

December 10, 2002

**Experience Study**  
**1997- 2001**  
**Public Employees Police and Fire**  
**Fund of Minnesota**

**MERCER**

Human Resource Consulting

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## Introduction

This report presents the results of an analysis of the experience of the Public Employees Police and Fire Fund of Minnesota over the four-year period from July 1, 1997 to June 30, 2001.

This report is divided into three sections. Section 1 describes the plan participants included in the study, the actuarial methods employed and the current actuarial assumptions used to perform the annual valuation. Section 2 details the results of the study separately for each assumption. Section 3 summarizes the results, and presents conclusions to the Board.

It is our opinion that this report is, to the best of our knowledge, complete and accurate. The actuarial methods are applied on an objective basis and are appropriate for the purpose at hand. Therefore, the information contained in this report fully and fairly discloses the experience of Public Employees Police and Fire Fund of Minnesota over the period July 1, 1997 to June 30, 2001.

The undersigned are available to provide further information or answer any questions with respect to this report.

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## Section I: Basis of Study

In this section, the basis of the study is presented and described.

**Section 1.1** Describes the sources of membership data used in the study.

**Section 1.2** Describes the actuarial methods employed in the study.

**Section 1.3** Summarizes the current set of actuarial assumptions used in the annual valuation of the Fund.

## Section 1.1

### Plan Participants

The individuals included in this study were members of the Public Employees Police and Fire Fund during the period from July 1, 1997 through June 30, 2001.

Census information gathered for the last five actuarial valuations formed the basis for this study. This census information and the current actuarial assumptions described in Section 1.3 were used to determine the expected number of terminations, deaths, withdrawals, disabilities and retirements during the period under consideration.

The actual terminations, deaths, disabilities, withdrawals and retirements were accumulated on an annual basis from records used in each actuarial valuation. The records include specific information received from the Public Employees Retirement Association office in the preparation of each actuarial valuation. This information was reviewed for accuracy and consistency.

## Section 1.2

### Actuarial Methodology

For any retirement system, actuarial assumptions employed are intended to be reasonable estimates of future expected events that could affect the amount and timing of benefits and the assets accumulated. These assumptions, along with an actuarial cost method, the employee census data and the provisions outlined in the statutes are used to determine the overall funding requirements for the Fund. The true cost to the Fund over time will be the actual benefit payments and expenses required by the statutes for the participant group covered under the Fund, less the investment return realized on trust assets. To the extent the actual experience deviates from the assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future contribution levels. The actuarial assumptions should be reasonable and should be reviewed periodically to insure that they remain appropriate. The actuarial cost method used to determine contributions, however, automatically adjusts over time for differences between what is assumed and the true experience under the plan.

### Decrements

For the withdrawal, mortality, disability and retirement studies, the following procedure was used. Based upon the current rates of decrement described in Section 1.3 and the census information described in Section 1.1, expected numbers of withdrawals, deaths, disabilities and retirements were determined for each age and then accumulated into five-year age groupings, (except for retirement, which was analyzed at distinct ages). The expected occurrences were then compared to the actual number of occurrences over the period under investigation.

### Salary Increases

For the salary increase study, fiscal year pay for each year from 1997 through 2001 was used. For each participant who was active on two consecutive valuation dates, with at least two years of service, we calculated the salary increase as a percentage of the prior year's pay. These actual salary increases were then compared to the expected salary increases over the period of investigation, in 5-year age and service groupings.

For purposes of comparing actual salary increases to assumed salary increases, we excluded all individuals whose pay increased or decreased 20% or more. While this was a relatively small group, their salary increases distorted the experience of the overall group of continuing active participants.

