850282

TEACHERS RETIREMENT ASSOCIATION

STATE OF MINNESOTA

REPORT OF ACTUARIAL VALUATION

June 30, 1984

BROWN AND FLOTT
CONSULTING ACTUARIES
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Board of Trustees
State of Minnesota
Teachers Retirement Association
St. Paul, Minnesota 55101

Gentlemen:

We are pleased to submit this report on the actuarial valuation of the Teachers Retirement Association as of June 30, 1984.

This valuation was conducted in accordance with the provisions of Minnesota Statutes, Chapter 356. The valuation is based on personnel and financial data furnished to us by the Executive Director of the Association.

We have prepared this report in accordance with generally accepted actuarial principles applied on a consistant basis. To the best of our knowledge and belief, the contents of this report are true and correct.

Respectfully submitted,

BROWN AND FLOTT

Robert F. Flott
Enrolled Actuary No. 1895

RFF:aj

Enc.

Teachers Retirement Association
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PURPOSE

The purpose of this report is to set forth the financial status of the Teachers Retirement Fund as of June 30, 1984 in accordance with the provisions of Minnesota Statutes, Section 356.215.

This section requires that an actuarial valuation of the fund be made each year. Such valuation shall be based on an assumed pre-retirement interest rate of 8%, an assumed post-retirement interest rate of 5%, and an assumed salary increase rate of 6.5%. The valuation report shall set forth the following items based on these assumptions and such other assumptions as may be appropriate:

1. The normal cost of the benefits provided by the laws governing the fund computed in accordance with the entry age normal cost method and expressed as a level percentage of the future payroll of active participants of the fund.

2. The accrued liabilities of the fund defined as the present value of all benefits minus the present value of future entry age normal costs.

3. An actuarial balance sheet showing current and expected future benefit obligations, current and expected future assets, and the current and expected future unfunded liabilities.

4. The additional annual contribution which would be required in addition to the normal cost to retire the unfunded accrued liability on a level percent of payroll basis by the established date for full funding which is in effect at the time of the valuation.

5. An analysis explaining the increase or decrease in the unfunded accrued liability sice the last valuation.

6. A tabulation of active membership and annutitants of the fund.

7. A statement of the administrative expenses in dollars and also as a percentage of covered payroll.

8. A summary of the principal provisions of the plan upon which the valuation is based.

This report is intended to comply with the requirements of Section 356.215.

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PRINCIPAL VALUATION RESULTS

The principal results of our valuation are summarized and compared with those of June 30, 1983 in the following schedule:

SUMMARY OF PRINCIPAL VALUATION RESULTS

	1983	1984
1. Accrued Liability	$3,472,264,036	$3,716,432,337
2. Assets in Excess of Current Liabilities	$1,983,579,211	$2,216,247,806
3. Unfunded Accrued Liability	$1,488,684,825	$1,500,184,531
4. Funding Ratio	57.13%	59.63%
5. Normal Cost		
a. Basic Group	15.92%	14.95%
b. Coordinated Group	9.06	8.31
6. Current Payroll	$1,146,613,563	$1,232,356,505
7. Additional Contribution Rate to amortize unfunded liabiltiy by 2009	9.03%	5.73%
8. Administrative Expenses as percentage of current payroll	0.13%	0.16%

The accrued actuarial liability of the fund is summarized in Table 5. The liability increased during the year by $244,168,301 or 7.0%.

The assets available for funding the accrued liability are summarized in Table 6. These assets increased during the year by $232,668,595 or 11.7%.

The unfunded accrued liability is the excess of the accrued liability over the available assets. The unfunded liability increased during the year by $11,499,706, or 0.7%. An analysis explaining this increase is presented on page 8 of this report.

The funding ratio is the ratio of the available assets to the accrued liability. This ratio increased during the year from 57.13% to 59.63%.

