



TO: Members of the Legislative Commission on Pensions and Retirement
FROM: Lawrence A. Martin, Executive Director
RE: Minneapolis Firefighters Relief Association; Proposed Mortality Assumption Change
DATE: December 8, 2005

Summary of the Proposed Change

The consulting actuarial firm retained by the Minneapolis Firefighters Relief Association, Van Iwaarden Associates, and the board of trustees of the Minneapolis Firefighters Relief Association are requesting approval by the Commission under Minnesota Statutes, Section 356.215, Subdivision 18, of a change in the mortality table used in preparing its annual actuarial valuation from the UP-1984 mortality table, set forward two years for males and set back three years for females, to the 1983 GAM mortality table, set forward two years for females.

Background Information

- a. <u>Minneapolis Firefighters Relief Association</u>. Background information on the Minneapolis Firefighters Relief Association is presented in Attachment A.
- b. <u>Actuarial Reporting Requirements</u>. Background information on the actuarial reporting requirements generally applicable to Minnesota public pension plans is set forth in Attachment B.
- c. <u>Demographic Actuarial Assumptions</u>. Background information on the establishment and revision of demographic actuarial assumptions is set forth in Attachment C.
- d. <u>Mortality Actuarial Assumptions for Closed Membership Defined Benefit Plans</u>. Background information on revising mortality actuarial assumptions for closed membership defined benefit retirement plans is set forth in Attachment D.

Summary of the Minneapolis Firefighters Relief Association Mortality Experience Studies

a. <u>2003 Mortality Experience Study</u>. In November 2003, Mark Meyer, FSA, and Paul D. Krueger, EA, consulting actuaries with the actuarial firm of Van Iwaarden Associates, prepared a joint mortality experience study of the Minneapolis Firefighters Relief Association and the Minneapolis Police Relief Association, dated November 2003, and received by the Legislative Commission on Pensions and Retirement office on January 15, 2004. The study covered participants of the two retirement plans for the four-year period from 1999 through 2002. The report ultimately included a recommendation that the 1983 GAM mortality table, set forward two years for females, be the mortality table for each relief association.

The 2003 joint mortality experience study found that actual mortality was 93 percent of the predicted female mortality overall and 78 percent of the predicted male mortality overall for the four-year period 1999-2002 for the combined population of the two plans, and 94 percent of the predicted female mortality and 72 percent of the predicted male mortality for the four-year period 1999-2002 for the Minneapolis Firefighters Relief Association alone. The following compares this experience in more detail:

	Joint Fo	emale M	ember Exp	MFRA Female Member Experience				
		Actual	Expecte	Actual/		Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	e	S	Deaths	d
40-44	11	0	0.0	0%	3	0	0.0	0%
45-49	18	0	0.1	0%	7	0	0.0	0%
50-54	52	0	0.3	0%	21	0	0.1	0%
55-59	82	0	0.7	0%	28	0	0.2	0%
60-64	94	1	1.3	80%	43	1	0.6	177%
65-69	154	2	3.3	62%	70	0	1.5	0%
70-74	248	10	8.1	123%	80	2	2.6	76%
75-79	324	15	16.0	94%	111	4	5.4	74%
80-84	405	26	30.7	85%	198	18	15.1	119%
85-89	295	30	32.8	92%	158	15	17.6	85%
90-94	112	20	18.3	109%	61	8	9.9	81%
95+	47	11	11.9	93%	18	6	4.3	141%
Total	1,842	115	123.3	93%	798	54	57.4	94%

	Joint N	Male Me	nber Expe	erience	MFRA Male Member Experience			
		Actual	Actual Expecte			Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	e	S	Deaths	d
40-44	0	0	0.0	0%	0	0	0.0	0%
45-49	1	0	0.0	0%	0	0	0.0	0%
50-54	521	3	4.6	65%	149	2	1.3	153%
55-59	694	8	9.1	88%	205	4	2.7	147%
60-64	781	8	16.1	50%	222	3	4.5	66%
65-69	719	12	23.3	52%	328	3	10.9	28%
70-74	636	20	31.3	64%	331	9	16.2	56%
75-79	455	23	32.9	70%	206	8	14.8	54%
80-84	263	34	30.1	113%	94	12	10.9	110%
85-89	202	32	32.6	98%	112	17	18.3	93%
90-94	50	9	12.3	73%	35	7	8.7	80%
95+	7	3	2.5	119%	4	0	1.5	0%
Total	4,329	152	194.8	78%	1,686	65	89.8	72%

The proposed mortality table, the 1983 GAM mortality table, set forward two years for females, would have resulted in actual mortality equaling 107 percent of the predicted female mortality overall for both plans and equaling 111 percent of the predicted male mortality for both plans overall and equaling 108 percent of the predicted female mortality for the Minneapolis Firefighters Relief Association and equaling 101 percent of the predicted male mortality for the Minneapolis Firefighters Relief Association for the four-year period 1999-2002. The following compares the actual deaths with the proposed mortality table results in more detail:

