

**The Report of an
ANNUAL ACTUARIAL VALUATION**

of the

**PUBLIC EMPLOYEES POLICE AND FIRE FUND
July 1, 1996**

Submitted to

THE BOARD OF TRUSTEES

Public Employees Retirement Association of Minnesota

St. Paul, Minnesota

GABRIEL, ROEDER, SMITH & COMPANY



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January 14, 1997

The Board of Trustees
Public Employees Retirement Association
of Minnesota
514 St. Peter Street - Suite 200
St. Paul Minnesota 55102

Dear Board Members:

Submitted in this report are the results of an Annual Actuarial Valuation of the assets, actuarial values and contribution requirements associated with benefits provided by the Public Employees Police and Fire Fund.

The date of the valuation was July 1, 1996.

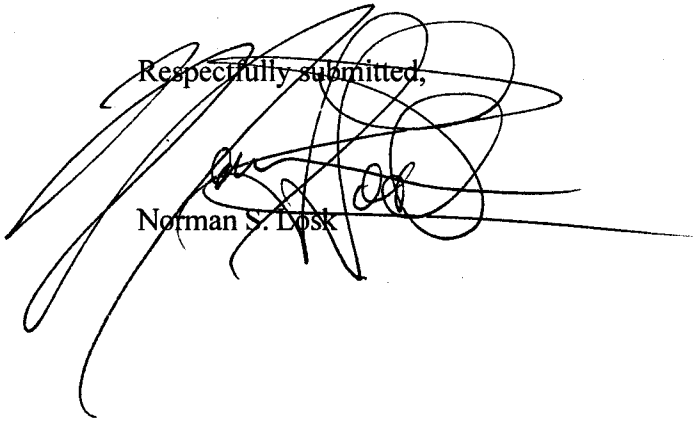
Valuation results, comments and conclusions are contained in Section A.

The valuation was based upon information, furnished by PERA, concerning Retirement Fund benefits, financial transactions, and individual members, terminated members, retirants and beneficiaries. Data was checked for internal consistency but was not otherwise audited by us. This information is summarized in Section B.

A description of the actuarial cost methods and actuarial assumptions used as well as definitions of technical terms may be found in Section C.

Information regarding the Pension Benefit Obligation needed to comply with the requirements of Statement No. 5 of the Governmental Accounting Standards Board is contained in Section D.

Respectfully submitted,


Norman S. Losk

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SECTION A

**VALUATION RESULTS, COMMENTS
AND CONCLUSIONS**

Summary of Results **(Dollars in Thousands)**

	<u>July 1, 1995</u>	<u>July 1, 1996</u>
A. CONTRIBUTIONS		
1. Statutory Contributions - Chapter 353 % of Payroll	19.00%	19.00%
2. Required Contributions - Chapter 356 % of Payroll	16.42	15.50
3. Sufficiency (Deficiency) (A1-A2)	2.58	3.50
B. ACCRUED LIABILITY FUNDING RATIO		
1. Current Assets	\$1,385,901	\$1,633,010
2. Actuarial Accrued Liability	1,198,082	1,375,531
3. Funding Ratio (1/2)	115.7	118.7
C. PLAN PARTICIPANTS		
1. Active Members		
a. Number	7,380	7,680
b. Projected Annual Earnings	\$ 313,885	\$332,604
c. Average Annual Earnings	42,532	43,308
d. Average Age	38.4	38.3
e. Average Service	10.5	10.9
2. Others		
a. Service Retirants	1,435	1,520
b. Disability Retirants	146	183
c. Survivors	426	454
d. Deferred Retirants	250	260
e. Terminated Non-vested	<u>141</u>	<u>130</u>
f. Total	2,398	2,547

Purpose

The purpose of this valuation is to determine the financial status of the Fund, including the determination of the sufficiency of the Statutory Contributions to the Fund.

Contribution Rates

The Retirement Fund is supported by member contributions, employer contributions and investment income from Retirement Fund assets.

Contributions required under Chapter 356 are determined by the annual actuarial valuation and are sufficient to:

- (1) cover the actuarial costs allocated to the current year by the actuarial cost methods described in Section C (the normal cost); and
- (2) finance over a period of future years any actuarial costs not covered by present assets and anticipated future normal costs (unfunded actuarial accrued liability); and
- (3) provide an allowance for expenses for the current year.

Contribution requirements for the fiscal year beginning July 1, 1996 are shown on page A-3.