MEMBERSHIP DATA

The Executive Director furnished us with data pertaining to active members, inactive members and retired members. Tables 1, 2, and 3 summarize this data and the changes during the year for each of these groups.

NORMAL COST

The normal cost for the basic group decreased from 15.92% to 14.95% and for the coordinated group decreased from 9.06% to 8.31%. Current statutes provide for equal employer and employee contributions of 8.5% of salary for the basic group and 4.5% for the coordinated group. The normal cost rates were determined using the entry age normal cost method.

ADDITIONAL SUPPORT RATE

In addition to the normal cost contribution discussed above, effective July 1, 1984, an employer contribution of 4.48% of salary is provided by statute to amortize the unfunded accued liability. The additional contribution needed to amortize this deficit by June 30, 2009 has been determined as follows:

(a)	Unfunded accrued liability	$ 1,500,184,531
(b)	Present value of future payroll	26,181,413,949
(c)	Additional support rate (a)/(b)	5.73%

Interest at the rate of 8% on the current unfunded accrued liability amounts to $120,014,762 or 9.74% of the current annual payroll.

ACTUARIAL BALANCE SHEET

An actuarial balance sheet, prepared in conformance with Section 356.215, is shown in Table 7. The data shown in this balance sheet does not correspond with other data included in this report. The value of invested assets shown in the balance sheet are equal to those shown in Table 6 plus one-third of the excess of the market value of these assets over the bookvalue. The present value of expected future normal costs and supplemental contributions are included as assets. Reflecting these items, the current and future unfunded liability shown in the balance sheet is $1,343,675,540 less than the amount shown on page 2. Using the unfunded liability shown in the balance sheet the additional contribution rate would be 0.60%. This is in addition to the current 4.48% statutory additional support rate.

ADMINISTRATIVE EXPENSE

The cost of administration of the fund during the year amounted to $1,918,330. This represents 0.16% of the current annual payroll.

SUMMARY OF PLAN PROVISIONS

1. Normal Retirement Benefit

   a. After attainment of age 65, or attainment of age 62 with 30 years service.

   b. Benefit based on average of highest successive ~~consecutive~~ 5 years earnings and years of service.

   c. Benefit percentages of average salary per year of service.

      Basic : 2.0% for first 10 years, 2.5% thereafter
      Coordinated: 1.0% for first 10 years, 1.5% thereafter

      (These percentages are reduced by one-half for each year of participation in the partial formula groups)

2. Late Retirement Benefit

   a. Annuity determined as for normal retirement considering service and earnings to actual retirement.

3. Early Retirement Benefit

   a. After attainment of age 55 and completion of 10 years of service or after completion of 30 years of service.

   b. Annuity determined as for normal retirement considering service and earnings to actual retirement and reduced by ½ of 1% for each month under age 65, to and including age 60, and by ¼ of 1% for each month under age 60.

   c. After completion of 10 years service member may elect a deferred annuity to commence any time after attainment of age 55. The annuity is increased by compound interest from the date service terminated to the date annuity payments begin. Interest is at the rate of 3% after 1980.

4. Disability Benefit

   a. After atainment of age 50 and completion of 5 years of service or after completion of 10 years of service.

   b. Annuity determined as for normal retirement considering service and earnings to actual retirement with no reduction because of age.

c. Basic group members receive addtional benefit based on their age at the time of retirement. This benefit is graded from $5 monthly for age 64 to $50 monthly for ages 55 and under.

5. Pre-Retirement Death Benefit

a. A refund of member's contributions with interest; or

b. After attainment of age 55 and completion of 10 years of service or after completion of 30 years service - the last half of a full joint and survivor annuity payable to a surviving spouse for life; or

c. For basic group members after completion of 18 months of service an annuity payable to a surviving dependent spouse equal to 50% of the members salary in the last year plus 10% for each dependent child subject to a family maximum of $1,000 per month.

6. Other Separation Benefits

a. A refund of member's accumulated deductions with interest at the rate of 5% per annum.