## Section 1.3

## Actuarial Assumptions

<i>Economic</i>	
<i>Investment Return</i>	Pre-Retirement: 8.5% Post-Retirement: 6.0%
<i>Salary Increases</i>	Annual increases according to table on next page.
<i>Benefit Increases after Retirement</i>	Payment of earnings in post-retirement fund in excess of 6% post-retirement assumption.
<i>Other</i>	
<i>Mortality</i>	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.
<i>Withdrawal</i>	Refer to Tables on following pages
<i>Expenses</i>	Prior year expenses expressed as a percentage of prior year payroll
<i>Disability</i>	Refer to Tables on following pages
<i>Retirement</i>	Refer to Tables on following pages
<i>Percentage Married at Retirement</i>	Males 85% Females 65%
<i>Age Difference</i>	Males are assumed to be four years older than female spouses
<i>Family</i>	Members are assumed to have no children
<i>Benefit Election</i>	Married Males 40% elect 50% J & S 45% elect 100% J & S Married Females 15% elect 50% J & S 15% elect 100% J & S

Section 1.3

**Actuarial Assumptions** (continued)

**TABLE OF SAMPLE SALARY INCREASES**

<u>Age</u>	<u>Increase</u>
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**

<u>Age</u>	<u>Males and Females</u>
20	.11%
25	.13%
30	.16%
35	.19%
40	.26%
45	.36%
50	.69%
55	1.35%
60+	0.0%



## Section 1.3

## Actuarial Assumptions (continued)

TABLE OF SAMPLE MORTALITY RATES

1983 Group Annuity Mortality		
<u>Attained Age</u>	<u>Males</u>	<u>Females</u>
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

<u>Attained Age</u>	<u>Males and Females</u>
20	8.59%
25	4.63%
30	2.80%
35	1.83%
40	1.26%
45	.91%
50	.50%
55+	.11%

Section 1.3

Actuarial Assumptions (continued)

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%

TABLE OF EARLY RETIREMENT RATES

Attained Age	Rate
50	5%
55	30%
60	10%
65	20%
70	50%
75	100%

## Section 2: Results of Study

This section presents the results of the study.

**Section 2.1** Withdrawal

**Section 2.2** Retirement

**Section 2.3** Disability

**Section 2.4** Active Mortality

**Section 2.5** Retiree and Beneficiary Mortality

**Section 2.6** Disability Retiree Mortality

**Section 2.7** Salary Increases

**Section 2.8** Investment Return

## Section 2.1

### Withdrawal

#### Basis of Analysis

The withdrawal rates specify the assumed probability that a given employee will leave employment within the following year for reasons other than retirement, death or disability. For most employers, these probabilities are much higher for employees at younger ages with relatively few years of service and decline quickly as service and age increases.

The Public Employees Police and Fire Fund uses age-related termination rates that trend downward as age increases.

#### Historical Data

During the four years from 1997 through 2001, the actual number of withdrawals was lower than expected (595 actual versus 663 expected). For members with less than 3 years of service, the actual number of withdrawals was higher than assumed, (275 actual versus 244 expected). However, for members with 3 or more years of service, actual withdrawals were just 76% of expected, (320 actual versus 419 expected).

**Section 2.1**

**1997-2001 Terminations**

Age	Less than 3 years			3+ years			Total		
	Actual	Expected	Actual/Expected	Actual	Expected	Actual/Expected	Actual	Expected	Actual/Expected
20-24	27	56.84	48%	0	1.56	0%	27	58.4	46%
25-29	118	125.26	94%	37	77.15	48%	155	202.41	77%
30-34	57	42.91	133%	72	125.49	57%	129	168.4	77%
35-39	39	13.27	294%	66	97.15	68%	105	110.42	95%
40-44	12	3.71	323%	71	63.32	112%	83	67.03	124%
45-49	18	1.73	1040%	41	41.82	98%	59	43.55	135%
50-54	2	0.29	690%	18	11.87	152%	20	12.16	164%
55-59	2	0		12	0.6	2000%	14	0.6	2333%
60-64	0	0		2	0				
65+	0	0		1	0				
	275	244.01	113%	320	418.96	76%	595	662.97	90%