**Contributions Required To Finance Benefits of the Retirement Fund
For the Year Beginning July 1, 1996
(Dollars in Thousands)**

A. Required Contributions - Chapter 356

1. Normal Cost	
Retirement benefits	13.77%
Disability and survivor benefits	3.52
Termination benefits	
Deferred service pensions	1.68
Refunds of member contribs.	<u>0.54</u>
Total Normal Cost	19.51
2. Unfunded Actuarial Accrued Liability	\$(257,479)
3. Supplemental Contribution Amortization by July 1, 2020	(4.14)%
4. Administrative Expense	0.13
5. Total Required Contribution	15.50%

B. Statutory Contributions - Chapter 353

1. Employee Contributions	7.60%
2. Employer Contributions	<u>11.40</u>
3. Total	19.00%

C. Contribution Sufficiency (Deficiency)	3.50%
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In determining the Required Contribution, credit was taken for the excess of applicable assets over actuarial accrued liabilities.

Note: Projected Annual Payroll for the Fiscal Year Beginning on July 1, 1996 is \$332,604.

Determination of Unfunded Actuarial Accrued Liability (UAAL)
and Supplemental Contribution Rate
July 1, 1996
(Dollars in Thousands)

A. Determination Of Actuarial Accrued Liability (AAL)

1. Active Members	
a. Retirement Annuities	\$ 730,955
b. Disability Benefits	80,387
c. Survivors Benefits	61,329
d. Deferred Retirements	23,300
e. Refunds Due to Death or Withdrawal	<u>(5,775)</u>
f. Total	890,196
2. Deferred Retirements	14,732
3. Annuitants	<u>470,603</u>
4. Total	<u><u>\$1,375,531</u></u>

B. Determination Of Unfunded Actuarial Accrued Liability (UAAL)

1. AAL (A4)	\$1,375,531
2. Current Assets	<u>1,633,010</u>
3. UAAL (B1-B2)	<u><u>\$ (257,479)</u></u>

C. Determination Of Supplemental Contribution Rate

1. Present Value of Future Payrolls through the Amortization Date of July 1, 2020	\$6,219,062
2. Supplemental Contribution Rate (B3/C1)	(4.14)%

Experience Gains and Losses
Year Ending June 30, 1996
(Dollars in Thousands)

A.	UAAL at Beginning of Year	\$(187,819)
B.	Change due to Interest Requirements and Current Rate of Funding	
1.	Normal Cost and Expenses	\$ 61,270
2.	Contribution	(60,131)
3.	Interest on A, B1, and B2	<u>(13,312)</u>
4.	Total (B1 + B2 + B3)	(12,173)
C.	Expected UAAL at End of year (A + B4)	(199,992)
D.	Increase (Decrease) due to Actuarial Losses (Gains) Because of Experience Deviations from Expected	
1.	Salary Increases	(15,997)
2.	Investment Return	(79,986)
3.	MPRIF Mortality	4,421
4.	Mortality	2,077
5.	Other Items	31,998
6.	Total	(57,487)
E.	UAAL at End of Year Before Plan Amendments and Changes in Actuarial Assumptions (C + D)	(257,479)
F.	Change in Actuarial Accrued Liability Due to Plan Amendments	0
G.	Change in Actuarial Accrued Liability Due to Changes in Actuarial Assumptions	<u>0</u>
H.	UAAL at End of Year (E + F + G)	\$(<u>257,479</u>)

COMMENTS

CONTRIBUTION SUFFICIENCY

As shown on page A-3, the Police and Fire Fund has a contribution sufficiency of 3.50% of payroll, since the Statutory Contribution Rate of 19.00% is greater than the Required Contribution Rate of 15.50%. In calculating the Required Contribution this year, the negative unfunded actuarial accrued liability was recognized, resulting in a negative Supplemental Contribution Rate.

CHANGES IN ACTUARIAL ASSUMPTIONS

There were no changes in actuarial assumptions from last year.

CHANGES IN PLAN PROVISIONS

There were no changes in plan provisions from last year.

ACTUARIAL GAINS AND LOSSES

As shown on page A-5, the Fund experience produced a net actuarial gain of \$57,487,000 during the year ending June 30, 1996. Substantial gains from investment and salary experience accounted for most of these gains.

SECTION B

**SUMMARY OF BENEFIT PROVISIONS AND
VALUATION DATA SUBMITTED BY PERA**

Summary of Plan Provisions

(July 1, 1996)

Eligibility - All full-time, and certain part-time, police officers and firefighters who are not contributing to any other local retirement fund.

Contributions - Member: 7.6% of salary.
Employer: 11.4% of salary.

Member and Employer rates are subject to change depending on future funding sufficiency.

