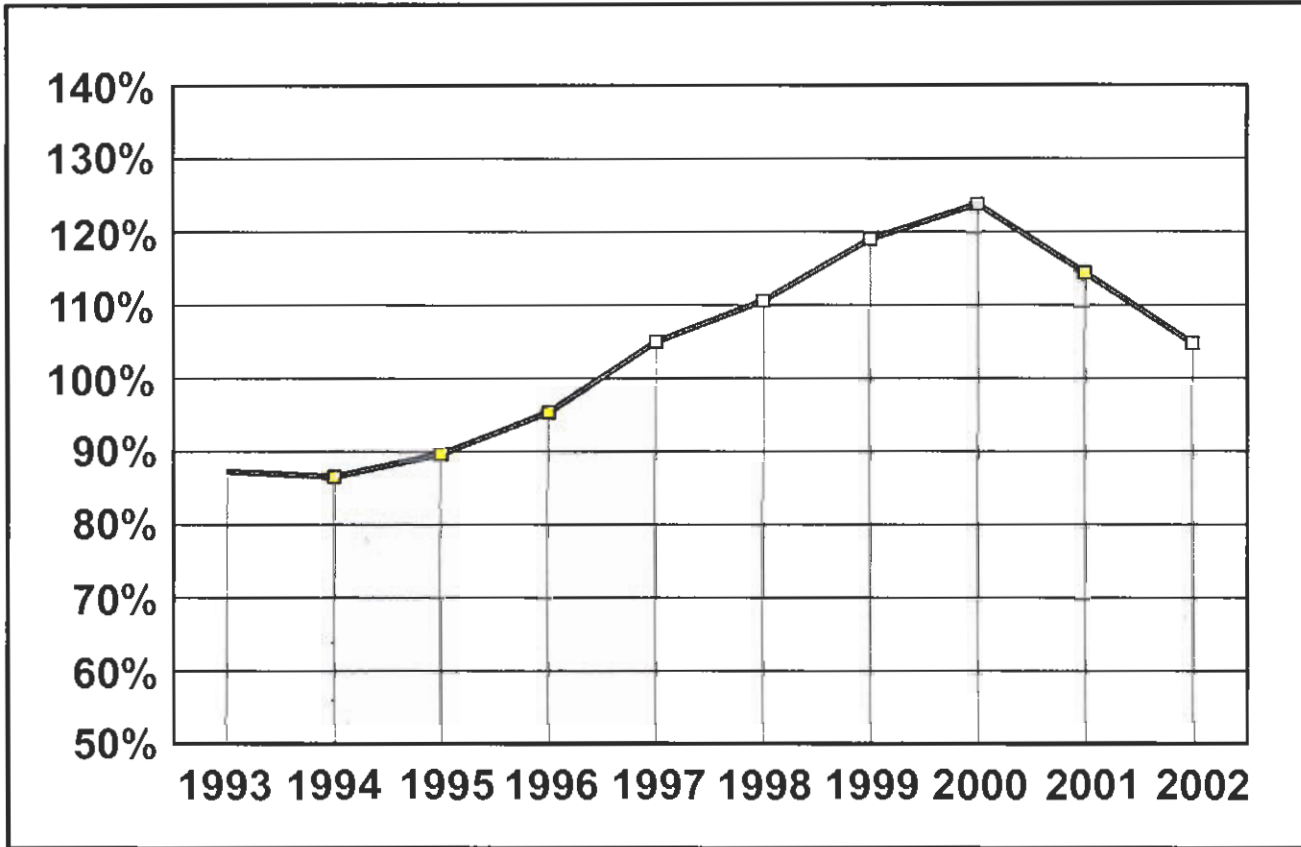
### Five-Year History of Accrued Liability and Actuarial Value of Assets

(Dollar Amounts in Billions)



The following chart shows a ten-year history of the funded ratio:

**Ten-Year History of Funded Ratio  
(1993 - 2002)**



## GASB No. 25 Disclosure

Statement No. 25 of the Governmental Accounting Standards Board established reporting standards for the annual financial reports of defined benefit pension plans. The System complied with Statement No. 25 beginning with the June 30, 1996 valuation. The statement requires disclosure of the "schedule of funding progress" and the "schedule of employer contributions" in the System's financial statements.

The "schedule of funding progress" shows historical trend information about the System's actuarial value of assets, the actuarial accrued liability and the unfunded actuarial accrued liability. The actuarial funded status is measured by comparing the actuarial value of assets (based on a 5-year moving average market value) with the accrued liability. The accrued liability is the present value of benefits accumulated to date under the System's funding method and reflects future pay increases for active employees. On this basis, the System's funded ratio is 104.8% as of June 30, 2002. The funded ratio is based on an actuarial value of assets of \$54.3 billion and an accrued liability of \$51.8 billion.

The "schedule of employer contributions" shows historical trend information about the annual required contributions (ARC) of the employer and the percentage of the ARC contributed to the System. The ARC is equal to the normal cost plus amortization of the unfunded actuarial accrued liability. The maximum period of amortizing the unfunded actuarial accrued liability permitted by GASB No. 25 is 40 years. The maximum amortization period decreases to 30 years in 2006. The employer contributions to the System are equal to the normal cost plus a 10-year amortization of each change in the unfunded accrued liability. The employer contributions to the System are equal to 100% of the ARC.

