December 10, 2002

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

MERCER
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Contents

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 1: 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

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

Section 1.3

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%

Section 1.3

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%

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%

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

	Less than 3 years			3+ years			Total		
Age	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%

Section 2.2

1997-1998 Retirements

Age	Actual	Expected	Actual Percent	Expected Percent	Actual/ Expected
50	15	9.57	7.84%	5.00%	157%
51	14	9.24	7.57%	5.00%	152%
52	15	6.58	11.40%	5.00%	228%
53	10	5.63	8.88%	5.00%	178%
54	13	5.03	12.91%	5.00%	258%
55	35	28.43	36.93%	30.00%	123%
56	19	5.17	36.78%	10.00%	368%
57	11	3.86	28.50%	10.00%	285%
58	6	2.63	22.80%	10.00%	228%
59	6	2.31	25.94%	10.00%	260%
60	13	5.89	44.14%	20.00%	221%
61	5	3.73	26.84%	20.00%	134%
62	4	6.72	29.78%	50.00%	60%
63	5	7.35	34.04%	50.00%	68%
64	0	3.64	0.00%	50.00%	0%
65	1	3.72	13.44%	50.00%	27%
66	2	1.59	62.89%	50.00%	126%
67	0	0.44	0.00%	50.00%	0%
68	0	0.33	0.00%	50.00%	0%
69	0	0.85	0.00%	50.00%	0%
70+	0	0.04	0.00%	100.00%	0%
	174	112.75			154%

Section 2.3

Disability

Basis of Analysis

The disability rates specify the assumed probability that a given employee will become disabled within the following year. The Public Employees Police and Fire Fund currently uses an age-related disability table.

Historical Data

During the four years from 1997 through 2001, there were more disabilities than expected (226 actual versus 126 expected), especially at ages 50-54.

The number of disability retirements increased substantially in 1999 and 2000. This peak seems to be related to the merger of the Police and Fire Consolidation Fund and the Public Employees Police and Fire Fund, which occurred on July 1, 1999.

Section 2.3

1997-2001 Disabilities

Age	Actual	Expected	Actual/Expected
20-24	0	1.25	0%
25-29	1	7.65	13%
30-34	10	11.87	84%
35-39	17	14.93	114%
40-44	31	17.75	175%
45-49	48	26.20	183%
50-54	91	32.11	283%
55-59	21	14.05	149%
60-64	5	0.00	
65+	2	0.00	
	226	125.81	180%

Section 2.3

2000-2001 Disabilities

Age	Actual	Expected	Actual/Expected
20-24	0	0.36	0%
25-29	0	1.97	0%
30-34	2	3.25	62%
35-39	4	4.00	100%
40-44	11	4.71	234%
45-49	16	7.07	226%
50-54	33	8.43	391%
55-59	6	3.21	187%
60-64	1	0.00	
65+	1	0.00	
	74	33.00	224%

Section 2.3

1999-2000 Disabilities

Age	Actual	Expected	Actual/Expected
20-24	0	0.33	0%
25-29	0	1.97	0%
30-34	4	3.05	131%
35-39	2	3.82	52%
40-44	11	4.57	241%
45-49	11	6.94	159%
50-54	33	8.79	375%
55-59	9	3.70	243%
60-64	2	0.00	
65+	1	0.00	
	73	33.17	220%

Section 2.3

1998-1999 Disabilities

Age	Actual	Expected	Actual/Expected
20-24	0	0.30	0%
25-29	0	1.90	0%
30-34	1	2.85	35%
35-39	8	3.69	217%
40-44	5	4.50	111%
45-49	11	6.82	161%
50-54	14	8.72	161%
55-59	4	3.97	101%
60-64	1	0.00	
65+	0	0.00	
	44	32.75	134%

Section 2.3

1997-1998 Disabilities

Age	Actual	Expected	Actual/Expected
20-24	0	0.26	0%
25-29	1	1.81	55%
30-34	3	2.72	110%
35-39	3	3.42	88%
40-44	4	3.97	101%
45-49	10	5.37	186%
50-54	11	6.17	178%
55-59	2	3.17	63%
60-64	1	0.00	
65+	0	0.00	
	35	26.89	130%

Section 2.4

Active Mortality

Basis of Analysis

The active mortality rates specify the assumed probability that a given employee will die in the following year. Currently, The Public Employees Police and Fire Fund uses the 1983 Group Annuity Table set back five years.

