WILLIAM M.
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Public Employees Police and Fire Fund of Minnesota

Actuarial Valuation Report as of July 1, 1998

March 1999

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Contents

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Highlights

This report has been prepared by William M. Mercer, Incorporated for the Public Employees Retirement Association of Minnesota (PERA) to:

- present the results of a valuation of the Public Employees Police and Fire Fund as of July 1, 1998;
- review experience in the Fund for the year ended June 30, 1998; and
- provide the funded status as of June 30, 1998, and the required contribution and sufficiency (deficiency) of the Fund as of July 1, 1998.

Summary of Principal Valuation Results

A summary of principal valuation results from the current valuation follows.

	Actuarial Valuation as of July 1, 1998 *(dollars in thousands)*
Contributions	
Statutory Contributions *Percentage of Compensation*	19.00%
Required Contributions *Percentage of Compensation*	12.45%
Contribution Sufficiency (Deficiency)	6.55%

Assets and Actuarial Present Values	
Market Value of Assets	$ 2,519,886
Actuarial Value of Assets	$ 2,337,313
Unfunded Actuarial Accrued Liability	$ (569,483)
Actuarial Accrued Liability	$ 1,767,830
Accrued Liability Funding Ratio	132.21%
Normal Cost	$ 83,286
Percentage of Compensation	20.86%

Summary of Data	
Number of Participants in Valuation	
Active Participants	8,499
Participants with Deferred Benefits	314
Terminated Other Non-Vested	194
Participants Receiving Benefits	2,526
Total	**11,533**

Active Participant Statistics	
Total Compensation (annualized 1997/1998 compensation)	$ 374,636
Average Compensation	$ 44,081
Average Age	38.2

Discussion

Contributions

The statutory contributions (as a percent of pay) as of July 1, 1998 are as follows:

7.60%	Employee
11.40%	Employer
19.00%	

Current law (Chapter 353.65) calls for a rate reduction in 1999 due to the well-funded nature of the Fund. We expect that both employee and employer rates will be reduced to maintain the 40%/60% ratio of responsibility.

Required contributions, as defined in Chapter 356, consist of normal cost, an amortization payment (or credit) on the unfunded actuarial accrued liability, and an expense allowance. Required contributions (as a percent of pay) as of July 1, 1998 are as follows:

Normal Cost	20.86%
Amortization	(8.55)%
Expenses	.14%
Total	12.45%

The normal cost rate decreased from 21.65% to 20.86%, and the amortization of the unfunded actuarial accrued liability decreased from (6.57)% to (8.55)% due to various gains and losses. The allowance for expenses increased from .13% to .14% in recognition of actual experience.

Since the statutory contributions exceed required contributions, the plan has a sufficiency of 6.55% of pay. This is an improvement since July 1, 1997, when statutory contributions were sufficient by 3.79% of pay.

Gains and Losses

Experience gains and losses provide a comparison of actual to expected experience. Gain and loss analysis is done for both assets and liabilities. Greater than expected investment return generated a substantial asset gain as of July 1, 1998. On the liability side, the fund experienced a gain due to salary increases being less than expected, and a small loss due to mortality being less than expected. The net gain was partially offset by miscellaneous losses due to new participants and turnover.

More detailed gain and loss information can be found in Section 1.2.

Assumption Changes

There have been no assumption changes since July 1, 1997.

Plan Changes

There were no significant plan changes since July 1, 1997 that impacted this valuation.

Certification

The actuarial valuation required for the Public Employees Police and Fire Fund has been prepared as of June 30, 1998 by William M. Mercer, Incorporated. In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to determine a sound value for the Association's assets, liability and future contribution requirements. Our calculations are based upon member data and unaudited financial information provided to us by the Association's staff. This data has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's data.

The contribution requirements are determined as a percentage of payroll. Employer rates provide for both normal cost and a contribution to amortize the unfunded actuarial accrued liability. The amortization period for the unfunded actuarial accrued liability is 22 years as of July 1, 1998. The contribution to the unfunded actuarial accrued liability is calculated to remain as a level percentage of future payroll (including projected payroll for future members). Payroll is assumed to increase 6% per year.

There are no changes in the actuarial assumptions used to determine the actuarial present value of benefits in the current valuation.