ACTUARIAL METHODS AND ASSUMPTIONS

As required by Minnesota Statutes, Section 356.215, the entry age normal cost method has been used to determine the accrued liability for active participants. Under this method the entry age normal cost, expressed as a percentage of future annual earnings, is determined at the time of entry for each participant. This is done by dividing the present value of expected future benefits by the present value of expected future earnings. The accrued liability at any time after entry is defined as the present value of expected future benefits less the entry age normal cost percentage of expected future earnings.

The assumption used in making this valuation are shown in Table 4. The pre-retirement interest and salary increase assumptions have been changed since the previous actuarial valuation.

POST-RETIREMENT INVESTMENT FUND

The post-retirement investment fund (PRIF) is a vehicle for providing vaiable annuity payments to retired participants. When a participant retires, assets equal to the present value of future benefits expected to be paid to that participant are transferred from the basic fund to the PRIF. Thereafter, benefits are paid from the PRIF. If interest earned by the PRIF exceeds the assumed valuation rate of 5% benefit payments are increased.

The PRIF participation, included as an asset in Table 6, is equal to the present value of all benefits being paid from that fund as of the valuation date. As of June 30, 1984 the participation shown exceeded the teachers retirement fund's share of the PRIF assets by $10,942,268. This amount is referred to as the annuity stabilization reserve.

During the year TRA annuitants receiving benefits from PRIF experienced less mortality than expected resulting in an actuarial loss of $818,424. This amount will be paid from TRA to PRIF.

As of January 1, 1984 benefits being paid from PRIF which had commenced before July 1, 1982 were increased by 7.50%. The cost of this increase is provided from earnings on investments of PRIF in excess of the 5% statutory valuation assumption.

1984 LEGISLATIVE CHANGES

Laws 1984, Chapter 564 made several changes affecting the actuarial valuation of this fund. These include the following:

1. The statutory employer addtional contribution to amortize the deficit was increased from 3.05% of payroll to 4.48%.
2. The assumed pre-retirement interest and salary increase rates were increased from 5% and 3.5% to 8% and 6.5% respectively. The effects of these assumption changes were as follows:

a. The accrued liability and the unfunded liability each decreased by $193,665,580.

b. The normal cost rates decreased by 0.90% for the basic group and 0.75% for the coordinated group.

c. The supplemental contribution rate decreased by 1.47% if calculated on a level dollar basis or by 0.74% if calculated on a level percentage of payroll basis.

3. The "Rule of 85" was adopted for a temporary period to expire on December 31, 1986. This rule permits employees who have attained age 55 and whose age plus years of service is at least 85 to retire with a full formula benefit. To determine the cost of this rule we first determined the number of persons who became eligible before June 30, 1984 and the number who would become eligible in future years. An election rate of 20.3% for the basic group and 12.5% for the coordinated group was determined by dividing the number electing to retire under this rule before June 30, 1984 by the number eligible. This rate was applied to determine the number expected to elect retirement in future years. An average cost per retiree was determined from a 10% sample of those electing retirement before June 30, 1984. For each of this sample the cost was determined as the difference between the actual amount transferred to the PRIF and the accrued liability which would have been required at June 30, 1984 if they had not retired. Using this data we estimated the cost for the year ending June 30, 1984 was $3,337,300 and the increase in the accrued liability for future retirees as of June 30, 1984 was $10,049,814.

ANALYSIS OF CHANGE IN UNFUNDED ACCRUED LIABILITY

As shown on page 2 of this report, during the current year the unfunded accrued liability increased by $11,499,706. The causes of this increase may be summarized as follows:

Increases:	
Actuarial Losses	
Salary increase rate	$217,517,340
Pre-retirement interest rate	39,051,843
Post-retirement mortality	818,424
Legislative Changes - Benefits	13,387,114
Accounting method changes	24,424,361
Decreases:	
Legislative changes - assumptions	193,665,580
Employer additional contribution	23,880,648
Actuarial gain - pre-retirement terminations	66,153,148
Net Increase	$ 11,499,706

Prior to June 30, 1984, in calculating the accrued prior service liability it was assumed that salaries increase each year at a rate of 3.5%. In the past year salaries actually increased at a rate of 12.6%. This departure from the assumed rate increased the deficit by $217,517,340.