Historical Data

During the four years from 1997 though 2001, the number of actual deaths was significantly less than expected. Unfortunately, this small sampling does not represent enough data to make a reasonable analysis of mortality rates. Using standard mortality tables usually represents the best estimate for future experience over the long term.

Because the sample group is small, results for the four-year period are shown in the aggregate.

Section 2.4

1997-2001 Active Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0.27	0%	0	0	0%
25-29	1	1.91	52%	0	0.18	0%
30-34	1	3.2	31%	0	0.26	0%
35-39	0	4.15	0%	0	0.36	0%
40-44	0	5.25	0%	0	0.34	0%
45-49	2	8.2	24%	1	0.24	417%
50-54	2	9.47	21%	0	0.1	0%
55-59	0	3.78	0%	0	0	0%
60-64	3	1.36	221%	0	0	
65+	1	0.44	227%	0	0	
	10	38.03	26%	1	1.48	68%

Section 2.5

Retiree and Beneficiary Mortality

Basis of Analysis

The post-retirement mortality rates specify the assumed probability that a given retiree or beneficiary will die in the following year. Currently, the Public Employees Police and Fire Fund uses the 1983 Group Annuity Mortality Table for post-retirement mortality.

Historical Data

During the four years from 1997 through 2001, actual deaths were consistently less than the expected number. The experience was similar for males and females.

Section 2.5

1997-2001 Retiree Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0	0%	0	0	0%
25-29	0	0	0%	0	0	0%
30-34	1	0	0%	0	0	0%
35-39	0	0	0%	0	0	0%
40-44	0	0	0%	1	0	N/A%
45-49	0	0	0%	0	0.13	0%
50-54	4	5.23	76%	0	0.51	0%
55-59	11	16.49	67%	1	1.03	97%
60-64	32	24.99	128%	6	1.90	316%
65-69	39	36.58	107%	7	4.30	163%
70-74	43	54.52	79%	12	10.20	118%
75-79	55	59.08	93%	10	18.49	54%
80-84	55	55.90	98%	21	28.43	74%
85-89	42	40.96	103%	34	27.90	122%
90-94	15	11.83	127%	22	21.27	103%
95-99	4	4.43	90%	11	11.18	98%
100+	0	2.29	0%	1	6.38	16%
	301	312.3	96%	126	131.72	96%

Section 2.5

2000-2001 Retiree Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0	0%	0	0	0%
25-29	0	0	0%	0	0	0%
30-34	1	0	0%	0	0	0%
35-39	0	0	0%	0	0	0%
40-44	0	0	0%	1	0	0%
45-49	0	0	0%	0	0.03	0%
50-54	3	2.23	135%	0	0.19	0%
55-59	3	5.89	51%	0	0.37	0%
60-64	15	8.68	173%	3	0.63	476%
65-69	12	11.81	102%	2	1.39	144%
70-74	13	18.96	69%	4	3.49	115%
75-79	18	22.53	80%	4	7.18	56%
80-84	16	19.48	82%	4	10.54	38%
85-89	12	15.74	76%	17	11.93	142%
90-94	9	4.83	186%	10	8.37	119%
95-99	2	1.25	160%	5	4.15	120%
100+	0	1.99	0%	1	4.66	21%
	104	113.39	92%	51	52.93	96%

Section 2.5

1999-2000 Retiree Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0	0%	0	0	0%
25-29	0	0	0%	0	0	0%
30-34	0	0	0%	0	0	0%
35-39	0	0	0%	0	0	0%
40-44	0	0	0%	0	0	0%
45-49	0	0	0%	0	0.05	0%
50-54	0	1.8	0%	0	0.18	0%
55-59	3	5.4	56%	1	0.35	286%
60-64	6	8.01	75%	2	0.57	351%
65-69	16	12.33	130%	2	1.43	140%
70-74	20	18.92	106%	4	3.57	112%
75-79	22	20.58	107%	5	6.57	76%
80-84	19	18.99	100%	11	11.04	100%
85-89	14	14.99	93%	11	10.54	104%
90-94	5	4.35	115%	8	7.85	102%
95-99	0	1.34	0%	3	4.37	69%
100+	0	0.30	0%	0	1.72	0%
	105	107.01	98%	47	48.24	97%