The current assumptions and methods, when applied in combination, fairly represent past and anticipated future experience of the Fund.

Future contribution requirements may differ from those determined in the valuation because of:

(1) differences between actual experience and anticipated experience;
(2) changes in actuarial assumptions or methods;
(3) changes in statutory provisions; and
(4) differences between the contribution rates determined by the valuation and those adopted.

Drew A. James, F.S.A.	3/19/99 Date
Bonita J. Wurst Bonita J. Wurst	3/19/99 Date

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Section 1: Funding Results

Section 1.1 Determination of Unfunded Actuarial Accrued Liability.

Section 1.2 Changes in Unfunded Actuarial Accrued Liability.

Section 1.3 Determination of Contribution Sufficiency (Deficiency).

Determination Of Unfunded Actuarial Accrued Liability (UAAL) And Supplemental Contribution Rate

	Actuarial Present Value of Projected Benefits	Actuarial Present Value of Future Normal Costs	Actuarial Accrued Liability
1. Determination of Actuarial Accrued Liability (AAL)	*(dollars in thousands)*		
a. Active Members			
1. Retirement Annuities	$ 1,719,811	$ 759,562	$ 960,249
2. Disability Benefits	$ 159,913	$ 98,312	$ 61,601
3. Survivor's Benefit	$ 66,224	$ 41,041	$ 25,183
4. Deferred Retirements	$ 82,116	$ 69,015	$ 13,101
5. Refunds Due to Death or Withdrawal	$ 2,876	$ 5,156	$ (2,280)
6. Total	**$ 2,030,940**	**$ 973,085**	**$ 1,057,855**
b. Deferred Retirements With Future Augmentation	$ 24,080	$ 0	$ 24,080
c. Former Members Without Vested Rights	289	0	289
d. Annuitants	$ 685,606	$ 0	$ 685,606
e. Total	**$ 2,740,915**	**$ 973,085**	**$ 1,767,830**
2. Determination of Unfunded Actuarial Accrued Liability (UAAL)			
a. AAL			$ 1,767,830
b. Actuarial Value of Assets			$ 2,337,313
c. UAAL			$ (569,483)
3. Determination of Supplemental Contribution Rate			
a. Present Value of Future Payrolls Through the Amortization Date of July 1, 2020			$ 6,657,153
b. Supplemental Contribution Rate (2c/3a)			$ (8.55%)

Changes in Unfunded Actuarial Accrued Liability (UAAL)

	Year Ending June 30, 1998 *(dollars in thousands)*
1. UAAL at Beginning of Year	$ (418,152)
2. Change Due to Interest Requirements and Current Rate of Funding	
a. Normal Cost and Expenses	$ 80,500
b. Contribution	(71,339)
c. Interest on 1, 2a, and 2b	(35,154)
d. Total	**$ (25,993)**
3. Expected UAAL at End of Year (1+2d)	$ (444,145)
4. Increase (Decrease) Due to Actuarial Losses (Gains) Because of Experience Deviations From Expected	
a. Salary Increases	$ (17,451)
b. Investment Return	(147,834)
c. Mortality	4,159
d. Other Items	35,788
e. Total	**(125,338)**
5. UAAL At End of Year Before Plan Amendments and Changes in Actuarial Assumption (3+4e)	$ (569,483)
6. Change in Actuarial Accrued Liability Due to Plan Amendments	0
7. Change in Actuarial Accrued Liability Due to Changes in Actuarial Assumptions	0
8. UAAL at End of Year (5+6+7)	**$ (569,483)**

Determination of Contribution Sufficiency (Deficiency)

	July 1, 1998 (dollars in thousands)	
	Percent of Payroll	Dollar Amount
1. Statutory Contributions - Chapter 353		
a. Employee Contributions	7.60%	$ 30,362
b. Employer Contributions	11.40%	45,543
c. Total	**19.00%**	**$ 75,905**
2. Required Contributions - Chapter 356		
a. Normal Cost		
1. Retirement Benefits	16.30%	$ 65,140
2. Disability Benefits	2.13%	8,504
3. Survivors	.91%	3,630
4. Deferred Retirement Benefits	1.41%	5,629
5. Refunds Due to Death or Withdrawal	.11%	423
6. **Total**	**20.86%**	**$ 83,326**
b. Supplemental Contribution Amortization by July 1, 2020 of UAAL	(8.55%)	$ (34,147)
c. Allowance for Expenses	.14%	$ 559
d. Total	**12.45%**	**$ 49,738**
3. Contribution Sufficiency (Deficiency) [1c-2d]	6.55%	$ 26,167

Note: Projected Annual Payroll for Fiscal Year Beginning on July 1, 1998 is $399,499.