	Joint Fo	emale Mo	ember Exp	perience	MFRA Female Member Experience			
		Actual	Expecte	Actual/		Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	e	S	Deaths	d
40-44	11	0	0.0	0%	3	0	0.0	0%
45-49	18	0	0.0	0%	7	0	0.0	0%
50-54	52	0	0.1	0%	21	0	0.1	0%
55-59	82	0	0.3	0%	28	0	0.1	0%
60-64	94	1	0.6	161%	43	1	0.3	357%
65-69	154	2	1.8	114%	70	0	0.8	0%
70-74	248	10	5.4	184%	80	2	1.8	113%
75-79	324	15	12.7	118%	111	4	4.3	93%
80-84	405	26	26.2	99%	198	18	12.9	139%
85-89	295	30	29.5	102%	158	15	15.9	95%
90-94	112	20	17.9	112%	61	8	9.7	83%
95+	47	11	12.6	87%	18	6	4.5	134%
Total	1,842	115	107.3	107%	798	54	50.2	108%

Joint Male Member Experience

MFRA Male Member Experience

		Actual	Expecte	Actual/		Actual	Expecte	Actual/
	-	Actual	Expecte	Actual/	-	Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	e	S	Deaths	d
40-44	0	0	0.0	0%	0	0	0.0	0%
45-49	1	0	0.0	0%	0	0	0.0	0%
50-54	521	3	2.6	114%	149	2	0.8	266%
55-59	694	8	5.0	160%	205	4	1.5	268%
60-64	781	8	8.8	91%	222	3	2.5	121%
65-69	719	12	14.5	83%	328	3	6.8	44%
70-74	636	20	21.5	93%	331	9	11.1	81%
75-79	455	23	24.0	96%	206	8	10.8	74%
80-84	263	34	23.8	143%	94	12	8.6	139%
85-89	202	32	26.0	123%	112	17	14.6	117%
90-94	50	9	9.3	97%	35	7	6.6	106%
95+	7	3	1.8	169%	4	0	1.0	0%
Total	4,329	152	137.3	111%	1,686	65	64.2	101%

b. <u>2005 Mortality Experience Study</u>. In 2005, Mark Meyer, FSA, and Paul D. Krueger, EA, of Van Iwaarden Associates, prepared another mortality experience study of the Minneapolis Firefighters Relief Association, which was filed with the Legislative Commission on Pensions and Retirement on December 1, 2005. The study covered participants of the Minneapolis Firefighters Relief Association for the five-year period from 2000 to 2004. The report also included a recommendation that the 1983 GAM mortality table, set forward two years for females, replace the UP-1984 mortality table, set forward two years for males and set back three years for females, as the mortality table for the Minneapolis Firefighters Relief Association.

The 2005 mortality experience study found that actual mortality was 98 percent of the predicted female mortality and 77 percent of the predicted male mortality for the five-year period 2000-2004. the following compares this experience in more detail:

	Fema	ale Mem	ber Experi	ience	Male Member Experience			
		Actual	Expecte	Actual/		Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	е	S	Deaths	d
40-44	5	0	0.0	0%	0	0	0.0	0%
45-49	6	0	0.0	0%	0	0	0.00	0%
50-54	21	0	0.1	0%	179	4	1.6	251%
55-59	35	1	0.3	339%	300	5	3.9	127%
60-64	56	1	0.7	137%	321	4	6.6	61%
65-69	79	0	1.7	0%	344	3	11.4	26%
70-74	104	3	3.3	90%	424	14	20.5	68%
75-79	135	7	6.6	106%	315	10	23.1	43%
80-84	194	15	14.9	101%	114	11	12.6	87%
85-89	216	19	24.1	79%	125	21	20.9	101%
90-94	87	14	14.2	99%	42	14	10.5	134%
95+	22	10	5.1	195%	8	2	2.9	68%
Total	960	70	71.1	98%	2,172	88	113.9	77%

The proposed mortality table, the 1983 GAM mortality table, set forward two years for females, would have resulted in actual mortality equaling 112 percent of the predicted fem ale mortality and equaling 108 percent of the predicted male mortality for the five-year period 2000-2004. The following compares the actual deaths with the proposed mortality table results in more detail:

	Fema	ale Mem	ber Experi	ience	Male Member Experience			
		Actual	Expecte	Actual/		Actual	Expecte	Actual/
	Exposur	Death	d	Expecte	Exposur	Death	d	Expecte
Age	e	S	Deaths	d	e	S	Deaths	d
40-44	5	0	0.0	0%	0	0	0.0	0%
45-49	6	0	0.0	0%	0	0	0.0	0%
50-54	21	0	0.1	0%	179	4	0.9	437%
55-59	35	1	0.1	729%	300	5	2.2	231%
60-64	56	1	0.4	277%	321	4	3.6	111%
65-69	79	0	0.9	0%	344	3	7.1	42%
70-74	104	3	2.2	136%	424	14	14.1	99%
75-79	135	7	5.2	133%	315	10	16.9	59%
80-84	194	15	12.7	118%	114	11	10.0	110%
85-89	216	19	21.7	88%	125	21	16.6	127%
90-94	87	14	13.9	101%	42	14	7.9	177%
95+	22	10	5.4	186%	8	2	2.1	97%
Total	960	70	62.6	112%	2,172	88	81.2	108%

Discussion and Analysis

The Minneapolis Firefighters Relief Association and its consulting actuaries, Mark Meyer and Paul D. Krueger of Van Iwaarden Associates, are requesting approval by the Legislative Commission on Pensions and Retirement of a change in the relief association's mortality table from the UP-1984 mortality table, set forward two years for males and set back three years for females, to the 1983 GAM mortality table with a two year set forward for females. Resolution 05-3, attached, would approve the mortality table change for the Minneapolis Firefighters Relief Association.