Section 2.5

1998-1999 Retiree Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0	0%	0	0	0%
25-29	0	0	0%	0	0	0%
30-34	0	0	0%	0	0	0%
35-39	0	0	0%	0	0	0%
40-44	0	0	0%	0	0	0%
45-49	0	0	0%	0	0.02	0%
50-54	1	.74	135%	0	0.08	0%
55-59	2	2.74	73%	0	0.16	0%
60-64	6	4.36	138%	0	0.35	0%
65-69	4	6.22	64%	0	0.71	0%
70-74	4	8.51	47%	2	1.51	132%
75-79	8	8.32	96%	0	2.39	0%
80-84	13	8.76	148%	4	3.58	112%
85-89	9	5.31	169%	6	2.85	211%
90-94	0	1.43	0%	4	2.78	144%
95-99	1	.89	112%	2	1.53	131%
100+	0	0.00	0%	0	0.00	0%
	48	47.28	102%	18	15.96	113%

Section 2.5

1997-1998 Retiree Mortality

	Male			Female		
Age	Actual	Expected	Actual/ Expected	Actual	Expected	Actual/ Expected
20-24	0	0	0%	0	0	0%
25-29	0	0	0%	0	0	0%
30-34	0	0	0%	0	0	0%
35-39	0	0	0%	0	0	0%
40-44	0	0	0%	0	0	0%
45-49	0	0	0%	0	0.03	0%
50-54	0	0.46	0%	0	0.06	0%
55-59	3	2.46	122%	0	0.15	0%
60-64	5	3.94	127%	1	0.35	286%
65-69	7	6.22	113%	3	0.77	390%
70-74	6	8.13	74%	2	1.63	123%
75-79	7	7.65	92%	1	2.35	43%
80-84	7	8.67	81%	2	3.27	61%
85-89	7	4.92	142%	0	2.58	0%
90-94	1	1.22	82%	0	2.27	0%
95-99	1	0.95	105%	1	1.13	88%
100+	0	0.00	0%	0	0.00	0%
	44	44.62	99%	10	14.59	69%

Section 2.6

Disability Retiree Mortality

Basis of Analysis

The post-disability mortality rates specify the assumed probability that a given disability retiree will die in the following year. Currently, the Public Employees Police and Fire Fund uses the 1965 Railroad Retirement Board Mortality Table for post-disability mortality.

Historical Data

During the four years from 1997 through 2001, the actual number of disability retiree deaths was significantly less than expected (18 actual versus 71 expected). As with the active mortality, not enough data exists to perform a meaningful analysis.

Because the sample group is small, results for the four-year period are shown in the aggregate.

Section 2.6

1997-2001 Disability Retiree Mortality

Age	Actual	Expected	Actual/ Expected
20-24	0	0	0%
25-29	0	0.13	0%
30-34	2	1.75	114%
35-39	0	3.51	0%
40-44	1	6.29	16%
45-49	5	13.17	38%
50-54	3	23.35	13%
55-59	4	14.44	28%
60-64	1	6.9	14%
65-69	2	1.13	177%
70-74	0	0.22	0%
75-79	0	0	0%
80-84	0	0	0%
85-89	0	0	0%
90-94	0	0	0%
95-99	0	0	0%
100+	0	0	0%
	18	70.89	25%

Section 2.7

Salary Scale

Basis of Analysis

Salary increases are derived from three sources:

- Inflation
- General productivity
- Merit and promotion increases

For any given year, the correlation of salary increases with inflation is seldom perfect. However, over several years, especially with consistent inflation during those years, salary increases usually show a fairly clear inflation component, normally with a slight lag between inflation and salary growth. Merit and promotion increases are usually inversely correlated with age. That is, average salary increases are usually higher as a percentage for younger employees in most groups.

Currently, for Public Employees Police and Fire Fund, an age-related salary increase assumption with a base rate of 5% is used. The base rate consists of the inflation and general productivity components. The salary increases range from 11.5% at age 20 to 5.25% at ages 50 and higher.