Annuitants receiving benefits from the Post-Retirement Investment Fund experienced mortality less favorable than expected resulting in an actuarial loss of $818,424.

Prior to June 30, 1984, in computing required reserves it was assumed that investment income would be earned at the rate of 5% per annum. The income required to maintain reserves on this basis exceeded the actual income from investment by $39,051,843.19.

Members terminated service prior to retirement at a rate greater than expected, releasing required reserves. This resulted in an actuarial gain of $66,153,148.

As discussed above, 1984 legislative changes in actuarial assumptions decreased the deficit by $193,665,580. The "Rule of 85" increased the deficit by $13,387,114.

Employer additional contributions, less administrative expenses and investment management fees reduced the deficit by $25,270,931.

Changes in accounting methods increased the deficit by $24,424,361.

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TABLE 1

SUMMARY OF CENSUS OF ACTIVE MEMBERS

	Basic Group		Coordinated Group	
	Number	Annual Payroll	Number	Annual Payroll
Full Formula				
At 6-30-83	1,825	$49,602,118	45,478	$810,727,629
New Entrants	9		5,857	
To Inactive	0		(668)	
Separation with Refund	(10)		(3,686)	
Deaths	(8)		(51)	
Disability	(4)		(38)	
Service Retirement	(235)		(613)	
At 6-30-84	1,577	$46,538,559	46,279	$880,379,535
Former Partial Formula				
At 6-30-83	608	$18,076,472	9,809	$265,395,019
New Entrants	0		19	
To Inactive	(5)		0	
Separation with Refund	0		(74)	
Deaths	(1)		(20)	
Disability Retirement	(1)		0	
Service Retirement	(26)		(81)	
At 6-30-84	575	$18,533,480	9,653	$283,930,876
Partial Formula				
At 6-30-83	3	$ 90,968	108	$ 2,721,357
Separation with Refund			(4)	
Service Retirement			(1)	
To Inactive	0		0	
At 6-30-84	3	$ 78,927	103	$ 2,895,128
Total at 6-30-83	2,436	$67,769,558	55,395	$1,078,844,005
Total at 6-30-84	2,155	$65,150,966	56,035	$1,167,205,539

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TABLE 2

SUMMARY OF CENSUS OF INACTIVE MEMBERS

	Basic Group		Coordinated Group	
	Number	Projected Annuity	Number	Projected Annuity
Full Formula				
At 6-30-83	499	$2,349,282	15,268	$ 9,971,711
Reinstated	5		30	
From Active	0		668	
Separation with Refund	(2)		(145)	
Deaths	(2)		(9)	
Service Retirement	(61)		(28)	
Write-offs	0		(1,076)	
At 6-30-84	439	$2,259,067	14,708	$10,470,136
Partial Formula				
At 6-30-83	31	$ 339,913	1,044	$ 1,954,301
Reinstated	0		0	
From Active	5		0	
Separation with Refund	0		(33)	
Deaths	0		(3)	
Service Retirement	0		(18)	
Write-offs	0		(6)	
At 6-30-84	36	$ 422,850	984	$ 2,950,637
Total at 6-30-83	530	$2,684,694	16,312	$12,820,879
Total at 6-30-84	475	$2,681,917	15,692	$13,420,733