Section 2: Plan Assets

Section 2.1 Summary of Assets

Section 2.2 Reconciliation of Assets

Section 2.3 Actuarial Value of Assets

Summary of Assets

		Market Value
1. Assets in Trust		*(dollars in thousands)*
a. Cash, Equivalents, Short-term Securities	$	19,665
b. Fixed Income		450,170
c. Equity		1,397,211
d. Real Estate		72,796
e. Equity in MPRIF		584,050
f. Other		0
Subtotal	**$**	**2,523,892**
2. Assets Receivable	$	139
3. Liabilities	$	(4,145)
4. Net Assets Held in Trust for Pension Benefits		
a. MPRIF Reserves	$	584,050
b. Member Reserves		245,499
c. Other Non-MPRIF Reserves		1,690,337
d. Total Assets Available for Benefits	**$**	**2,519,886**

Reconciliation of Assets

	Year Ending June 30, 1998
	Market Value
	(dollars in thousands)
1. Assets Available at Beginning of Period	$ 2,075,157
2. Additions	
a. Member Contributions	$ 28,552
b. Employer Contributions	42,786
c. Contributions from other Sources	0
d. MPRIF Income	74,117
e. Net Investment Income	
1. Interest and Dividends	$ 201,708
2. Net Realized Gain (Losses)	34,772
3. Net Change in Unrealized Gain (Loss)	123,079
4. Investment Expenses	(2,608)
5. Net Subtotal	$ 369,951
f. Other	193
g. Total Additions	**$ 502,599**
3. Disbursements	
a. Service Retirements paid from MPRIF	$ 46,572
b. Service Retirements paid from plan assets	277
c. Disability Benefits	5,888
d. Survivor Benefits	3,297
e. Refunds	1,181
f. Administrative Expenses	525
g. Other	130
h. Total Disbursements	**$ 57,870**
4. Other Changes in Reserves	$ 0
5. Assets Available at End of Period	**$ 2,519,886**

Actuarial Value of Assets

		July 1, 1998
1. Determination of Actuarial Value of Assets		*(dollars in thousands)*
a.	Cost Value of Assets	$ 2,246,026
b.	Market Value	2,519,886
c.	Market Over Cost: (b) – (a)	273,860
d.	One-third of Market Over Cost: (c)/3	91,287
e.	Actuarial Value of Assets (a) + (d)	$ 2,337,313

Section 3: Basis of Valuation

This section presents and describes the basis of the valuation. The census of participants, actuarial basis and provisions of the Plan are the foundation of the valuation, since these are the present facts on which the projection of benefit payments will depend. The valuation is based on the premise that the Plan will continue in existence.

Section 3.1 The participant data used for the actuarial valuation.

Section 3.2 The actuarial funding method, procedures and actuarial assumptions.

Section 3.3 The plan provisions valued in the actuarial valuation.

Plan Participants

A. Count of Active Participants

	Years of Service									
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
Under 20	78	1								79
20 - 24	223									223
25 - 29	1,084	240								1,324
30 - 34	638	755	276							1,669
35 - 39	308	469	662	233	1					1,673
40 - 44	140	204	349	463	225					1,381
45 - 49	75	76	151	253	464	164				1,183
50 - 54	33	34	60	77	200	271	37			712
55 – 59	15	18	16	29	31	44	30	4		187
60 - 64	3	9	12	2	10	12	4	1	1	54
65 - 69	2	1	4	1	1	1	3			13
70 - 74		1								1
75+										0
Total	2,599	1,808	1,530	1,058	932	492	74	5	1	8,499

B. Participants in Pay Status

Age	Participants Receiving Benefits	
	Count	Total Monthly Benefit
Under 40	46	$ 78,526
40–44	41	78,736
45–49	84	168,377
50–54	255	548,047
55–59	484	1,217,834
60–64	437	978,755
65–69	387	800,956
70–74	340	632,670
75–79	210	339,566
80–84	152	191,961
85–89	56	42,455
90–94	23	14,719
95–99	11	6,200
Total	**2,526**	**$ 5,098,802**

Actuarial Basis

A. Individual Entry Age Normal Method

Liabilities and contributions shown in this report are computed using the Individual Entry Age Normal method of funding.