Section 2.1

2000-2001 Terminations

Age	Actual	Expected	Actual/Expected
20-24	5	16.80	30%
25-29	32	51.94	62%
30-34	38	46.56	82%
35-39	30	29.59	101%
40-44	17	17.76	96%
45-49	14	11.71	120%
50-54	10	3.15	317%
55-59	5	0.13	3846%
60-64	0	0.00	
65+	1	0.00	
	152	177.64	86%

Section 2.1

1999-2000 Terminations

Age	Actual	Expected	Actual/Expected
20-24	11	15.26	72%
25-29	36	51.83	69%
30-34	35	43.25	81%
35-39	20	28.28	71%
40-44	22	17.29	127%
45-49	17	11.52	148%
50-54	4	3.33	120%
55-59	2	0.16	1250%
60-64	0	0.00	
65+	0	0.00	
	147	170.92	86%

Section 2.1

1998-1999 Terminations

Age	Actual	Expected	Actual/Expected
20-24	5	14.29	35%
25-29	50	50.33	99%
30-34	34	40.51	84%
35-39	29	27.30	106%
40-44	20	16.88	118%
45-49	18	11.31	159%
50-54	0	3.31	0%
55-59	3	0.17	1765%
60-64	0	0.00	
65+	0	0.00	
	159	164.10	97%



## Section 2.1

## 1997-1998 Terminations

Age	Actual	Expected	Actual/Expected
20-24	6	12.05	50%
25-29	37	48.31	77%
30-34	22	38.08	58%
35-39	26	25.25	103%
40-44	24	15.10	159%
45-49	10	9.01	111%
50-54	6	2.37	253%
55-59	4	0.14	2857%
60-64	2	0.00	
65+	0	0.00	
	137	150.31	91%

## Section 2.2

### Retirement

#### Basis of Analysis

The retirement rates specify the assumed probability that a given employee will retire within the following year. For most plans, these probabilities are higher for older employees or employees with more years of service. Accordingly, retirement rates will usually vary by age or service. In addition, probabilities of retirement are usually higher if employees are eligible to receive full unreduced benefits prior to normal retirement age. Currently, The Public Employees Police and Fire Fund uses retirement rates that vary by age.

#### Historical Data

During the four years from 1997 through 2001, the actual number of retirements was significantly higher than expected (959 actual versus 495 expected). The largest discrepancy occurred in the under age 55 group.

The number of early retirements increased substantially after July 1, 1999. On that date, two events occurred. The penalty for early retirement was reduced, and the Police and Fire Consolidation Fund merged into the Public Employees Police and Fire Fund.

These events appear to have had an affect on overall retirement patterns.

## Section 2.2

## 1997-2001 Retirements

Age	Actual	Expected	Actual Percent	Expected Percent	Actual/ Expected
50	121	50.1	12.08%	5.00%	242%
51	98	44.52	11.01%	5.00%	220%
52	98	39.25	12.48%	5.00%	250%
53	116	32.87	17.65%	5.00%	353%
54	105	25.53	20.56%	5.00%	411%
55	148	120.9	36.72%	30.00%	122%
56	84	24.62	34.12%	10.00%	341%
57	33	15.71	21.01%	10.00%	210%
58	43	13.38	32.14%	10.00%	321%
59	27	9.3	29.03%	10.00%	290%
60	27	15.33	35.23%	20.00%	176%
61	10	10.68	18.73%	20.00%	94%
62	15	22.58	33.22%	50.00%	66%
63	8	17.94	22.30%	50.00%	45%
64	7	14.67	23.86%	50.00%	48%
65	11	13.51	40.71%	50.00%	81%
66	4	6.33	31.60%	50.00%	63%
67	3	3.34	44.91%	50.00%	90%
68	1	1.02	49.02%	50.00%	98%
69	0	1.49	0.00%	50.00%	0%
70+	0	12.32	0.00%	100.00%	0%
	959	495.39			194%