The requested mortality table change approval raises several pensions and related policy issues that may merit consideration and discussion by the Commission, as follows:

1. <u>Sufficiency of the Evidence of a Need for a Mortality Table Change</u>. The policy issue is the sufficiency of the evidence presented by the Minneapolis Firefighters Relief Association and its actuarial consulting firm, Van Iwaarden Associates, that a need exists for a change of mortality tables for the Minneapolis Firefighters Relief Association. The Minneapolis Firefighters Relief Association has filed two mortality experience studies with the Commission, one done jointly with the Minneapolis Police Relief Association based on four-year (1999-2002) data as of November 2003, and one for the Minneapolis Firefighters Relief Association solely based on five-year (2002-2004) data as of July 2005. The reports make implicit and explicit arguments that the current mortality table is no longer appropriate for the Minneapolis Firefighters Relief Association, arguing that:

- a. <u>The UP-1984 Table is Dated</u>. The UP-1984 mortality table was completed in the early 1970s.
- b. <u>The UP-1984 Table Over-Predicted Female Deaths</u>. The two experience studies found that the actual deaths of female Minneapolis Firefighters Relief Association members were less than 100 percent of those expected, with the actual-to-expected number at 94 percent in the 2003 study and at 98 percent in the 2005 study.
- c. <u>The UP-1984 Table Greatly Over-Predicted Male Deaths</u>. The two experience studies found that the actual deaths of male Minneapolis Firefighters Relief Association members were less than 100 percent of those expected, with the actual-to-expected number at 72 percent in the 2003 study and at 77 percent in the 2005 study.

The suggestion that the UP-1984 mortality table is dated and hence obsolete is not accurate, since the 1983 GAM mortality table is also based on group annuitant experience from 1964-1968 and is projected to 1983, while the UP-1984 mortality table uses data of a similar vintage, projected to 1984. If more recent tables were the true criterion, these are the 1994 Uninsured Pensioner Mortality Table (UP-1984) and the 1994 Group Annuity Mortality Table (1994 GAM). The actual deaths to expected death percentages, however, indicate that the Minneapolis Firefighters Relief Association mortality experience is somewhat variable over a short period of time and may overstate the magnitude of departures taking the edge off of that argument. The 2005 study produced better results for both males and females than the 2003 study, which is a result that runs counter of a general societal trend of improving mortality (with an expected result of a greater departure in the later study) and does so over a relatively short period. Overall, the current mortality table predicted in 2003 57.4 female deaths over a four-year period compared to 54 actual female deaths, predicted in 2005 71.1 female deaths over a five-year period compared to 70 actual female deaths, predicted in 2003 89.8 male deaths over a four-year period compared to 65 actual male deaths, and predicted in 2005 113.9 male deaths over a five-year period compared to 88 actual male deaths. While the Minneapolis Firefighters Relief Association actuarial valuations do not provide a breakdown of the plan membership by age cohorts, the experience studies suggest that the largest group of female members of the Minneapolis Firefighters Relief Association is between 70 and 89 and the largest group of male members of the Minneapolis Firefighters Relief Association is between 55 and 79. The two experience studies suggest some disparity in female death expectations for the largest component groups and much greater disparities in male death expectations for the largest component groups. A careful examination of the two studies suggests that some better fit for males between age 55 and age 70 in a mortality table would be desirable.

- 2. <u>Appropriate Fit of the Recommended Actuarial Assumption</u>. The policy issue is whether or not the new mortality table recommended by the relief association and its consulting actuaries is a good fit for the recent mortality experience and for the likely future mortality experience. The two experience studies filed by the Minneapolis Firefighters Relief Association with the Legislative Commission on Pensions and Retirement in 2003 and 2005 make the following arguments for the recommended mortality table as the appropriate mortality for the Minneapolis Firefighters Relief Association:
 - a. <u>Recommended Table is Standard Table and is More Recent</u>. The consulting actuaries indicate that the 1983 GAM mortality table is a standard mortality table and is more recent than the UP 1984 table currently used.
 - b. <u>Recommended Table is the PERA-P&F Mortality Table</u>. The consulting actuaries argue that the 1983 GAM mortality table is the mortality table utilized by the Public Employees Police and Fire Retirement Plan (PERA-P&F), although with one-year set backs for both females and males.
 - c. <u>Recommended Table Produces a Desirable Prediction Margin</u>. The consulting actuaries indicate that the recommended table produces a mortality margin (fewer expected deaths than actual deaths) that is appropriate, that the margin is somewhat greater than the five or ten percent margins used by standard mortality tables (eight percent for females in 2003 study, 12 percent for females in 2005 study, on percent for males in 2003 study, and eight percent for males in 2005 study), and that the recommended table will gave a greater allowance for mortality improvement, will have a longer shelf life consequently, and is desirable because of the small population covered by the retirement plan.