## Rate of Return

The investment return of the trust fund (i.e. total return including both realized and unrealized gains and losses) for fiscal years 1997/1998 through 2001/2002 is shown in the table below. The return based on the actuarial value of assets used for determining annual contribution rates is also shown.

The rate of return on market value reflects the investment earnings on the market value of assets from the beginning of the fiscal year to the end of the fiscal year. The actuarial assets are the assets recognized for valuation purposes. Actuarial assets are based on a smoothed market value that recognizes investment gains and losses over a period of three years. The rate of return on the actuarial value of assets is a measure of the increase in the actuarial value of assets from the beginning of the fiscal year to the end of the fiscal year.

Fiscal Year	Rate of Return Based on	
	Market Value	Actuarial Value
2001/2002	(5.3)%	2.7%
2000/2001	(7.3)	14.3
1999/2000	12.1	13.6
1998/1999	12.3	15.1
1997/1998	15.9	16.8

\* Market rate of return provided by Wilshire

**Table 1**  
**Summary of Results of Actuarial Valuation**  
**As of June 30, 2002**  
(Dollar Amounts in Thousands)

Item	Amount
<b>Member Data</b>	
1. Number of Members	
a) Active Members	242,616
b) Inactive Members and Vestees	61,295
c) Annuitants, Beneficiaries and Survivor Annuitants	141,414
d) Total	445,325
2. Annualized Salaries	\$ 9,378,944
3. Annual Annuities	\$ 2,248,291
<b>Valuation Results</b>	
4. Present Value of Future Pension Benefits	
a) Active Members	\$ 43,894,324
b) Inactive Members and Vestees	759,418
c) Annuitants, Beneficiaries and Survivor Annuitants	19,875,263
d) Total	\$ 64,529,005
5. Present Value of Future Pension Normal Cost	
a) Active Members	\$ 6,341,762
b) Employer	6,494,036
c) Total	\$ 12,835,798
6. Pension Accrued Liability	
a) Active Members (4a) - (5c)	\$ 31,058,526
b) Inactive Members and Vestees	759,418
c) Annuitants, Beneficiaries and Survivor Annuitants	19,875,263
d) Total	\$ 51,693,207
7. Health Care Premium Assistance Payments	\$ 103,304
8. Total Accrued Liability (6) + (7)	\$ 51,796,511
9. Actuarial Value of Assets	\$ 54,296,368
10. Unfunded Accrued Liability (8) - (9)	\$ (2,499,857)
11. Total Normal Cost Rate	14.33 %
12. Member Contribution Rate	7.08 %
13. Employer Normal Cost Rate (11) - (12)	7.25 %
<b>Employer Annual Funding Requirement for Fiscal 2003/2004</b>	
14. Employer Contribution Rate	
a) Normal	7.25 %
b) Unfunded Accrued Liability	(4.27)
c) Preliminary Pension Rate	2.98 %
d) Preliminary Pension Rate with 1% Floor	2.98
e) Health Insurance Premium Assistance	0.79
f) Total Rate	3.77 %

**Table 2**

**Summary of Sources of Employer Contribution Rate  
As of June 30, 2002  
(Dollar Amounts in Thousands)**

	Funding Period 10 Years from July 1	Initial Amount of Liability	Outstanding Balance as of July 1, 2002	Annual Payment	
				Amount	Percent
1. Amortization of:					
a) July 1, 2001 Fresh Start Unfunded Base	2002	\$ (9,137,130)	\$ (9,913,786)	\$ (1,510,937)	(14.31)%
b) Changes in 2001	2002	2,932,201	3,181,438	484,876	4.59 %
c) Changes in 2002	2003	3,014,171	3,014,171	484,430	4.72 %
d) 2002 COLA	2003	463,795	463,795	76,694	0.73 %
e) 2003 COLA	2004	754,524	754,524	-	0.00 %
Total Amortization Payments			(2,499,858)	(450,937)	(4.27)%
2. Employer Normal Cost Rate					7.25 %
3. Preliminary Pension Rate (1) + (2)					2.98 %
4. Preliminary Pension Rate with 1% Floor -- Maximum of (3) and 1%					2.98 %
5. Health Insurance Premium Assistance Rate					0.79 %
6. Final Total Employer Contribution Rate (4) and (5)					3.77 %

**Table 3**  
**Determination of Health Insurance Contribution Rate**  
**For Fiscal Year 2003/2004**  
(Dollar Amounts in Thousands)

Item	Amount
1. Estimated Number of Eligible Annuitants in Fiscal Year 2004/2005	97,900
2. Estimated Number of Eligible Annuitants Who Elect Coverage	79,299
3. Estimated Annual Health Insurance Premium Assistance Payments During Fiscal Year 2004/2005 (2) x \$100 x 12	\$ 95,159
4. Estimated Health Insurance Premium Assistance Administrative Expenses During Fiscal Year 2004/2005	1,953
5. Total Estimated Health Insurance Premium Assistance Account Disbursements During Fiscal Year 2004/2005 (3) + (4)	\$ 97,112
6. Estimated Balance in Health Insurance Premium Assistance Account for Prior Fiscal Year 2003/2004	\$ 13,971
7. Estimated Shortfall in Health Insurance Premium Assistance Account (5) - (6)	\$ 83,141
8. Required Health Insurance Premium Assistance Contribution Rate	
(a) Estimated 2003/2004 Payroll	\$ 10,554,969
(b) Required Health Insurance Premium Assistance Contribution Rate (7) / (8a) (rounded up)	0.79%