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TABLE 3

SUMMARY OF CENSUS OF ANNUITANTS

Type of Annuity	Number	Annual Amount	Present Value
Annuities Payable from Post Retirement Investment Fund			
1. Service Retirement Annuitants			
as of 6-30-83	11,154	$56,697,035.30	$647,539,568.87
new	983	8,587,193.26	
deaths	-225	-702,951.30	
net adjustments	109	4,466,835.56	
as of 6-30-84	12,028	$69,048,112.82	$789,856,539.24
2. Beneficiaries of Deceased Members			
as of 6-30-83	127	$ 731,763.12	$ 8,602,641.4[illegible]
new	17	102,932.16	
expired	-5	-10,197.12	
net adjustments	0	45,212.88	
as of 6-30-84	139	$ 869,711.04	$ 10,372,064.0[illegible]
3. Beneficiaries of Deceased Annuitants			
as of 6-30-83	444	$ 2,083,289.16	$ 11,794,733.75
new	75	297,034.80	
expired	-27	-68,586.72	
net adjustments	2	208,167.36	
as of 6-30-84	494	$ 2,519,904.60	$ 13,612,911.2[illegible]
4. Section 136.82 Supplemental Annuities			
as of 6-30-83	168	125,753.16	$ 1,369,394.7[illegible]
new	6	7,553.64	
deaths	0	0	
net adjustments	0	7,148.04	
as of 6-30-84	174	$ 140,454.84	$ 1,470,803.10
5. Section 354.59 Allowances			
as of 6-30-83		$ 620,205.36	$ 4,057,213.29
expirations		-38,002.68	
net adjustments		34,218.36	
as of 6-30-84		$ 616,421.04	$ 3,897,449.64
Total 6-30-83 MPRIF	11,893	$60,258,046.10	$673,363,552.14
Total 6-30-84 MPRIF	12,835	$73,194,604.34	$819,209,767.29

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TABLE 3 (Cont'd.)

SUMMARY OF CENSUS OF ANNUITANTS

Type of Annuity	Number	Annual Amount	Present Value
6. Service Retirement Annuities Payable from Variable Annuity Fund			
as of 6-30-83	193	$ 94,070.28	$ 1,219,507.43
new	66	44,427.40	
deaths	-1	- 579.00	
net adjustments	9	14,356.28	
as of 6-30-84	267	$ 152,274.96	$11,976,378.62
7. Disability Annuities			
as of 6-30-83	223	$ 1,470,491.16	$20,704,222.98
new	43	289,270.80	
deaths	-19	-96,832.80	
returned to work	- 6	-39,922.68	
net adjustments	-19	-65,464.80	
as of 6-30-84	222	$ 1,557,541.68	$21,703,275.1[illegible]
8. Survivor Benefits			
as of 6-30-83	109	$ 339,669.48	$ 4,315,298.4[illegible]
new	5	26,295.00	
terminated	-10	-19,215.48	
net adjustments	0	14,716.92	
as of 6-30-84	104	$ 361,465.92	$ 4,692,209.0[illegible]
9. 1915 Law Annuities			
as of 6-30-83	9	$ 15,359.40	$ 59,173.45
deaths	-7	-11,850.24	
as of 6-30-84	2	$ 3,509.16	$ 14,238.[illegible]

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TABLE 4

ASSUMED RATES OF DECREMENT USED IN VALUATION OF FORMULA PLAN BENEFITS

Age	Death	Disability	Withdrawal
20	.000405	.000380	.177
25	.000457	.000500	.146
30	.000544	.000560	.116
35	.000684	.000645	.085
40	.000916	.000820	.055
45	.001295	.001105	.024
50	.002000	.001735	.001
55	.003754	.003560	.001
60	.006480	.006320	.001

Assumed age at retirement - 62

Post Retirement Mortality - 1971 Group Annuity Mortality Table for males set back 8 years.