A national survey of defined benefit retirement plans does indicate that the 1983 GAM mortality table is widely used and is more common than the UP-1984 mortality table. The argument that the 1983 GAM mortality table is considerably less obsolete than the UP-1984 mortality table is

probably overstated, since both tables use data from the same vintage and are not the most recent tables available. The contention that PERA-P&F uses the 1983 GAM mortality table is correct, but the Minneapolis Firefighters Relief Association generally does not premise its practices on PERA-P&F features. The mortality table margin contention deserves more analysis. The 2005 mortality experience study also compared actual deaths with expected deaths under two other alternative mortality table configurations, the 1983 GAM mortality table with a one-year set back for males and a two-year forward for females, which increases the likely margin, and the 1983 GAM mortality table with a three-year set forward for females and a on-year set forward for males, which essentially eliminates any margin. The presentation of alternatives raise concerns about the extent of a margin needed in order to extend the "shelf life" of the mortality table and about the modest size of the population on which to base any mortality table. As the bounce in the actual versus expected results under the current mortality table between the 2003 study and the 2005 study indicates, a small population is subject to considerable variability in demographic occurrences over time. While the current mortality table does not appear to the best fit for males for the periods 1999-2002 and 2000-2004, the recommended table is not necessarily a good predictor of future mortality because the Minneapolis Firefighters Relief Association membership is not large enough in number to average out the results and replicate more general experience. Since the relief association is a closed group, with a small number of active members and an aging retired population, it also is not clear that "shelf life" considerations should be a major consideration.

- 3. <u>Appropriateness of Assumption Change Request Delay from 2003</u>. The policy issue is the appropriateness of the timing of the request, since the first mortality experience study was produced in October 2003, and whether the pursuit of the assumption change reflects considerations unrelated to the accuracy of the assumption. Although a copy of a revised experience study was filed with the Commission in January 2004, the first request for Commission approval of the assumption change was not sent to the Commission until November 2005. While accuracy in actuarial assumptions, individually and interacting as a group, is an undeniably desirable goal, the interest of the relief association in gaining accuracy in this one assumption and the timing of the relief association's request do cloud the issue. The 2003 mortality experience study indicates that the mortality table is the most significant demographic assumption currently. The study also indicated that the economic assumptions are more significant, with the interest rate actuarial assumption being the most significant.
- 4. Appropriateness of the Lack of Experience Study Results for Other Actuarial Assumptions. The policy issue is the appropriateness of handling this one actuarial assumption change request when the relief association has not also pursued a review of the other relevant actuarial assumptions. While not binding on the Legislative Commission on Pensions and Retirement or the Minneapolis Firefighters Relief Association Board, Actuarial Standard of Practice 35, governing the selection of demographic and other non-economic assumptions for measuring pension obligations for pension actuaries, requires that demographic assumptions be selected from the appropriate assumption universe and indicates that assumptions should be evaluated for reasonableness, must be individually reasonable, and, for mortality assumptions, should differentiate between different subgroups or factors where appropriate. Evaluating only one assumption when there are other important actuarial assumptions can leave the assumptions as a totality potentially unreasonable. While the Actuarial Standards of Practice potentially require less scrutiny and review when economic actuarial assumptions are specified in law or in some comparable fashion, the interest and salary actuarial assumptions in Minnesota Statutes, Sections 356.215, Subdivision 8, and 356.216, Paragraph (b) for the Minneapolis Firefighters Relief Association and the Minneapolis Police Relief Association are essentially unique to those plans, replicated only for the Minneapolis Employees Retirement Fund in 1993 and for the Bloomington Fire Department Relief Association in 2005. The statutory assumptions for the Minneapolis Firefighters Relief Association were established separate for the plan when the 13th check post-retirement adjustment was enacted in 1989 (see Laws 1989, Chapter 319, Article 19). It may be better practice for the Commission to require the Minneapolis Firefighters Relief Association to conduct a full experience study, including interest and salary increases, of the Minneapolis Firefighters Relief Association and to consider any additional assumption changes that may be appropriate.
- 5. <u>Appropriateness of an Amortization Period Change with any Assumption Change</u>. The policy issue is the appropriateness of potential proposed legislation extending the amortization period of the Minneapolis Firefighters Relief Association to accompany any actuarial assumption change that produces a net increase in the unfunded actuarial accrued liability of the relief association. Currently, the Minneapolis Firefighters Relief Association has a 2010 amortization date under Minnesota Statutes, Section 69.77, adjusted by separate 15-year amortization periods for each net increase or decrease in the unfunded actuarial accrued liability caused by an actuarial gain or loss under

Minnesota Statutes, Section 423C.15, Subdivision 3. Although Minnesota Statutes, Section 356.215, Subdivision 11, provides for an adjustment of the amortization target date upon benefit plan changes, actuarial method changes, or actuarial assumption changes, the provision does not apply to the Minneapolis Firefighters Relief Association. An actuarial assumption change could produce a significant increase in the unfunded actuarial accrued liability of the Minneapolis Firefighters Relief Association date would be an appropriate accommodation to that infrequent occurrence.