Allowable Service - Police and fire service during which member contributions were deducted. May also include certain leaves of absence and military service.

Salary - Includes amounts deducted for deferred compensation or supplemental retirement plans, net income from fees, and sick leave payments funded by the employer. Excludes lump sum payments at separation and Workers' Compensation benefits.

Average Salary - Average of the 5 highest successive years of salary. Average salary is based on all allowable service if less than 5 years.

Normal Retirement Benefit

Eligibility - Age 55 and 3 years of allowable service. Proportionate retirement annuity is available at age 65 and 1 year of allowable service.

Amount - 2.65% of average salary for each year of allowable service.

Early Retirement Benefit

Eligibility - Age 50 and 3 years of allowable service.

Amount - Normal retirement benefit based on allowable service and average salary at retirement date assuming augmentation to age 55 at 3% per year and actuarial reduction for each month the member is under age 55.

Form of Payment - Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are:

50% or 100% joint and survivor with bounceback feature without additional reduction (option canceled if member is pre-deceased by beneficiary).

Summary of Plan Provisions (Continued)

(July 1, 1996)

Benefit Increases - Benefits may be increased each January 1, depending on changes in the Consumer Price Index and on investment performance of the Minnesota Post Retirement Investment Fund (MPRIF). A benefit recipient who has been receiving a benefit for at least 12 full months as of June 30, will receive a full increase. Benefit recipients receiving benefits for at least 1 full month but less than 12 full months will receive a partial increase.

Members retired under law in effect before July 1, 1973 receive an additional lump sum payment each year. In 1989, this lump sum payment is the greater of \$25 times each full year of allowable service or the difference between \$400 times each full year of allowable service and the sum of the benefits paid from any Minnesota public pension plan plus cash payments from the Social Security Administration for the preceding fiscal year July 1, 1988 through June 30, 1989. In each following year, the lump sum payment will increase by the same percentage increase that is applied to regular annuities paid from MPRIF.

Duty Disability Benefit

Eligibility - Physically or mentally unable to perform duties as a police officer or firefighter as a direct result of an act of duty.

Amount - 53% of average salary plus 2.65% of average salary for each year in excess of 20 years of allowable service. The disability benefit is reduced to that amount which, when added to Workers' Compensation, does not exceed salary. Payments revert to retirement annuity at age 55.

Non-Duty Disability Benefit

Eligibility - Physically or mentally unable to perform duties as a police officer or firefighter with 1 year of allowable service.

Amount - Normal retirement benefit based on allowable service (minimum of 15 years) and average salary at disability without reduction for commencement before age 55. Payments revert to retirement annuity at age 55.

Form of Payment - Same as for retirement.

Benefit Increases - Adjusted by PERA to provide same increase as MPRIF.

Summary of Plan Provisions (Continued)

(July 1, 1996)

Retirement Benefits

Eligibility - Age 55.

Amount - Any optional annuity continues. Otherwise the larger of the disability benefit paid before age 55 or the normal retirement benefit available at age 55, or an actuarially equivalent optional annuity.

Benefit Increases - Same as for retirement.

Surviving Spouse Benefit

Eligibility - Active or disabled member with surviving spouse, married for at least 1 year unless death in the line of duty.

Amount - 50% of salary averaged over last 6 months. Benefit paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991.

Surviving Dependent - Child Benefit

Eligibility - Active or disabled member with dependent child.

Amount - 10% of salary averaged over last 6 months for each child. Family benefit minimum (including spouse's benefit) of 50% of salary and maximum of 70% of salary. Benefits paid until child marries, dies, or attains age 18. (Age 23 if full-time student).

Surviving Spouse Optional Annuity

Eligibility - Active or disabled member who dies before age 55, benefits commence when member would have been age 55 or as early as age 50 if qualified for early retirement except that benefits commence immediately if member had 30 years of service.

Amount - Survivor's payment of the 100% joint and survivor benefit the member could have elected if terminated. Alternatively, spouse may elect refund of deceased contributions with interest if there are no dependent children.

Benefit Increases - Adjusted by PERA to provide same increase as MPRIF.

Summary of Plan Provisions (Continued)

(July 1, 1996)

Refund Of Contributions

Eligibility - Termination of public service.

Amount - Member's contributions with 5% interest compounded annually if termination occurred before May 16, 1989, and 6% interest if termination occurred on or after May 16, 1989. A deferred annuity may be elected in lieu of a refund if 3 or more years of allowable service.

Deferred Annuity

Eligibility - 3 years of allowable service.