The objective under this method is to fund each participant's benefits under the Plan as payments which are level as a percentage of salary, starting at original participation date (or employment date), and continuing until the assumed retirement, termination, disability or death.

At the time the funding method is introduced, there will be a liability which represents the contributions which would have been accumulated if this method of funding had always been used. The difference between this liability and the assets (if any) which are held in the fund is the unfunded actuarial accrued liability (UAAL), which is typically funded over a chosen period in accordance with an amortization schedule. If the UAAL is negative, it is still amortized and serves as a credit against future normal cost.

A detailed description of the calculation follows:

- The **normal cost** for each active participant under the assumed retirement age is determined by applying to earnings the level percentage of salary which, if contributed each year from date of entry into the Plan until the assumed retirement (termination, disability or death) date, is sufficient to provide the full value of the benefits expected to be payable.

- The present value of future normal costs is the total of the discounted values of all active participants' normal costs, assuming these to be paid in each case from the valuation date until retirement (termination, disability or death) date.

- The **present value of projected benefits** is calculated as the value of all benefit payments expected to be paid to the Plan's current participants, including active and retired members, beneficiaries, and terminated members with vested rights.

- The **accrued liability** is the excess of the present value of projected benefits over the present value of future normal costs.

- The **unfunded actuarial accrued liability (UAAL)** is the excess of the accrued liability over the assets of the fund, and represents that part of the accrued liability which has not been funded by accumulated past contributions.

- The **supplemental contribution amortization** is a level percent of pay over a stipulated number of years which is required to amortize the unfunded liability.

B. Asset Valuation Method

The Actuarial Asset Value is equal to the Cost Value plus one-third of the difference between Market and Cost Value of the assets.

C. Actuarial Assumptions

The following assumptions were used in valuing the liabilities and benefits under the Plan

Economic	
Investment Return	Pre-Retirement: 8.5% Post-Retirement: 6.0%
Salary Increases	Annual increases according to table on next page.
Benefit Increases after Retirement	Payment of earnings in post-retirement fund in excess of 6% post-retirement assumption.

Other	
Mortality	Pre-Retirement: 1983 Group Annuity Mortality for males and females set back 5 years. Post-Retirement: 1983 Group Annuity Mortality for males and females. Post-Disability: 1965 RRB rates for males and females.
Withdrawal	Refer to Tables on following pages
Expenses	Prior year expenses expressed as a percentage of prior year payroll
Disability	Refer to Tables on following pages
Retirement	Refer to Tables on following pages
Percentage Married at Retirement	Males .... 85% Females 65%
Age Difference	Males are assumed to be four years older than female spouses
Family	Members are assumed to have no children
Benefit Election	Married Males • 40% elect 50% J & S • 45% elect 100% J & S Married Females • 15% elect 50% J & S • 15% elect 100% J & S

C. Actuarial Assumptions *(continued)*

TABLE OF SAMPLE SALARY INCREASES	
Age	**Increase**
25	9.5%
30	8.0%
35	7.0%
40	6.0%
45	5.5%
50	5.25%
55+	5.25%

TABLE OF SAMPLE DISABILITY RATES	
Age	**Males and Females**
20	.11%
25	.13%
30	.16%
35	.19%
40	.26%
45	.36%
50	.69%
55	1.35%
60+	0.0%

C. Actuarial Assumptions *(continued)*

TABLE OF SAMPLE MORTALITY RATES		
1983 Group Annuity Mortality		
Attained Age	Males	Females
20	.033%	.014%
25	.038%	.019%
30	.046%	.025%
35	.061%	.034%
40	.086%	.048%
45	.124%	.067%
50	.218%	.101%
55	.391%	.165%
60	.613%	.254%
65	.916%	.424%
70	1.559%	.706%