6. <u>Actuarial Impact of the Proposed Assumption Change</u>. The policy issue is the actuarial impact the proposed change in the mortality table for the Minneapolis Firefighters Relief Association will have on the relief association. Although the adverse actuarial impact of an actuarial assumption change should not defeat a proposed assumption change that is both needed and appropriate, an adverse actuarial impact may necessitate other potential accommodations in the funding requirements of the plan or in the allocation of State aid. The following sets forth that actuarial impact:

			Impact o	of Mortality	Resulting	
	2004 Va	luation	Table	Change	Actuaria	al Condition
<u>Membership</u>						
Active Members		42				42
Service Retirees		438				438
Disabilitants		6				6
Survivors		177				177
Deferred Retirees		0				0
Nonvested Former						
Members						
Total Membership		663				663
Funded Status						
Accrued Liability		\$275,513,196		\$32,000,000		\$307,513,196
Current Assets		\$248,545,796		\$0		\$248,545,796
Unfunded Accrued Liability		\$26,967,400		\$32,000,000		\$58,967,400
Funding Ratio	90.21%				80.82%	
U						
Financing Requirements						
Covered Payroll		\$3,141,585				\$3,141,585
Benefits Payable		\$20,598,079				\$20,598,079
Normal Cost	21.07%	\$636,326			21.07%	\$636,326
Administrative Expenses						<u></u>
Normal Cost & Expense	21.07%	\$636,326			21.07%	\$636,326
Normal Cost & Expense	21.07%	\$636,326			21.07%	\$636,326
Amortization	71.82%	\$2.256.188	98.68%	\$3,100,000	170.50%	\$5.356.188
Total Requirements	92.89%	\$2,892,514	98.68%	\$3,100,000	191.57%	\$5,992,514
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Employee Contributions	8.00%	\$251,327			8.00%	\$251,327
Employer Contributions	0.08%	\$2,670			0.08%	\$2,670
Employer Add'l Cont.						
Direct State Funding	68.34%	2,146,934			68.34%	2,146,934
Other Govt. Funding						
Administrative Assessment						
Total Contributions	76.42%	\$2,400,931			76.42%	\$2,400,931
Total Requirements	92.89%	\$2,892,514			191.57%	\$5,992,514
Total Contributions	76.42%	\$2,400,931			<u>76.42%</u>	\$2,400,931
Deficiency (Surplus)	16.47%	\$491,583			115.15%	\$3,591,583
· · · ·						
Amortization Target Date	2020					
Actuary	Van Iwaarden					

Sources: December 31, 2004, Minneapolis Firefighters Relief Association actuarial valuation, December 31, 2004, Minneapolis Firefighters Relief Association annual financial report, and July 1, 2005, Minneapolis Firefighters Relief Association Mortality Experience Study.

7. <u>Opposition to the Recommended Change by the City of Minneapolis</u>. The policy issue is the appropriateness of Commission acting on an actuarial assumption change request from the Minneapolis Firefighters Relief Association in light of expressed opposition to the recommended change by the City of Minneapolis. On November 4, 2005, prior to Commission receipt of the request for Commission approval of the recommended actuarial assumption change by the Minneapolis Firefighters Relief Association, Patrick P. Born, City Finance Officer of the City of Minneapolis, wrote the Commission to indicate that the City does not agree that the Minneapolis Firefighters Relief

Association mortality table needs to be updated at this time, indicates that the change would add to the financial burden carried by the city taxpayers, indicates a belief that the recommended mortality change was not based on statistically significant data, requests that an experience study be conducted on all Minneapolis Firefighters Relief Association actuarial assumptions, and requests that the City be involved in the selection of any new mortality table for the Minneapolis Firefighters Relief Association. Representatives of the City of Minneapolis should be accorded an opportunity to present to the Commission their views and concerns along with the representatives of the Minneapolis Firefighters Relief Association and its consulting actuaries.

8. Appropriateness of Considering the Minneapolis Firefighters Relief Association Actuarial Assumption Change Request in Light of a Delayed Minneapolis Police Relief Association Change Request. The policy issue is the appropriateness of the Commission considering the request of the Minneapolis Firefighters Relief Association to change its mortality table when the Minneapolis Police Relief Association is considering recommending the same actuarial assumption change under a joint experience study, but is reportedly delaying the request until 2008. The 2003 joint mortality experience study of the Minneapolis Firefighters Relief Association and the Minneapolis Police Relief Association indicates similar mortality deviation results for both plans and recommends the same mortality assumption change for both relief associations. The May 20, 2005, and August 9, 2005, minutes of the Minneapolis Police Relief Association Board both indicate that the Minneapolis Police Relief Association would not be forwarding a mortality table assumption change to the Legislative Commission on Pensions and Retirement until 2008. If the assumption change is not critical for the Minneapolis Police Relief Association, with fewer active members than the Minneapolis Firefighters Relief Association, some clarification about the urgency for the proposed Minneapolis Firefighters Relief Association mortality table change will need to be presented for Commission consideration.

Attachment A

Background Information on the Minneapolis Firefighters Relief Association

a. <u>Relief Association Establishment and Operation</u>. The Minneapolis Firefighters Relief Association was established as an organization in 1868, initially to provide relief to disabled firefighters and to their families, when the Minneapolis Firefighters was a volunteer fire department, and was incorporated under Minnesota law in 1886, after the Minneapolis Fire Department became a paid fire department, in 1879. The Minneapolis Firefighters Relief Association began paying service pensions to retiring firefighters in 1897. Membership in the Minneapolis Firefighters Relief Association was closed to new firefighters as of June 15, 1980, when pension coverage for newly hired Minneapolis firefighters shifted to the statewide Public Employees Police and Fire Plan (PERA-P&F).