**Table 4**  
**Summary of Market Value of Plan Assets**  
**As of June 30, 2002**  
(Dollar Amounts in Thousands)

<b>Market Value</b>	
1. Market Value of Assets as of June 30, 2001	\$ 48,143,327
2. Contributions During Fiscal Year 2001/2002	772,011
3. Disbursements During Fiscal Year 2001/2002	2,783,155
4. Investment Return During Fiscal Year 2001/2002	
a) Net Investment Return	\$ (2,524,060)
b) Administrative Expenses	31,570
c) Investment Return After Expenses (a) - (b)	\$ (2,555,630)
5. Market Value of Assets as of June 30, 2002 (1) + (2) - (3) + (4c)	\$ 43,576,553
6. Rate of Return (per Wilshire)	(5.25)%
<b>Asset Allocation by Account</b>	
1. Members' Savings Account	\$ 7,780,370
2. Annuity Reserve Account	19,652,797
3. State Accumulation Account	16,040,082
4. Health Care Account	<b>103,304</b>
5. Total (1) + (2) + (3) + (4)	\$ 43,576,553

**Table 5**  
**Derivation of Actuarial Value of Assets**  
**As of June 30, 2002**  
(Dollar Amounts in Thousands)

1. Market Value of Assets as of June 30, 2002					\$ 43,576,553
2. Determination of Deferred Gain (Loss)					
	Return on Assets				
<u>Year</u>	<u>Actual</u>	<u>Expected</u>	<u>Difference</u>	<u>% Deferred</u>	<u>Deferred Amount</u>
2001/2002	\$ (2,555,630)	\$ 4,575,102	\$ (7,130,732)	80%	\$ (5,704,585)
2000/2001	(3,877,769)	4,480,947	(8,358,716)	60%	(5,015,230)
					\$ (10,719,815)
3. Actuarial Value of Assets (1) - (2)					\$ 54,296,368
4. Actuarial Rate of Return *					2.74%

\* The actuarial rate of return is the investment return on the increase in the actuarial value of the assets from the June 30, 2001 valuation to the June 30, 2002 valuation.



**Table 6****Analysis of Change in Unfunded Accrued Liability****As of June 30, 2002**

(Dollar Amounts in Thousands)

Item	Amount
1. Unfunded Accrued Liability at June 30, 2001	\$ (6,913,006)
2. Interest Credit at 8.50% to June 30, 2002	(587,606)
3. Contributions Toward Unfunded Accrued Liability	(551,700)
4. FY 2001/2002 Act 9 Normal Cost Not Covered by Contributions	216,564
5. Decrease for Members Who Did Not Elect TD Service	(118,871)
6. Change due to 7/1/2002 COLA	463,796
7. Change due to 7/1/2003 COLA	754,524
8. Expected Unfunded Accrued Liability at June 30, 2002 (1) + (2) - (3) + (4) + (5) + (6) + (7)	\$ (5,632,899)
9. Actual Unfunded Accrued Liability at June 30, 2002	\$ (2,499,857)
10. Increase (Decrease) from Expected (8) - (9)	\$ 3,133,042
11. Reasons for Increase (Decrease)	
(a) Experience (Gains) Losses	
(i) Loss from Investment Return on Actuarial Value of Assets	\$ 3,097,890
(ii) Gain from Salary Increases Less than Expected	(162,903)
(iii) Loss from Retirement and Other Separation Experience	128,154
(iv) Loss from Annuitants' Mortality Experience	69,901
Subtotal	\$ 3,133,042
(b) Change in Assumptions	\$ -
(c) Grand Total	\$ 3,133,042

**Table 7**  
**Schedule of Funding Progress**  
**GASB Statement No. 25 Disclosure**  
(Dollar Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Funded (Unfunded) Actuarial Accrued Liability	Funded Ratio	Covered Payroll	Unfunded Accrued Liability as a Percentage of Covered Payroll
2002	\$ 54,296,368	\$ 51,796,511	\$ 2,499,857	104.8 %	\$ 9,378,944	(26.7) %
2001	54,830,300	47,917,294	6,913,006	114.4	9,414,884	(73.4)
2000	49,293,047	39,822,832	9,470,215	123.8	8,939,598	(105.9)
1999	44,606,526	37,499,115	7,107,411	119.0	8,247,602	(86.2)
1998	39,968,957	36,136,163	3,832,794	110.6	8,091,481	(47.4)
1997	34,872,643	33,209,493	1,663,150	105.0	7,745,001	(21.5)

**Table 8**  
**Schedule of Employer Contributions**  
**GASB Statement No. 25 Disclosure**  
(Dollar Amounts in Thousands)

Fiscal Year Ended June 30	Annual Required Contribution	Percentage Contributed
2002	\$ 539	100 %
2001	158,193	100 %
2000	390,504	100 %
1999	513,940	100 %
1998	718,431	100 %
1997	726,205	100 %

The information presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e. the contribution determined by the valuation completed as of June 30, 2000 was contributed in the fiscal year ending June 30, 2002).