## Section 2.2

## 2000-2001 Retirements

Age	Actual	Expected	Actual Percent	Expected Percent	Actual/ Expected
50	46	13.48	17.07%	5.00%	341%
51	42	11.72	17.91%	5.00%	358%
52	18	9.35	9.62%	5.00%	193%
53	30	9.07	16.54%	5.00%	331%
54	31	7.19	21.56%	5.00%	431%
55	27	25.33	31.98%	30.00%	107%
56	14	5.47	25.59%	10.00%	256%
57	8	3.64	22.01%	10.00%	220%
58	10	3.01	33.20%	10.00%	332%
59	5	2.04	24.47%	10.00%	245%
60	0	2.56	0.00%	20.00%	0%
61	3	2.44	24.63%	20.00%	123%
62	0	3.35	0.00%	50.00%	0%
63	0	3.29	0.00%	50.00%	0%
64	1	1.62	30.86%	50.00%	62%
65	3	2.81	53.48%	50.00%	107%
66	0	1.1	0.00%	50.00%	0%
67	1	0.96	52.36%	50.00%	104%
68	0	0.02	0.00%	50.00%	0%
69	0	0	0.00%	50.00%	0%
70+	0	4.89	0.00%	100.00%	0%
	239	113.34			211%

## Section 2.2

## 1999-2000 Retirements

Age	Actual	Expected	Actual Percent	Expected Percent	Actual/ Expected
50	33	13.97	11.81%	5.00%	236%
51	35	11.82	14.81%	5.00%	296%
52	47	11.57	20.32%	5.00%	406%
53	58	10.67	27.18%	5.00%	544%
54	39	6.54	29.82%	5.00%	596%
55	55	34.81	47.40%	30.00%	158%
56	31	7.22	42.92%	10.00%	429%
57	11	4.38	25.09%	10.00%	251%
58	15	3.68	40.81%	10.00%	408%
59	10	2.56	39.02%	10.00%	391%
60	8	3.56	44.92%	20.00%	225%
61	1	1.85	10.80%	20.00%	54%
62	4	6.29	31.82%	50.00%	64%
63	2	2.25	44.44%	50.00%	89%
64	1	3.79	13.19%	50.00%	26%
65	3	3.16	47.54%	50.00%	95%
66	1	1.58	31.75%	50.00%	63%
67	1	1.15	43.48%	50.00%	87%
68	0	0	0.00%	50.00%	0%
69	0	0.17	0	50.00%	0%
70+	0	4.66	0	100.00%	0%
	355	135.68			262%

## Section 2.2

## 1998-1999 Retirements

Age	Actual	Expected	Actual Percent	Expected Percent	Actual/ Expected
50	27	13.08	10.32%	5.00%	206%
51	7	11.74	2.98%	5.00%	60%
52	18	11.75	7.66%	5.00%	153%
53	18	7.5	12.00%	5.00%	240%
54	22	6.77	16.26%	5.00%	325%
55	31	32.33	28.76%	30.00%	96%
56	20	6.76	29.59%	10.00%	296%
57	3	3.83	7.84%	10.00%	78%
58	12	4.06	29.57%	10.00%	296%
59	6	2.39	25.06%	10.00%	251%
60	6	3.32	36.12%	20.00%	181%
61	1	2.66	7.53%	20.00%	38%
62	7	6.22	56.32%	50.00%	113%
63	1	5.05	9.91%	50.00%	20%
64	5	5.62	44.52%	50.00%	89%
65	4	3.82	52.36%	50.00%	105%
66	1	2.06	24.27%	50.00%	49%
67	1	0.79	63.29%	50.00%	127%
68	1	0.67	74.63%	50.00%	149%
69	0	0.47	0.00%	50.00%	0%
70+	0	2.73	0.00%	100.00%	0%
	191	133.62			143%