Historical Data

Mercer investment consultants regularly forecast economic variables such as inflation. Their recommendation is that a reasonable inflation rate is 2% to 3%. The general productivity component adds another 1% at most. This suggests a maximum reasonable base rate of 4%.

The table on the next page shows, by five-year age groups, the average salary increase over the entire study period and the average salary increase for each year in the study period. The table also shows the total average salary increase for each year in the experience study. As expected, higher increases occur at the younger ages.

We also reviewed the same data based on service but did not see as great a correlation as is apparent with age. Actual salary increases were less than assumed during the 4-year period.

For the salary analysis, we excluded members 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 2.7

Salary Scale by Age

	Average Salary Increases										
Years	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+	Total
1997-1998	8.9%	7.4%	5.8%	4.4%	3.6%	3.3%	3.6%	3.3%	2.9%	(1.3%)	4.6%
1998-1999	10.8%	8.2%	6.2%	4.9%	4.5%	4.0%	3.7%	3.1%	5.9%	1.4%	5.2%
1999-2000	8.6%	8.3%	6.6%	5.5%	4.7%	4.5%	4.0%	4.5%	2.5%	3.6%	5.5%
2000-2001	10.6%	8.4%	6.3%	4.9%	5.1%	4.7%	4.5%	4.2%	5.1%	6.6%	5.5%
All Years	9.7%	8.0%	6.2%	4.9%	4.5%	4.2%	3.9%	3.8%	4.1%	2.5%	5.2%
Expected	11.0%	8.9%	7.6%	6.6%	5.8%	5.4%	5.25%	5.25%	5.25%	5.25%	

Section 2.8

Investment Return

Basis of Analysis

The investment return assumption for funding is set to reflect long-term asset performance. It is based upon anticipated earnings on funds needed to provide all projected future benefits for current members, including future contributions.

Consistency and reasonableness between the investment return and salary scale assumption are important to produce valid costs. The inflation component of each assumption should be consistent. The investment return assumption consists of the inflation component and a real rate of return.

Currently, The Public Employees Police and Fire Fund uses an 8.50% investment return assumption.

Historical Data and Analysis

Returns in excess of the 8.50% target were achieved in fiscal years ending June 30,1998, 1999, and 2000. The investment return in fiscal year ending June 30, 2001 was sharply negative. For most market observers, the outlook for the capital markets has changed and the expected returns are not as optimistic as before.

To evaluate the investment return assumptions, we must consider forecasted inflation as well as forecasted real rates of return on assets. Mercer investment consultants forecast these values on a regular basis reflecting the latest thinking on the economy and the outlook for capital markets.

Using Mercer investment assumptions and model for calculating portfolio returns and the target asset allocation below, we feel the plan can substantiate an investment return between 5.5% and 9.25% with the expected return about 7.25%. Mercer's best practice is to choose the most appropriate assumption that falls between the 25th and 75th percentile. Choosing a rate too close to the edge of the range can result in the need to change the assumption too frequently, causing volatility in pension contribution results. The current 8.5% investment return assumption is at the 65th percentile.

On the following page, the target asset allocations for the active and post funds are shown.

Section 2.8

Investment Return

Target Asset Allocations

	Active Fund	MPRIF
Domestic Stocks	45%	50%
International Stocks	15%	15%
Bonds	24%	27%
Alternative Assets*	15%	5%
Cash	1%	3%
	100%	100%

* Alternative assets include real estate, venture capital, and resource (oil, gas, etc.) funds.

Section 3: Summary of Observations

The following summarizes the results of the experience study covering the period from July 1, 1997 through June 30, 2001 and indicates where assumption changes will be considered:

Withdrawal

Actual withdrawals were 90% of expected, although for members with more than three years of experience, actual withdrawals were only 76% of expected. The rates should be adjusted to better reflect actual experience.

Retirement

Current retirement rates underestimated the number of retirements and did not anticipate the high number of early retirements. Rates should be updated to reflect early retirement benefit improvements and actual experience.

Disability

The actual number of disability retirements was significantly greater than assumed. Rates should be updated to reflect actual experience.

Active and Disability Retiree Mortality

The sample group is not large enough to perform a meaningful analysis. Standard mortality tables represent the most likely probabilities. However, the standard mortality table for disabilitants seems to significantly underestimate life expectancy and an alternative table should be considered.