Additional information as of the latest actuarial valuation follows:

Valuation Date:	6/30/2002
Actuarial Cost Method:	Entry Age
Amortization Method:	Level percent closed
Remaining Amortization Period:	10 years
Asset Valuation Method:	5-year smoothed market

Actuarial Assumptions:	
- Investment Rate of Return *	8.50%
- Projected Salaried Increases *	6.25%

* Includes Inflation at:	3.50%
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**Table 9**  
**Solvency Test**  
**Comparative Summary of Accrued Liability**  
**and Actuarial Value of Assets**  
(Dollar Amounts in Thousands)

Valuation as of June 30	(1)	(2)	(3)	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
	Active Member Contributions	Retirees and Beneficiaries	Active Member Employer Financed		(1)	(2)	(3)
2002	\$ 7,780,370	\$ 19,978,567	\$ 24,037,574	\$ 54,296,368	100%	100%	100%
2001	7,464,404	15,802,140	24,650,750	54,830,300	100%	100%	100%
2000	6,775,934	16,036,880	17,010,018	49,293,047	100%	100%	100%
1999	6,298,483	15,275,756	15,924,876	44,606,526	100%	100%	100%
1998	6,113,312	13,734,388	16,288,463	39,968,957	100%	100%	100%
1997	5,755,010	12,078,982	15,375,501	34,872,643	100%	100%	100%

**Table 10**  
**History and Projection of Contribution Rates**

<b>Contribution Rates</b>						
<b>Fiscal Year</b>	<b>Member</b>	<b>Employer Normal Cost Rate</b>	<b>Unfunded Liability Rate</b>	<b>Preliminary Employer Pension Rate</b>	<b>Health Insurance Rate</b>	<b>Total Employer Rate</b>
1994/1995	5.55	6.43	4.18	10.61	0.45	11.06
1995/1996	5.59	6.43	4.67	11.10	0.62	11.72
1996/1997	5.62	6.44	3.56	10.00	0.60	10.60
1997/1998	5.65	6.44	2.17	8.61	0.15	8.76
1998/1999	5.69	6.33	(0.44)	5.89	0.15	6.04
1999/2000	5.72	6.40	(2.04)	4.36	0.25	4.61
2000/2001	5.77	6.29	(4.65)	1.64	0.30	1.94
2001/2002	6.43	5.63	(6.05)	(0.42)	1.09	1.09
2002/2003	7.10	7.20	(10.03)	1.00	0.97	1.15
2003/2004	<b>7.08</b>	<b>7.25</b>	<b>(4.27)</b>	<b>2.98</b>	<b>0.79</b>	<b>3.77</b>

The projection of contribution rates is based on the assumption that there are no actuarial gains or losses, no changes in demographics or economic assumptions and no changes in benefit provisions.

**Table 11**  
**History and Projection of Annuitants, Beneficiaries,**  
**Survivor Annuitants and Active Members**

Valuation as of June 30	New Annuitants During the Year	Annuitant Deaths During the Year	Annuitants at End of Year	Beneficiaries and Survivor Annuitants at End of Year	Total Annuitants, Beneficiaries and Survivor Annuitants	Active Members
1993			108,444	4,768	113,212	197,997
1994			109,813	5,218	115,031	206,540
1995			110,509	5,451	115,960	210,783
1996			113,007	5,719	118,726	213,906
1997			118,137	5,987	124,124	215,077
1998			120,665	6,149	126,814	220,703
1999			126,448	6,421	132,869	223,495
2000			127,404	6,654	134,058	234,210
2001			125,880	6,836	132,716	243,311
2002			<b>134,300</b>	<b>7,114</b>	<b>141,414</b>	<b>242,616</b>
2003	9,927	4,042	140,185	7,556	147,741	242,616
2004	9,941	4,181	145,945	7,965	153,910	242,616
2005	10,526	4,336	152,135	8,332	160,467	242,616
2006	10,985	4,490	158,630	8,657	167,287	242,616
2007	11,439	4,638	165,431	8,946	174,377	242,616
2008	11,573	4,793	172,211	9,201	181,412	242,616
2009	11,443	4,940	178,714	9,426	188,140	242,616
2010	11,466	5,098	185,082	9,625	194,707	242,616
2011	11,305	5,243	191,144	9,801	200,945	242,616
2012	11,141	5,395	196,890	9,957	206,847	242,616

## Table 12 Description of Actuarial Assumptions and Methods

### ASSUMPTIONS

**Interest Rate:** 8½% per annum, compounded annually (adopted as of June 30, 1990). The components are 3½% for inflation and 5% for the real rate of return. Actuarial equivalent benefits are determined based on 4% (since 1960).

**Separation From Service:** Illustrative rates of assumed separation from service are as follows (adopted in 2000):

Age	Annual Rate of:						
	Non-Vested Withdrawal	Vested Withdrawal*		Death	Disability	Early Retirement**	Superannuation Retirement
		Less than 10 Years of Service	10 or More Years of Service				
<b>Males</b>							
25	13.00 %	5.50 %	1.40 %	.05 %	.02 %		
30	11.00	3.00	1.40	.05	.02		
35	11.00	3.00	1.10	.05	.10		
40	11.00	3.00	.80	.07	.18	.13 %	
45	11.00	3.00	.50	.10	.18	.15	
50	9.00	3.00	1.78	.16	.28	1.56	24.00 %
55	9.00	3.00	3.50	.25	.43	10.00	24.00
60	9.00	2.40	4.50	.46	.58	10.00	28.00
65				.90			20.00
69				1.44			20.00
<b>Females</b>							
25	13.00 %	9.50 %	4.00 %	.01 %	.04 %		
30	13.00	7.50	4.00	.02	.04		
35	13.00	5.50	2.00	.03	.08		
40	10.00	3.50	1.00	.04	.13	.60 %	
45	10.00	3.00	.55	.07	.18	.60	
50	10.00	3.00	1.50	.10	.25	1.74	10.00 %
55	10.00	3.00	3.00	.15	.35	10.00	10.00
60	10.00	3.50	5.90	.23	.45	15.00	25.00
65				.48			28.00
69				.88			20.00

\* Vested Withdrawal - At least 5 years service but not eligible for Early or Superannuation retirement.