The Minneapolis Firefighters Relief Association is managed by a governing board of 12 members, of which two are active firefighters, eight are retired firefighters or surviving spouses, and two are appointed representatives of the City of Minneapolis. In addition to maintaining records and determining benefit amounts, the Minneapolis Firefighters Relief Association governing board is the investment authority for the assets of the special (pension) and general (non-pension) funds of the relief association.

In calendar year 2004, the Minneapolis Firefighters Relief Association received total contributions of almost \$2.2 million (98.1 percent from the State of Minnesota, 0.1 percent from the City of Minneapolis, and 1.8 percent from the members), received net investment income slightly under \$23.9 million, paid total retirement benefits of almost \$22.5 million, and paid administrative expenses slightly under \$600,000 (34 percent for personnel, 41 percent for professional services, and 25 percent for conferences, communications, office rent, and other items).

b. <u>Nature of the Benefit Plan; Benefit Coverage</u>. The Minneapolis Firefighters Relief Association provides from its special fund a salary-related service pension to firefighters retiring at age 50 or older with at least five years of service, a disability benefit to temporarily or permanently disabled firefighters, a survivor benefit to the surviving family of a deceased active, retired, or disabled firefighter, and a return of contributions to the estate of deceased active, retired, or disabled firefighters on whose behalf no survivor benefit is payable. Pensions and benefits are based on the salary of a first grade firefighter, irrespective of the actual rank of the firefighter. Under Laws 1997, Chapter 233, Article 4, a joint-and-survivor optional annuity form can be elected in lieu of the automatic survivorship coverage otherwise provided by the fund.

Since 1990, the contributions by any member (eight percent of the pay of a first-grade firefighter) who has 25 or more years of service are not deposited in the special fund; but rather, the contribution is deposited in a health insurance account set up for the member. After retirement, in addition to the pension benefit paid from the association's special fund, the retiree receives distributions from the health insurance account, which the retiree can use toward health care costs or other expenses of the retiree.

When a Minneapolis firefighter retires and begins drawing a service pension from the association's special fund, those benefits are eligible for increases annually through three different post-retirement increase mechanisms. Individually and as a package, these adjustment provisions are poorly designed and can produce increases which bear no relationship to inflation, and can produce erratic changes in the benefits over time. The mechanisms are:

- 1. <u>Active Salary-Related Escalator</u>. The first post-retirement adjustment is a standard escalator tied to increases in the salary of a first-grade firefighter. This escalator increases retirement benefits by the same percentage increase as the percentage increase in first-grade firefighter pay negotiated between the City and the Minneapolis Firefighters Union.
- 2. <u>13th Check Adjustment</u>. A second increase provision is based on the investment performance of the special fund of the relief association, and is referred to as the 13th check post-retirement adjustment. The 13th check post-retirement adjustment was enacted in 1989.
- 3. <u>Additional Post-Retirement Adjustment</u>. A third post-retirement increase mechanism was added to law in 2000. If the funding ratio (percentage of plan pension liabilities covered by plan assets) of the relief association exceeds 110 percent, the association is authorized to distribute a portion of the funding in excess of 110 percent of its liabilities to its benefit recipients.

Additionally, from its general fund, the Minneapolis Firefighters Relief Association provides a \$1,200 lump sum death benefit to the survivors or estate of deceased active or former firefighters and a \$102 per year of service lump sum retirement benefit to a retiring firefighter.

c. <u>Actuarial and Financial Reporting</u>. The Minneapolis Firefighters Relief Association is required to prepare actuarial reporting under Minnesota Statutes, Sections 69.77, 356.215, 356.216, and 423C.15. The relief association is required to make financial reports under Minnesota Statutes, Sections 69.051 and 356.20.

Minnesota Statutes, Section 69.77, initially enacted in 1969 (Laws 1969, Chapter 223), and amended periodically thereafter, requires municipalities to fund their local relief associations on an actuarial basis. The basic provisions of the 1969 Local Police and Salaried Firefighters Relief Associations Financial Guidelines Act are as follows:

- Each member of a local association is required to contribute at least eight percent of the salary used for calculating retirement benefits, with the contribution to be made by salary deduction.
- The financial requirements of the associations must be calculated annually based on the most recent actuarial valuation. The financial requirements are to include normal cost and amortization of the unfunded accrued liability by the year 2010. The minimum obligation of the municipality to be raised by taxes each year is the financial requirements of the association, less member contribution amounts received under the police or fire state aid program, and amounts received under the local police and salaried firefighter relief associations amortization aid programs for that year.
- The levy required to meet the municipality's minimum obligation is outside statutory or charter levy limitations.
- If a municipality fails to include an amount sufficient to meet the minimum obligation to the association, the relief association has the authority to certify the amount required to the county auditor for inclusion in the municipality's tax levy.
- Investments of local associations must be in securities which are authorized investments under Minnesota Statutes, Chapter 356A.
- Local associations are authorized to contract with outside investment advisors and are authorized to certify funds for investment by the State Board of Investment in the Minnesota Supplemental Investment Fund.
- Actuarial valuations must be filed by the association with the State Auditor, the Legislative Commission on Pensions and Retirement, the Legislative Reference Library, and the municipality.
- All articles of incorporation or bylaw amendments affecting benefits for a local relief association must be ratified by the municipality prior to becoming effective.
- The penalty for a violation of the act is to make the transfer of funds received under the various state aid programs or the levying of taxes by the municipality unlawful.