Retiree and Beneficiary Mortality

Actual deaths were consistently less than expected. Mortality rates should be updated to reflect actual experience.

Salary Scale

Actual salary increases were lower than assumed. Rates should be adjusted to reflect a more reasonable base inflation and productivity rate, and to better fit actual experience.

Investment Return

Current assumption of 8.50% falls within a reasonable range. No change recommended.

MERCER

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December 10, 2002

Mr. Tom Curtis
Milliman and Robertson
15800 Bluemond Road, Suite 400
Brookfield, WI 53005

Subject:
Recommended Assumption Changes
Public Employees Police and Fire Fund

Dear Tom

We have completed an experience study for the Public Employees Police and Fire Fund (PEPFF) for the four-year period July 1, 1997 to June 30, 2001. The resulting report is attached. We are recommending certain assumption changes as a follow-up to the experience study. Please review our recommendations and provide your feedback.

Withdrawal
Overall, there were fewer withdrawals than expected. However, the experience was different depending on tenure of service. For participants with less than 3 years of service, the actual to expected ratio was 113%. For participants with 3 or more years of service, the actual to expected ratio was just 76%.

Our recommendation is that select and ultimate rates be introduced, with a select period of three years. The proposed termination rate for members with less than 3 years of service is 3.5%, and the age-related termination rates have been reduced to better reflect the experience of the members with 3 or more years of service. The proposed rates are attached.

Retirement
During the 4-year period, there were many more retirements than expected, especially before age 55. At least two events have had an impact on the retirement patterns of members in the PEPFF. On July 1, 1999 the penalty for early retirement was improved from 2.4% per year to 1.2% per year. Also on July 1, 1999, the Police and Fire Consolidation Fund was merged into the PEPFF. The incidence of early retirement after July 1, 1999 was noticeably higher than in earlier years.

We recommend changes in the rates that recognize the retirement trends. The proposed rates, which are attached, are higher at earlier ages than the current rates, but do not go quite as far as

the experience indicated. The rates are based on the aggregate 4-year experience, but may need to be even higher if the experience of the last 2 years continues.

Disability
Disability retirement experience was similar to overall retirement experience. There were significantly more disability retirements than expected, especially at ages 50 to 54. The experience became even more pronounced after July 1, 1999, probably due in part to the merger of the Police and Fire Consolidation Fund into the PEPFF. Our recommended disability rates are attached. The rates are based on the aggregate 4-year experience, but may need to be even higher if the experience of the last 2 years continues.

Active Mortality
The small sampling of active deaths is not statistically significant. However, we do propose a slight modification. We recommend that the active mortality assumption be updated to be consistent with the Public Employees Retirement Fund. This would move the table from 1983 Group Annuity Mortality with a 5 year setback, to 1983 Group Annuity Mortality set back 8 years for males and set back 7 years for females.

Retiree and Beneficiary Mortality
The current mortality table is the 1983 Group Annuity Mortality Table. The actual number of deaths was less than expected, for both males and females. We recommend updating the mortality table to be 1983 Group Annuity Mortality set back two years. This assumption provides a margin for mortality improvements.

Disability Mortality
In the PEPFF, a member is considered disabled if they are physically or mentally unable to perform duties as a police officer or fire fighter. The current assumption is the 1965 Railroad Retirement Board mortality table. The actual number of deaths was much lower than expected (18 actual versus 71 expected). We recommend using a mortality table that reflects a longer life expectancy than the 1965 Railroad Retirement Board. We propose a table made up of 1965 Railroad Retirement Board mortality rates up to age 50, graded mortality rates between ages 51 to 54, and 1983 Group Annuity Mortality set back two years for ages 55 and greater.

We anticipate that the combination of higher disability incidence and longer life expectancy will have a significant cost impact on the Fund.

Salary Increases

Salary increase rates are comprised of three components: inflation, general productivity, and merit. The current salary increase rates use a base inflation rate of 5%. We have assumed that this base inflation rate also includes general productivity. Mercer investment consultants support an inflation rate between 2% and 3%, plus a general productivity rate from .75% to 1.00%. We recommend changing the base inflation plus general productivity rate from 5% to 4%. The recommended salary increase rates are attached. Each recommended rate is 1% less than the current rate.