\*\* Early Retirement - Age 55 with 25 years service, but not eligible for Superannuation retirement.

## Description of Actuarial Assumptions and Methods (Continued)

**Death After Retirement:** The 1995 George B. Buck Mortality Tables, rated forward one year for males and unadjusted for females, adopted in 2000, are used to project mortality for healthy annuitants and for dependent beneficiaries. Special mortality tables based on PSERS' experience are used for disability retirements. (The 1995 George B. Buck Mortality Tables, rated forward one year for males and unadjusted for females, adopted in 2000, are used to determine actuarial equivalent benefits.)

**Salary Increase:** Effective average of 6 1/4% per annum, compounded annually. The components are 3 1/2% for inflation, 1% for real wage growth and 1 3/4% for merit or seniority increases (adopted as of June 30, 2000). Representative values are as follows:

Age	Annual Rate of Salary Increase
20	10.00 %
30	9.50
40	7.25
50	5.00
55	4.75
60	4.50
65	4.50
70	4.50

## MISCELLANEOUS

**Option 4 Elections:** 100% of members are assumed to elect a refund of contributions and a reduced annuity.

**Withdrawal Annuity:** 90% of members are assumed to commence payment immediately and 10% are assumed to defer payment to superannuation age.

## METHODS

**Calculations:** The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system, and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

**Actuarial Cost Method:** Entry Age Normal Cost Method. The outstanding balance of the June 30, 2001 unfunded accrued liability is to be amortized over a 10 year period commencing July 1, 2002, with level dollar funding. Changes in the unfunded accrued liability, including actuarial gains and losses, subsequent to June 30, 2001 are to be amortized over a period of 10 years from the first day of July next following the change, with level dollar funding.



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## Description of Actuarial Assumptions and Methods (Continued)

**Asset Valuation Method:** A five-year moving market average value of assets that recognizes the 8½% actuarial expected investment return immediately and spreads the difference between the actual and expected return (beginning with the 2000/2001 fiscal year) over a period of five years (adopted as of June 30, 2001).

**Determination of Health Care Contribution Rate:** Rate necessary to establish reserves sufficient to provide postemployment healthcare insurance premium assistance payments for all participating eligible annuitants for the subsequent fiscal year.

### DATA

**Census and Assets:** The valuation was based on members of the System as of June 30, 2002 and does not take into account future members. All census data was supplied by the System and was subject to reasonable consistency checks. Asset data was supplied by the System.

**Table 13****Summary of Benefit and Contribution Provisions****MEMBERSHIP**

For valuation purposes, all employees are considered to be full coverage and assumed to elect coverage under Class T-D. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

**BENEFITS****Superannuation Annuity**

**Eligibility** Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age.

**Amount** 2.5% of final average salary times years of school service and intervening military service. 2% of final average salary for non-school service and for members who do not elect Class T-D coverage. Minimum of \$100 per year of service. "Final average salary" means the highest average annual salary for any 3 years of service.

Annual salary is subject to a limit of \$200,000, as adjusted under Section 401(a)(17).

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

**Early Retirement Annuity**

**Eligibility** Age 55 with 25 years of service.

**Amount** Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

**Withdrawal Annuity**

**Eligibility** 5 years of service.

**Amount** Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately. Actuarially equivalent benefits are based on 4% interest and the 1995 George B. Buck mortality tables, rated forward one year for males and unadjusted for females.

## Summary of Benefit and Contribution Provisions (Continued)

### Disability Annuity

Eligibility	5 years of service.
Amount	The standard single life annuity if the total number of credited service is greater than 16.667, otherwise the standard single life annuity multiplied by the lesser of the following ratios: $(Y^*/Y)$ or $(16.667/Y)$ where Y is the number of years of credited service and Y* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). Minimum of \$100 per year of service.

### Return of Contributions

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

### Death Benefit

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity which would have been effective if the member retired on the day before death. Option 1 (see next page) assumed payable if no other option elected.

### Normal and Optional Forms of Benefits

Normal Form:	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than \$5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.
Option 2:	Joint and 100% survivorship annuity.
Option 3:	Joint and 50% survivorship annuity.
Option 4:	Benefit of equivalent actuarial value, including lump sum payment of member contributions.

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Summary of Benefit and Contribution Provisions (Continued)

**Postemployment Health Care Insurance Premium Assistance**

Eligibility	Retired members who: <ul style="list-style-type: none"><li>(a) have 24½ or more years of service, or</li><li>(b) are disability annuitants, or</li><li>(c) have 15 or more years of service and who both terminated school service and retired after attaining superannuation age and</li><li>(d) participate in the PSERS Health Options Program or in an employer-sponsored health insurance program.</li></ul>
Amount	Participating eligible annuitants receive health insurance premium assistance payments from the Health Insurance Account equal to the lesser of \$55 per month (\$100 per month effective January 1, 2002) or the actual monthly premium. All administrative expenses necessary to operate the health insurance premium assistance program are to be funded by the Health Insurance Account. The Health Insurance Account is credited with contributions of the Commonwealth and the employers.