Minnesota Statutes, Sections 356.215 and 356.215, require the preparation of actuarial valuations under the entry age normal cost actuarial method, using specified interest and salary rate actuarial assumptions, and calculating the actuarial requirements based on a specified amortization target date. Minnesota Statutes, Section 423C.15, provides for an adjustment to the city normal cost contribution, suspends city normal cost contributions in certain instances, provides 15-year amortization periods for actuarial losses after 2001, and limits the amortization target date revisions to the end of the average life expectancy of the relief association membership.

Minnesota Statutes, Section 69.051, a portion of the police state aid program, requires the preparation of a financial report and audit for qualification for police state aid, with the report filed with the State Auditor and with the Legislative Commission on Pensions and Retirement. Minnesota Statutes, Section 356.20, requires annual financial reporting by various Minnesota public pension plans, but grandparents financial reporting under Minnesota Statutes, Section 69.051, by local fire and police relief associations.

Attachment B

Background Information: Minnesota Public Pension Plan Actuarial Reporting Requirements Generally

1. <u>Actuarial Reporting Requirements</u>. With the creation of defined benefit public pension plan liabilities, there arises a need to provide financing to match the liabilities and to create a trust fund for the accumulated assets. The method of financing depends primarily on the nature of the benefit plan as either a defined contribution plan or a defined benefit plan and the liability which is undertaken as a consequence. Since the obligation undertaken with a defined benefit plan is to provide a benefit of a predetermined amount at and after the time of retirement, the financing method will be more complex and will allow more variations. There are a number of possible financing budget estimation methods which have been developed by actuaries which can be utilized.

The <u>actual or ultimate cost of a pension plan</u> is the total amount of any retirement annuities, disability benefits and survivor benefits plus the total amount of any administrative costs paid. The actual or ultimate cost will result no matter what method of financing is employed to fund pension benefits. The financing or actuarial funding method merely separates out the portion of the actual or ultimate cost that will be paid from investment returns from the portion to be funded from periodic contributions and affects the timing of the financing and the amount of the financing burden which will be borne by the pension plan employer or employers.

Virtually every public pension plan is required to make annual financial and actuarial reports under Minnesota Statutes, Sections 356.20 and 356.215. The Standards for Actuarial Work, issued by the Commission, specify the detailed contents and format requirements for both the actuarial valuation reports and the experience studies. The public pension plans which are included in this requirement are the General State Employees Retirement Plan of the Minnesota State Retirement System (MSRS-General), the Correctional State Employees Retirement Plan of the Minnesota State Retirement System (MSRS-Correctional), the General Employee Retirement Plan of the Public Employees Retirement Association (PERA-General), the Public Employees Police and Fire Retirement Plan (PERA-P&F), the Teachers Retirement Association (TRA), the State Patrol Retirement Plan, the Minneapolis Teachers Retirement Fund Association (MTRFA), the St. Paul Teachers Retirement Fund Association (SPTRFA), the Duluth Teachers Retirement Fund Association (DTRFA), the Minneapolis Employees Retirement Fund (MERF), the University of Minnesota Faculty Retirement Plan and Supplemental Retirement Plan, the Judges Retirement Plan, and the various local police and firefighters relief associations.

The annual actuarial valuation is required to include the determination of normal cost as a percentage of salary and accrued liability of the fund calculated according to the entry age normal cost method, with a prescribed pre- and post-retirement interest assumption, a prescribed salary assumption, and other assumptions as to mortality, disability, retirement, and withdrawal which are appropriate to the experience of the plan. A statement of administrative cost of the fund as a gross amount and as a percent of payroll is required. The actuary must also present an actuarial balance sheet, setting forth the accrued assets, the accrued liabilities (reserves for active members, deferred annuitants, inactive members without vested rights, and annuitants) and the unfunded actuarial accrued liability. The valuation is also to include a calculation of the additional rate of support required to amortize the unfunded accrued liability by the end of the applicable target full funding year. The actuary is required to provide an analysis of the increase or decrease in the unfunded accrued liability from changes in benefits, changes in actuarial assumptions, gains and losses from actual deviations from actuarial assumptions, amortization contribution, and changes in membership. An exhibit setting forth total active membership, additions and separations from active service during the year, total benefit recipients, additions to and separations from the annuity payroll, and a breakdown of benefit recipients into service annuitants, disabilitants, surviving spouses and children, and deferred annuitants is also required.

The quadrennial experience study periodically prepared for MSRS-General, PERA-General, and TRA is required to furnish experience data and an actuarial analysis which substantiates the actuarial assumptions upon which the annual valuations are based. The quadrennial experience study is required to contain an actuarial analysis of the experience of the largest retirement plans and a comparison of that plan experience with the actuarial assumptions in force for the most recent annual actuarial experience.

The purpose of the quadrennial experience studies is to provide the Commission and the retirement plan administrations with a periodic opportunity to review the accuracy of the current actuarial assumptions of the three largest retirement plans, compared to the experience for the most recent period and to revise those actuarial assumptions based on the recommendation of the retained consulting actuary and on input from plan administrators, their actuarial consultants, and others. The actuarial valuation process, as corrected or refined by the quadrennial experience process, is intended to provide policymakers and others with an accurate picture of the funded condition and financial requirements of a public pension plan and the process is not aided if it relies on incorrect or inadequate assumptions. If a trend line is established in recent experience, that trend line should be reflected in a plan's actuarial assumptions, even if those assumptions make the financing position of the plan appear worse than it would under different assumptions.