The total payroll growth assumption, currently at 6%, is comprised of the base rate described above plus 1% population growth. The 1% population growth assumption seems reasonable. We recommend that the total payroll growth assumption be changed from 6% to 5% to be consistent with the change in base inflation.

Investment Return

No change recommended.

Tom, the proposed assumption changes are widespread and significant. I appreciate your careful review of the proposed changes and look forward to your feedback. Thanks in advance.

Sincerely,

Bonnie Wurst

Bonnie Wurst

Copy:
Mary Vanek - PERA
Steve McElhaney - Mercer

g:\pera\expstudy\assumption changes.doc

Public Employees Police and Fire Fund

Summary of Assumption Changes

Turnover

Proposed Assumption: 3-Year Select Period Rate of 3.5%

Age	Current Assumption Male	Current Assumption Female	Proposed Assumption* Male	Proposed Assumption* Female
20	859	859	601	601
21	750	750	525	525
22	660	660	462	462
23	583	583	408	408
24	519	519	363	363
25	463	463	324	324
26	416	416	291	291
27	374	374	262	262
28	339	339	237	237
29	307	307	215	215
30	280	280	190	190
31	256	256	180	180
32	234	234	170	170
33	215	215	160	160
34	198	198	150	150
35	183	183	146	146
36	169	169	142	142
37	157	157	138	138
38	146	146	134	134
39	135	135	130	130
40	126	126	126	126
41	118	118	118	118
42	110	110	110	110
43	103	103	103	103
44	97	97	97	97
45	91	91	91	91
46	86	86	86	86
47	81	81	81	81
48	69	69	69	69
49	59	59	59	59
50	50	50	50	50
51	39	39	39	39
52	29	29	29	29
53	22	22	22	22
54	15	15	15	15

Public Employees Police and Fire Fund

Summary of Assumption Changes

Turnover

Proposed Assumption: 3-Year Select Period Rate of 3.5%

	Current Assumption		Proposed Assumption*	
Age	Male	Female	Male	Female
55	11	11	11	11
56	7	7	7	7
57	5	5	5	5
58	3	3	3	3
59	1	1	1	1
60	0	0	0	0
61	0	0	0	0
62	0	0	0	0
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0

* Age related rates apply after the 3-year select period

Separations expressed as the number of occurrences per 10,000

Public Employees Police and Fire Fund

Summary of Assumption Changes

Retirement

	Current Assumption		Proposed Assumption	
age	Male	Female	Male	Female
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	500	500	1,000	1,000
51	500	500	1,000	1,000
52	500	500	1,000	1,000
53	500	500	1,000	1,000
54	500	500	1,000	1,000

Public Employees Police and Fire Fund

Summary of Assumption Changes

Retirement

	Current Assumption		Proposed Assumption	
age	Male	Female	Male	Female
55	3,000	3,000	3,000	3,000
56	1,000	1,000	2,000	2,000
57	1,000	1,000	2,000	2,000
58	1,000	1,000	2,000	2,000
59	1,000	1,000	2,000	2,000
60	2,000	2,000	2,500	2,500
61	2,000	2,000	2,500	2,500
62	5,000	5,000	3,500	3,500
63	5,000	5,000	3,500	3,500
64	5,000	5,000	3,500	3,500
65	5,000	5,000	5,000	5,000
66	5,000	5,000	5,000	5,000
67	5,000	5,000	5,000	5,000
68	5,000	5,000	5,000	5,000
69	5,000	5,000	5,000	5,000
70	10,000	10,000	10,000	10,000

Separations expressed as the number of occurrences per 10,000

Public Employees Retirement System

Statement of Assets and Liabilities

June 30, 2020

(Dollars in Thousands)