**CONTRIBUTIONS**

By Members	Members who elect coverage under Class T-D and who were hired prior to July 22, 1983 contribute at a rate of 6½% of compensation, while members who elect coverage under Class T-D who were most recently hired on or after July 22, 1983 contribute at a rate of 7½% of compensation. Members who do not elect coverage under Class T-D and who were hired prior to July 22, 1983 contribute at a rate of 5¼% of compensation, while members who do not elect coverage under Class T-D who were most recently hired on or after July 22, 1983 contributed at a rate of 6¼% of compensation. Reduction for a joint coverage member of 40% of Social Security tax, exclusive of disability and medical coverage portion.
By Commonwealth and employers	Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor and premium assistance contribution, is funded by the Commonwealth and the employers.

**Table 14**  
**Summary of Membership Data**  
**As of June 30, 2002**  
(Dollar Amounts in Thousands)

**Active Members \***

Item	Male	Female	Total
Number of Members	68,847	173,769	242,616
Annual Salaries **	\$ 3,110,662	\$ 6,268,282	\$ 9,378,944
Average Age	45.2	44.9	45.0
Average Service	14.0	11.3	12.1

\* Excludes 61,295 inactive members and vestees.

\*\* These salaries shown in the table above represent a rate of pay as of the valuation date and are the approximate average of the salaries of \$9,178,679 reported for the fiscal year ended June 30, 2002 and the expected salaries for the fiscal year ended June 30, 2003.

**Annuitants and Beneficiaries**

Item	Number	Annual Annuities	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	128,203	\$ 2,120,597	\$ 16,541	70.1
Survivors and Beneficiaries	7,114	50,146	7,049	76.0
Disabled Annuitants	6,097	77,548	12,719	62.3
<b>Total</b>	<b>141,414</b>	<b>\$ 2,248,291</b>	<b>15,899</b>	<b>70.1</b>

**Exhibit I****Active Membership Data as of June 30, 2002  
Number and Average Annual Salary**

Age	Years of Service									Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 +	
<b>Under 25</b>	6,340	53								6,393
	\$22,517	\$24,543								\$22,534
<b>25 - 29</b>	15,994	3,753	35							19,782
	\$30,311	\$39,013	\$32,381							\$31,966
<b>30 - 34</b>	10,731	10,377	2,353	58						23,519
	\$27,672	\$41,572	\$45,586	\$32,643						\$35,609
<b>35 - 39</b>	10,398	5,504	5,653	2,096	82					23,733
	\$20,967	\$37,369	\$47,597	\$49,102	\$34,119					\$33,644
<b>40 - 44</b>	12,962	6,555	4,604	4,803	2,379	138				31,441
	\$19,219	\$30,769	\$42,899	\$52,138	\$52,386	\$36,161				\$32,707
<b>45 - 49</b>	11,058	8,054	6,197	4,499	7,303	5,740	104			42,955
	\$20,640	\$29,968	\$39,268	\$49,357	\$58,466	\$60,068	\$37,439			\$39,825
<b>50 - 54</b>	6,530	5,726	6,234	5,203	4,638	12,241	9,912	48		50,532
	\$21,586	\$30,436	\$37,948	\$45,769	\$55,090	\$63,028	\$65,014	\$36,788		\$48,745
<b>55 - 59</b>	3,817	2,952	3,544	3,482	3,479	3,385	6,286	1,565	11	28,521
	\$20,120	\$26,913	\$33,501	\$40,263	\$45,536	\$55,699	\$66,164	\$68,114	\$33,379	\$45,055
<b>60 - 64</b>	1,844	1,307	1,502	1,535	1,614	1,424	723	601	154	10,704
	\$17,209	\$22,979	\$28,284	\$32,796	\$35,492	\$43,244	\$52,869	\$67,578	\$65,897	\$33,860
<b>Over 64</b>	1,338	816	803	628	476	472	289	92	122	5,036
	\$14,731	\$17,309	\$21,365	\$24,420	\$27,588	\$30,667	\$37,488	\$48,453	\$63,310	\$23,222
<b>Total</b>	81,012	45,097	30,925	22,304	19,971	23,400	17,314	2,306	287	242,616
<b>Ave. Sal.</b>	\$23,318	\$33,832	\$39,879	\$45,790	\$52,013	\$59,226	\$64,300	\$66,538	\$63,551	\$38,658