TABLE OF SAMPLE WITHDRAWAL RATES	
Attained Age	Males and Females
20	8.59%
25	4.63%
30	2.80%
35	1.83%
40	1.26%
45	.91%
50	.50%
55+	.11%

TABLE OF RETIREMENT RATES	
Attained Age	Males and Females
50-54	5%
55	30%
56-59	10%
60-61	20%
62-69	50%
70	100%

Summary of Plan Provisions

Eligibility	All full-time and certain part-time, police officers and fire fighters, who are not contributing to any other local retirement fund.
Contributions	
Member	7.6% of salary. Beginning July 1, 1994, automatically adjusted downward after four continuous years of sufficiencies at or above .5% of salary.
Employer	11.4% of salary. Beginning July 1, 1994, automatically adjusted downward after four continuous years of sufficiencies at or above .5% of salary.
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 annual leave and sick leave payments and Workers' Compensation benefits.
Average Salary	Average of the five highest successive years of salary. Average salary is based on all Allowable Service if less than five years.
Normal Retirement Benefit	
Eligibility	Age 55 and three years of Allowable Service. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.
Amount	3.0% of Average Salary for each year of Allowable Service.
Early Retirement Benefit	
Eligibility	Age 50 and three years of Allowable Service
Amount	Normal Retirement Benefit based on Allowable Service and Average Salary at retirement date and a 0.2%* 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: 25%, 50%, 75% or 100% joint and survivor with bounce back feature without additional reduction.

* Effective July 1, 1996. Prior to that date, an actuarial reduction is used assuming augmentation of the normal benefit to age 55 at 3% per year.

Summary of Plan Provisions *(Continued)*

Benefit Increases	Benefits may be increased each January 1 depending on the 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 one 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 calendar 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 fire fighter as a direct result of an act of duty.
Amount	60% of Average Salary plus 3.0% 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 and actual earnings, does not exceed salary or 125% of pay for an employee at same position. Payments change to retirement annuity at age 65. If a Member became disabled prior to July 1, 1997 but did not commence their benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in post-retirement interest rates from 5% to 6%.
Non-Duty Disability Benefits	
Eligibility	Physically or mentally unable to perform duties as a police officer or fire fighter with one 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 change to retirement annuity at age 65. At age 55, 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. If a Member became disabled prior to July 1, 1997 but did not commence their benefit before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in post-retirement interest rates from 5% to 6%.

Summary of Plan Provisions *(Continued)*

Form of Payment	Same as for retirement.
Benefit Increases	Same as for retirement.
Surviving Spouse Benefit	
Eligibility	Active or Disabled Member with surviving spouse, married for at least one year unless death in the line of duty.
Amount	50% of salary averaged over last six months. Benefit paid until spouse's death but no payments while spouse is remarried prior to July 1, 1991. If a Member became deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5% to 6%.
Surviving Dependent Child Benefit	
Eligibility	Active or Disabled Member with dependent child.
Amount	10% of salary averaged over last six 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). If a Member became deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5% to 6%.

Summary of Plan Provisions *(Continued)*

Surviving Spouse Optional Annuity	
Eligibility	Active or Disabled Member 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's contributions with interest if there are no dependent children. If a Member became deceased prior to July 1, 1997 and the beneficiary was not eligible to commence their survivor benefits before July 1, 1997, the benefit payable is calculated under the laws in effect before July 1, 1997, and an actuarial increase shall be made for the change in the post-retirement interest rates from 5% to 6%.
Benefit Increases	Adjusted by PERA to provide same increases as MPRIF.
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 three or more years of Allowable Service.
Deferred Annuity	
Eligibility	Three years of Allowable Service.
Amount	Benefit computed under law in effect at termination and increased by the following percentage compounded annually: 0% before 7/1/71; 5% from 7/1/71 to 1/1/81; and 3% thereafter until January of the year following attainment of age 55 and 5% thereafter until the annuity begins. Amount is payable as a normal or early retirement. If a Member terminated employment prior to July 1, 1997 but was not eligible to commence their pension before July 1, 1997, an actuarial increase shall be made for the change in the post-retirement interest rates from 5% to 6%.

Summary of Significant Changes in Benefits

No significant changes in benefits were recognized for this valuation.