Amount - Benefit computed under law in effect at termination and increased by the following annual percentage: 0% before 7/1/71, 5% from 7/1/71 to 1/1/81, and 3% thereafter until January 1 of the year following attainment of age 55 and 5% thereafter until the annuity begins. Amount is payable as a normal or early retirement.

Accounting Balance Sheet
July 1, 1996
(Dollars in Thousands)

	<u>Market Value</u>	<u>Cost Value</u>
A. ASSETS		
1. Cash, Equivalents, Short-Term Securities	\$ 15,102	\$ 15,102
2. Investments		
a. Fixed Income	316,777	318,643
b. Equity	942,117	817,292
c. Real Estate	50,014	51,957
3. Equity in Minnesota Post-Retirement Investment Fund (MPRIF)	391,369	391,369
4. Other	<u>145</u>	<u>145</u>
B. TOTAL ASSETS	<u>\$1,715,524</u>	<u>\$1,594,508</u>
C. AMOUNTS CURRENTLY PAYABLE	\$ 1,837	\$ 1,837
D. ASSETS AVAILABLE FOR BENEFITS		
1. Member Reserves	\$ 212,498	\$ 212,498
2. Employer Reserves	1,109,820	988,804
3. MPRIF Reserves	391,369	391,369
4. Non-MPRIF Reserves	<u>0</u>	<u>0</u>
5. Total Assets Available for Benefits	<u>1,713,687</u>	<u>1,592,671</u>
E. TOTAL AMOUNTS CURRENTLY PAYABLE AND ASSETS AVAILABLE FOR BENEFITS	<u>\$1,715,524</u>	<u>\$1,594,508</u>
F. DETERMINATION OF ACTUARIAL VALUE OF ASSETS		
1. Cost Value of Assets Available for Benefits (D5)		\$1,592,671
2. Market Value (D5)	\$1,715,524	
3. Cost Value (D5)	<u>1,592,671</u>	
4. Market Over Cost (F2-F3)	\$ 121,016	
5. 1/3 of Market Over Cost (F4)/3		<u>40,339</u>
6. Actuarial Value of Assets (F1 + F5) (Same as "Current Assets")		<u>\$1,633,010</u>

Changes in Assets Available for Benefits
Year Ending June 30, 1996
(Dollars in Thousands)

	<u>Market Value</u>	<u>Cost Value</u>
A. ASSETS AVAILABLE AT BEGINNING OF PERIOD	\$1,445,345	\$1,356,179
B. OPERATING REVENUES		
1. Member Contributions	24,065	24,065
2. Employer Contributions	36,066	36,066
3. Investment Income	178,775	178,775
4. MPRIF Income	37,716	37,716
5. Net Realized Gain (Loss)	0	0
6. Other	158	159
7. Net Change in Unrealized Gain (Loss)	<u>31,851</u>	<u>0</u>
8. Total Revenue	308,631	276,781
C. OPERATING EXPENSES		
1. Service Retirements	31,384	31,384
2. Disability Benefits	3,201	3,201
3. Survivor Benefits	2,547	2,547
4. Refunds	846	846
5. Investment Fees	800	800
6. Expenses	400	400
7. Other	<u>111</u>	<u>111</u>
7. Total Disbursements	40,289	40,289
D. OTHER CHANGES IN RESERVES	0	0
E. ASSETS AVAILABLE AT END OF PERIOD	<u>\$1,713,687</u>	<u>\$1,592,671</u>

SECTION C

**ACTUARIAL FUNDING METHODS, ACTUARIAL
ASSUMPTIONS AND DEFINITIONS
OF TECHNICAL TERMS**

Actuarial Methods Used for the Valuation

Retirement and Casualty Benefits. Normal cost and the allocation of actuarial values between service rendered before and after the valuation date were determined using an individual entry-age normal cost projected benefit method having the following characteristics:

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

Credit was taken for assets in excess of the actuarial accrued liability.

Actuarial Assumptions

The actuary calculates contribution requirements and actuarial values of a retirement system by applying actuarial assumptions to the benefit provisions and people information of the system, using the actuarial methods described on page C-1.