**Exhibit II**  
**The Number and Average Annual Annuity**  
**As of June 30, 2002**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Years of Service									Total	
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 +		
Under 50		344	1,594	484	198	42					2,662
		\$700	\$1,183	\$3,095	7,648	\$13,920					\$2,150
50 - 54		46	1,921	747	415	526	539	8			4,202
		\$1,318	\$1,185	\$3,265	\$7,906	\$17,998	\$29,118	\$29,164			\$7,961
55 - 59	1	53	2,317	1,217	716	1,116	7,733	1,777	6		14,936
	\$2,833	\$2,199	\$1,496	\$3,896	\$8,230	\$20,766	\$33,107	\$45,696	\$28,221		\$25,093
60 - 64	90	218	1,918	1,799	1,587	2,285	6,721	4,411	193		19,222
	\$620	\$2,487	\$2,761	\$5,977	\$10,883	\$20,463	\$31,075	\$39,493	\$45,845		\$24,585
65 - 69	366	706	2,628	2,496	2,904	3,081	4,168	3,676	1,291		21,316
	\$570	\$1,962	\$3,158	\$6,024	\$10,283	\$16,695	\$25,488	\$33,106	\$38,875		\$18,031
70 - 74	565	1,132	2,828	2,863	3,213	3,365	3,695	2,360	1,664		21,685
	\$491	\$1,699	\$3,189	\$5,668	\$10,028	\$15,538	\$23,124	\$30,312	\$37,563		\$15,284
75 - 79	598	1,207	2,844	2,965	2,916	2,725	2,199	1,949	888		18,291
	\$491	\$1,591	\$3,270	\$5,952	\$10,088	\$15,082	\$20,288	\$26,131	\$35,210		\$12,382
80 - 84	453	1,032	2,418	2,215	1,864	1,671	1,266	1,387	490		12,796
	\$538	\$1,613	\$3,323	\$5,931	\$9,338	\$13,607	\$18,298	\$22,613	\$29,725		\$10,341
85 - 89	310	744	1,400	1,285	1,022	956	799	966	517		7,999
	\$651	\$1,938	\$3,769	\$6,463	\$9,858	\$13,447	\$18,239	\$22,228	\$26,005		\$10,957
Over 89	60	409	578	599	563	663	539	807	876		5,094
	\$878	\$2,501	\$4,720	\$7,611	\$11,482	\$13,819	\$17,571	\$20,834	\$24,605		\$14,100
Total	2,443	5,891	20,446	16,670	15,398	16,430	27,659	17,341	5,925		128,203
	\$547	\$1,751	\$2,718	\$5,659	\$9,962	\$16,407	\$27,625	\$32,838	\$34,184		\$16,541

**Exhibit III**  
**The Number and Average Annual Annuity**  
**As of June 30, 2002**

**Beneficiaries and Survivor Annuitants**

Age	Years of Service									Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 +	
Under 50	2	17	41	35	50	29	14	12	13	213
	\$228	\$1,060	\$1,436	\$2,179	\$4,981	\$6,977	\$9,897	\$7,431	\$13,432	\$4,729
50 - 54	2	2	19	21	20	25	33	18	12	152
	\$291	\$533	\$2,111	\$3,151	\$4,308	\$10,582	\$12,168	\$12,946	\$10,836	\$8,047
55 - 59	2	8	26	35	31	43	83	39	20	287
	\$381	\$2,067	\$1,917	\$3,062	\$4,976	\$10,234	\$11,799	\$11,978	\$7,387	\$8,233
60 - 64	3	8	52	44	40	45	108	102	36	438
	\$354	\$1,348	\$2,844	\$3,951	\$5,518	\$9,307	\$14,511	\$16,441	\$15,965	\$10,941
65 - 69	7	22	87	71	76	73	138	118	59	651
	\$456	\$1,626	\$2,652	\$3,811	\$6,244	\$9,421	\$11,942	\$15,235	\$17,167	\$9,464
70 - 74	17	37	108	134	116	119	154	166	95	946
	\$564	\$1,093	\$2,467	\$3,569	\$5,343	\$6,961	\$11,390	\$12,614	\$16,348	\$8,080
75 - 79	23	80	179	183	144	176	195	262	92	1,334
	\$778	\$1,244	\$2,320	\$3,567	\$5,735	\$8,084	\$9,276	\$10,660	\$13,528	\$6,957
80 - 84	15	110	191	153	163	153	194	274	153	1,406
	\$485	\$1,154	\$2,041	\$3,091	\$5,006	\$6,406	\$7,600	\$9,457	\$10,629	\$6,035
85 - 89	10	85	133	102	102	83	115	211	174	1,015
	\$623	\$1,074	\$1,893	\$3,072	\$4,337	\$5,554	\$6,325	\$7,985	\$9,110	\$5,481
Over 89	8	29	55	57	41	50	78	145	208	671
	\$1,085	\$896	\$2,040	\$2,860	\$3,781	\$5,296	\$5,779	\$6,461	\$7,258	\$5,405
Total	89	398	891	835	783	796	1,112	1,347	862	7,113
	\$626	\$1,172	\$2,203	\$3,322	\$5,164	\$7,501	\$9,847	\$10,664	\$11,089	\$7,050