Assumed rate of interest - 8% Pre-retirement - 5% Post-retirement

Assumed rate of salary increase - 6.5%

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Table 5

SUMMARY OF ACCRUED LIABILITY

1.	Post-Retirement Investment Fund Participation		$ 819,209,767.29
2.	Variable Annuity Fund Participation		106,008,080.07
3.	For Active Members		
	Basic	$ 486,339,630.00	
	Coordinated	2,201,827,282.00	
	Total		$2,688,166,912.00
4.	For Inactive Members		
	Basic	$ 21,946,224.00	
	Coordinated	54,693,582.00	
	Total		$ 76,639,806.00
5.	1915 Law Annuities		$ 12,287.54
6.	Disability Annuities		$ 21,703,274.92
7.	Surviving Spouse Annuities		$ 4,646,250.08
8.	Surviving Children Annuities		$ 45,958.97
	Total Accrued Liability		$3,716,432,336.87

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Table 6

ASSETS AND CURRENT LIABILITIES

A. Assets

Cash	$ 449,013.90
Accounts receivable	28,053,283.23
Due from other funds	267,723.95
Accrued investment income	479,268.74
Investment at amortized cost*	1,222,456,304.78
Short-term cash equivalents	59,127,441.00
Equity in Investment Funds	925,217,847.36
Equipment at cost, less depreciation	43,828.70
Total Assets	$2,236,094,711.66

B. Current Liabilities

Accounts payable	$ 12,379,173.90
Due to other funds	7,352,044.68
Accrued Compenstate absences	115,687.15
Total Current Liabilities	$ 19,846,905.73

C. Assets in excess of current liabilities $2,216,247,805.93

* The market value of these investments as of June 30, 1984 was $1,153,473,496.21 or $68,982,808.57 less than the amortized cost shown.

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Table 7

Actuarial Balance Sheet June 30, 1984

Current and Expected Future Assets

Current Assets Less Current Liabilities		
Cash and equivalents	$ 68,573,653.79	
Fixed income investments	344,631,020.04	
Equity investments	854,831,016.33	
Equity in investment funds	925,217,847.36	
Total Current Assets		$2,193,253,537.52
Expected Future Assets		
Supplemental contributions	$1,366,669,808.00	
Normal costs	1,201,098,830.00	
Total Future Assets		$2,567,768,638.00
Total Current and Expected Assets		$4,761,022,175.52

Current and Expected Future Benefit Obligations

Current Benefit Obligations		
For service rendered to date		
For annuitants		
Retirement	$ 821,198,433.45	
Disability	21,703,274.92	
Surviving spouse	4,646,250.08	
Surviving children	45,958.97	
For inactive members	76,639,806.00	
For active members		
Retirement	1,232,491,939.00	
Disability	53,466,315.00	
Refund	108,999,075.00	
Survivor benefits	56,278,154.00	
Variable fund	104,031,701.45	
Total Current Obligations		$2,479,500,907.87
Expected Future Obligations		$2,438,030,259.00
Total Current and Expected Obligations		$4,917,531,166.87
Current Unfunded Liability		$ 286,247,300.35
Current and Future Unfunded Liability		$ 156,508,991.35

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SCHEDULE OF TOTAL RESERVES REQUIRED JUNE 30, 1984

1.	For Post-Retirement Investment Fund Annuities	$ 819,209,767.29
2.	For Variable Annuity Fund Participants	106,008,080.07
3.	For Active Members	2,688,166,912.00
4.	For Inactive Members	76,639,806.00
5.	For Other Annuitants	
	a. 1915 Law Retirement Annuities	12,287.54
	b. Disability Annuities	21,703,274.92
	c. Surviving Spouses' Annuities	4,646,250.08
	d. Surviving Children's Annuities	45,958.97
	Total Other Annuitants	$ 26,407,771.51
	Total Required Reserves	$3,716,432,336.87

Certification

The above exhibit has been prepared in accordance with the provisions of Section 356.20. The required reserves for formula benefits have been computed in accordance with the Entry Age Normal Cost actuarial method and rules adopted by the legislative commission on pensions and retirement.

Respectfully submitted,

BROWN AND FLOTT

Robert F. Flott

Robert F. Flott

Chicago, Illinois
December 5, 1984