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

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

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

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

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

Summary of Actuarial Assumptions and Methods

Interest:	Pre-Retirement: 8.5% per annum.
	Post-Retirement: 5% per annum.
Salary Increases:	Reported salary for prior fiscal year, with new-hires annualized, increased 6.5% to current fiscal year and 6.5% annual for each future year.
Mortality:	Pre-Retirement:
	Male - 1971 Group Annuity Mortality Table male rates projected to 1984 by Scale D.
	Female - 1971 Group Annuity Mortality Table female rates projected to 1984 by Scale D.
	Post-Retirement:
	Male - Same as above.
	Female - Same as above.
	Post-Disability:
	Male - 1965 RRB rates.
	Female - 1965 RRB rates.
Retirement Age:	Age 60 or, if over age 60, one year from the valuation date.
Separation:	Graded rates based on plan experience as of June 30, 1989. Rates are shown in rate table.
Disability:	Rates as shown in rate table.
Expenses:	Prior year expenses expressed as percentage of prior year payroll. (0.12% of payroll.)
Return of Contributions:	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
Family Composition:	85% of male members and 65% of female members are assumed to be married. Female is four years younger than male. Assume members have no children.

Summary of Actuarial Assumptions and Methods

Social Security:	NA
Benefit Increases After Retirement:	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumption.
Special Consideration:	Married members assumed to elect subsidized joint and survivor form of annuity as follows: Males - 40% elect 50% J & S option; 45% elect 100% J & S option; Females - 15% elect 50% J & S option; 15% elect 100% J & S option;
Actuarial Cost Method:	Entry-age normal actuarial cost method with normal costs expressed as a level percentage of earnings. Under this method actuarial gains (losses) reduce (increase) the unfunded actuarial accrued liability.
Asset Valuation Method:	Cost Value plus one-third unrealized gains or losses.
Payment on the Unfunded Actuarial Accrued Liability:	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

**Separations Expressed as The
Number of Occurrences Per 10,000**

Age	Death		Withdrawal		Disability		Retirement	
	Male	Female	Male	Female	Male	Female	Male	Female
20	5	2	859	869	11	11	0	0
25	6	3	463	463	13	13	0	0
30	7	4	280	280	16	16	0	0
35	10	5	183	183	19	19	0	0
40	15	8	126	126	26	26	0	0
45	27	12	91	91	36	36	0	0
50	49	18	50	50	69	69	0	0
55	78	27	11	11	135	135	0	0
60	121	46	0	0	0	0	10,000	10,000
65	195	81	0	0	0	0	0	0
70	334	140	0	0	0	0	0	0

GLOSSARY

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

Actuarial Assumptions. Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

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

Actuarial Equivalent. A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

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

Actuarial Gain (Loss). The difference between actual experience and actuarial assumption anticipated experience during the period between two actuarial valuation dates.

Actuarial Present Value. The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

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

Normal Cost. The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.

Pension Benefit Obligation. A standardized disclosure measure of the present value of pension benefits, adjusted for the effects of projected salary increases, estimated to be payable in the future as a result of employee service to date.

Unfunded Actuarial Accrued Liability. The difference between actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded actuarial liability" or "unfunded accrued liability."

SECTION D

**THE PENSION BENEFIT OBLIGATION
REQUIRED BY STATEMENT NO. 5 OF
THE GOVERNMENTAL ACCOUNTING
STANDARDS BOARD**

Pension Benefit Obligation

The amount shown below as the "pension benefit obligation" is a standardized disclosure measure of the present value of pension benefits, adjusted for the effects of projected salary increases, estimated to be payable in the future as a result of employee service to date. The measure is the actuarial present value of credited projected benefits and is intended to (i) help users assess the plan's funding status on a going-concern basis, (ii) assess progress being made in accumulating sufficient assets to pay benefits when due, and (iii) allow for comparisons among public employee retirement plans. The measure is independent of the actuarial funding method used to determine contributions to the plan.

The pension benefit obligation was determined as part of an actuarial valuation of the plan as of July 1, 1996. Significant actuarial assumptions used in determining the pension benefit obligation include (a) a rate of return of 8.5% per year pre-retirement and 5% per year post-retirement, compounded annually, (b) projected salary increases of 6.5% per year compounded annually, and (c) the assumption that benefits will not increase after retirement.

At July 1, 1996, the assets in excess of the pension benefit obligation were \$339,553,000, determined as follows:

Pension Benefit Obligation:

Retirees and beneficiaries currently receiving benefits	\$ 470,603,000
Terminated employees not yet receiving benefits	14,732,000
Current employees --	
Accumulated employee contributions including allocated investment income	205,302,000
Employer financed - Vested	536,307,000
Employer financed - Non-vested	<u>326,174,000</u>
Total Pension Benefit Obligation	\$1,253,118,000
Net assets available for benefits, at cost	<u>1,592,671,000</u>
Assets in excess of the Pension Benefit Obligation	\$ 339,553,000
Funded Ratio	127.1%

There were no changes in actuarial assumptions or plan provisions during the year.