**Exhibit IV**  
**The Number and Average Annual Annuity**  
**As of June 30, 2002**

**Retired on Account of Disability**

Age	Years of Service									Total	
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 +		
Under 50		186	188	92	83	17					566
		\$7,825	\$10,203	\$13,622	\$18,601	\$24,549					\$11,640
50 - 54		161	163	135	197	243	46	1			946
		\$7,088	\$9,242	\$12,621	\$20,449	\$30,707	\$41,319	\$29,253			\$18,786
55 - 59		175	223	189	244	264	65	2			1,162
		\$7,022	\$8,356	\$11,044	\$17,763	\$26,768	\$36,321	\$37,345			\$16,365
60 - 64		179	276	248	226	152	17				1,098
		\$5,300	\$7,487	\$9,746	\$14,784	\$23,876	\$29,927				\$11,759
65 - 69		149	221	175	144	96	18	3			806
		\$4,412	\$6,573	\$8,287	\$12,843	\$19,526	\$25,510	\$40,232			\$9,757
70 - 74		123	189	129	130	59	9			1	640
		\$3,551	\$5,692	\$8,428	\$12,888	\$18,858	\$23,350		\$50,092		\$8,825
75 - 79		94	92	76	74	57	15	2			410
		\$3,576	\$5,967	\$7,716	\$11,567	\$16,704	\$20,002	\$26,943			\$8,862
80 - 84		58	79	52	50	28	24				291
		\$3,482	\$6,057	\$7,510	\$10,335	\$15,592	\$20,910				\$8,681
85 - 89		12	41	38	16	15	10				132
		\$2,622	\$5,548	\$7,912	\$10,489	\$15,838	\$18,851				\$8,739
Over 89			15	10	8	9	4				46
			\$6,361	\$7,676	\$11,011	\$13,648	\$13,311				\$9,486
Total		1,137	1,487	1,144	1,172	940	208	8	1		6,097
		\$5,662	\$7,554	\$9,924	\$15,701	\$24,799	\$31,170	\$34,816	\$50,092		\$12,719

**Exhibit V**  
**The Number and Average Annual Annuity**  
**As of June 30, 2002**

**Those in Receipt of a Refund Annuity**

Age	Years of Service									Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 +	
Under 50										
50 - 54										
55 - 59										
60 - 64										
65 - 69										
70 - 74										
75 - 79										
80 - 84										
85 - 89										
Over 89	1 \$ 66									1 \$ 66
<b>Total</b>	<b>1</b> <b>\$ 66</b>									<b>1</b> <b>\$ 66</b>

**Exhibit VI**  
**Annuitant and Beneficiary Membership Data**  
**As of June 30, 2002**

**Number and Average Annual Benefit**  
**Excludes Partial Lump Sum Payments**

Age Last Birthday	Number	Annual Benefit (Dollars in Thousands)	Average Annual Benefit (Dollars)
<b>Annuitants</b> (Normal, Early and Withdrawal)			
Under 60	21,800	\$ 413,961	\$ 18,989
60 - 64	19,222	472,581	24,585
65 - 69	21,316	384,345	18,031
70 - 74	21,685	331,435	15,284
75 - 79	18,291	226,483	12,382
Over 79	25,889	291,793	11,271
Total	128,203	\$ 2,120,597	\$ 16,541
<b>Survivors and Beneficiaries</b>			
Under 60	652	\$ 4,593	\$ 7,045
60 - 64	438	4,792	10,941
65 - 69	651	6,161	9,464
70 - 74	946	7,644	8,080
75 - 79	1,334	9,280	6,957
Over 79	3,093	17,675	5,715
Total	7,114	\$ 50,146	\$ 7,049
<b>Disabled Annuitants</b>			
Under 60	2,674	\$ 43,376	\$ 16,221
60 - 64	1,098	12,911	11,759
65 - 69	806	7,864	9,757
70 - 74	640	5,648	8,825
75 - 79	410	3,634	8,862
Over 79	469	4,116	8,776
Total	6,097	\$ 77,548	\$ 12,719
<b>Grand Total</b> <b>Average Annual Benefit</b>		141,414	\$ 2,248,291
		\$ 15,899	

**Exhibit VII****10 Year History of Membership Data****Active Members**

<b>Valuation as of June 30</b>	<b>Number of Active Members</b>	<b>Percentage Change in Membership</b>	<b>Total Annual Payroll (Dollars in Thousands)</b>	<b>Percentage Change in Payroll</b>
2002	242,616	(0.29%)	\$ 9,378,944	(0.38%)
2001	243,311	3.89%	9,414,884	5.32%
2000	234,210	4.79%	8,939,598	8.39%
1999	223,495	1.27%	8,247,602	1.93%
1998	220,703	2.62%	8,091,481	4.47%
1997	215,077	0.55%	7,745,001	1.69%
1996	213,906	1.48%	7,616,585	3.23%
1995	210,783	2.05%	7,378,342	7.16%
1994	206,540	4.31%	6,885,337	8.46%
1993	197,997	(2.46%)	6,348,565	4.11%

**Annuitant and Survivor Annuitant Members**

<b>Year Ended June 30</b>	<b>Number on roll</b>	<b>Additions</b>	<b>Deletions</b>	<b>Percentage Change in Membership</b>	<b>Annual Annuities (Dollars in Millions)</b>	<b>Percentage Change in Annuities</b>
2002	141,414	13,003	4,305	6.55%	\$ 2,248.3	20.10%
2001	132,716	3,140	4,482	(1.00)%	1,872.0	0.00%
2000	134,058	5,923	4,734	0.89%	1,880.6	2.73%
1999	132,869	10,609	4,554	4.77%	1,830.6	10.77%
1998	126,814	7,132	4,442	2.17%	1,652.6	14.21%
1997	124,124	9,787	4,389	4.55%	1,447.0	11.74%
1996	118,726	7,047	4,281	2.39%	1,295.0	6.05%
1995	115,960	4,923	3,994	0.81%	1,221.1	2.99%
1994	115,031	4,866	3,047	1.61%	1,185.6	12.06%
1993	113,212	12,258	4,072	7.79%	1,058.0	22.65%