Public Employees Police and Fire Fund

Summary of Assumption Changes

Disability

age	Current Assumption Male	Current Assumption Female	Proposed Assumption Male	Proposed Assumption Female
20	11	11	11	11
21	11	11	11	11
22	12	12	12	12
23	12	12	12	12
24	13	13	13	13
25	13	13	13	13
26	14	14	14	14
27	14	14	14	14
28	14	14	14	14
29	15	15	15	15
30	16	16	16	16
31	16	16	16	16
32	17	17	17	17
33	17	17	17	17
34	18	18	18	18
35	19	19	19	19
36	20	20	20	20
37	22	22	22	22
38	23	23	23	23
39	24	24	24	24
40	26	26	29	29
41	28	28	34	34
42	29	29	39	39
43	31	31	44	44
44	34	34	49	49
45	36	36	54	54
46	41	41	64	64
47	46	46	74	74
48	52	52	84	84
49	60	60	94	94
50	69	69	104	104
51	80	80	123	123
52	91	91	143	143
53	104	104	163	163
54	119	119	183	183

Public Employees Police and Fire Fund

Summary of Assumption Changes

Disability

age	Current Assumption Male	Current Assumption Female	Proposed Assumption Male	Proposed Assumption Female
55	135	135	203	203
56	152	152	206	206
57	171	171	209	209
58	192	192	212	212
59	215	215	215	215
60	0	0	0	0
61	0	0	0	0
62	0	0	0	0
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0

Separations expressed as the number of occurrences per 10,000

Public Employees Police and Fire Fund

Summary of Assumption Changes

Salary Increases

age	Current Assumption	Proposed Assumption
20	11.50%	10.50%
21	11.50%	10.50%
22	11.00%	10.00%
23	10.50%	9.50%
24	10.00%	9.00%
25	9.50%	8.50%
26	9.20%	8.20%
27	8.90%	7.90%
28	8.60%	7.60%
29	8.30%	7.30%
30	8.00%	7.00%
31	7.80%	6.80%
32	7.60%	6.60%
33	7.40%	6.40%
34	7.20%	6.20%
35	7.00%	6.00%
36	6.80%	5.80%
37	6.60%	5.60%
38	6.40%	5.40%
39	6.20%	5.20%
40	6.00%	5.00%
41	5.90%	4.90%
42	5.80%	4.80%
43	5.70%	4.70%
44	5.60%	4.60%
45	5.50%	4.50%
46	5.45%	4.45%
47	5.40%	4.40%
48	5.35%	4.35%
49	5.30%	4.30%
50	5.25%	4.25%
51	5.25%	4.25%
52	5.25%	4.25%
53	5.25%	4.25%
54	5.25%	4.25%

Public Employees Police and Fire Fund

Summary of Assumption Changes

Salary Increases

age	Current Assumption	Proposed Assumption
55	5.25%	4.25%
56	5.25%	4.25%
57	5.25%	4.25%
58	5.25%	4.25%
59	5.25%	4.25%
60	5.25%	4.25%
61	5.25%	4.25%
62	5.25%	4.25%
63	5.25%	4.25%
64	5.25%	4.25%
65	5.25%	4.25%
66	5.25%	4.25%
67	5.25%	4.25%
68	5.25%	4.25%
69	5.25%	4.25%
70	5.25%	4.25%

Public Employees Police and Fire Fund

Summary of Asset Purchase Gains (Losses)

Salary Increases

CM

A MILLIMAN GLOBAL FIRM

Milliman USA

Consultants and Actuaries

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January 31, 2003

Ms. Bonnie Wurst
Mercer Human Resource Consulting
Suite 2100
800 LaSalle Avenue
Minneapolis, MN 55402-2012

RE: Recommended Assumption Changes – Public Employees' Police & Fire Fund

Dear Bonnie:

I have reviewed your experience study report as well as your proposed changes in assumptions. For the most part, your experience study findings are consistent with the aggregate experience we have observed in the valuation results over the last few years. Likewise, I am comfortable with most of your recommended assumptions. My comments on your observations and recommendations follow by assumption.

Withdrawal

Your observations are consistent with ours and your recommended assumptions are reasonable. We concur with this recommendation.

Retirement

Clearly rates of retirement are up. We agree that, at least in part, this is probably attributable to the change in the early retirement reduction provisions. We also agree that it is prudent not to "over shoot" the mark based on just these few years. Accordingly, we concur with the recommended changes in retirement rates that you propose.

Disability

The incidence of disability claims has clearly been higher than expected over the last four years. While this experience does coincide with the merger of the Consolidation Funds, more detailed analysis would be necessary to substantiate a causal relationship. Nonetheless, the recommended changes in rates that you propose are reasonable and we concur with these recommendations.