Minnesota public pension plan actuarial assumptions are specified in part in statute (the economic assumptions, interest/investment return, individual salary increase, and payroll growth) and are determined in part by other parties, with Commission approval (the balance of all actuarial assumptions, generally, the demographic assumptions). Economic assumptions are required to project the amount of benefits that will be payable. Demographic assumptions are used to project the development of the population covered by the pension plan and hence when the benefits to be provided will be paid. The demographic assumptions project when a member is likely to progress between the various categories of membership (active, deferred, or retired) and how long the person stays in each category. The types of economic assumptions used to measure obligations under a defined benefit pension plan include the following:

- (i) inflation;
- (ii) investment return (sometimes referred to as the valuation interest rate);
- (iii) compensation progression schedule; and
- (iv) other economic factors (e.g., Social Security, cost-of-living adjustments, growth of individual account balances, and variable conversion factors).

The types of demographic assumptions used to measure pension obligations include, but are not necessarily limited to, the following:

- (i) retirement;
- (ii) mortality;
- (iii) termination of employment;
- (iv) disability and disability recovery;
- (v) election of optional forms of benefits; and
- (vi) other assumptions, such as administrative expenses; household composition; marriage, divorce, and remarriage; open group assumptions; transfers; hours worked; and assumptions regarding missing or incomplete data.

The actuarial assumption selection process should result in actuarial assumptions that are reasonable in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable actuarial assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period. For any given measurement, two or more reasonable actuarial assumptions may be identified for the same contingency.

- 2. <u>Historical Development of Actuarial Reporting Requirements</u>. Since the creation of the Legislative Commission on Pensions and Retirement as an interim commission in 1955, data has been required to be provided to the State by the various public pension plans in the State, as follows:
 - Laws 1957, Special Session, Chapter 11. The initial actuarial reporting law enacted by the Minnesota Legislature was Laws 1957, Special Session, Chapter 11. The 1957 actuarial reporting law was an uncoded temporary law that was applicable only to actuarial valuations prepared as of January 1, 1958. No prior generally applicable law required specific actuarial reporting to the Legislature or to any other public office or official. The 1957 actuarial reporting law required census tabulations of active members and benefit recipients, an actuarial balance sheet disclosing assets, liabilities and the actuarial full funding deficit, a statement of actuarial assumptions, an indication of the normal support rate for currently accruing liabilities and an indication of the 1997 target date amortization requirement. The 1957 actuarial reporting law was unspecific on the manner in which the actuarial calculation was to be prepared, leading to disputes when some funds prepared valuations on a basis other than the entry age normal actuarial method. The 1957 actuarial reporting law was broadly applicable to all statewide general and public safety pension plans, all local general employee plans, all local police relief associations and all local salaried firefighters relief associations. Problems with the 1957 actuarial reporting law led the

Commission to refine the actuarial reporting requirements and procedures and to recommend a general ongoing actuarial reporting law in the years between 1958 and 1965.

- Laws 1965, Chapters 359 and 751. Laws 1965, Chapter 359, was the initial codification of the general employee pension plan actuarial reporting law. Laws 1965, Chapter 751, was an uncoded temporary law applicable to local police and paid firefighters relief association actuarial valuations prepared as of December 31, 1964. The general employee pension plan actuarial reporting law required an indication of the level normal cost, an actuarial balance sheet disclosing assets, accrued liabilities and unfunded accrued liability as well as specific required reserve figures and an indication of the 1997 target date amortization requirement. The general employee pension plan actuarial reporting law required that the actuarial valuation normal cost and accrued liabilities to be prepared using the Entry Age Normal Cost (Level Normal Cost) Method, that the actuarial method be used to value all aspects of the benefit plan and known future benefit changes, that the actuarial valuation be prepared on the basis of a three percent interest assumption and other appropriate assumptions and that assets not include any present value of future amortization contributions. The general employee pension plan actuarial reporting law required annual actuarial valuations for the State Employees Retirement Fund, the Public Employees Retirement Fund, and the State Police Officers Retirement Fund. The general employee pension plan actuarial reporting law also required the preparation of an experience study validating the actuarial assumptions used in the valuation. The local police and paid fire actuarial reporting law was based on the 1957 actuarial reporting law with the additional clarification of a three percent interest rate assumption, the requirement of normal cost and accrued liabilities calculated on the basis of the entry age normal cost method and the reporting of the amount for the amortization of the unfunded accrued liability by the 1997 target date. The local police and paid fire actuarial reporting law was applicable to all police and paid firefighters relief associations.
- <u>Laws 1967, Chapter 729</u>. Laws 1967, Chapter 729, was a revision in the 1965 local police and paid fire actuarial reporting law. The 1967 local police and paid fire actuarial reporting law was a coded general statute requiring actuarial valuations as of December 31, 1967, and each four years thereafter. It was also made applicable volunteer firefighters relief associations and very small active membership police and paid firefighters relief associations. A three percent salary rate assumption was added. A 2007 target date amortization requirement replaced the prior 1997 target date amortization requirement for police and paid fire fighters and paid fire fighters relief associations. An addition of a requirement to the calculated normal cost for amortizing net actuarial experience gains or losses was also added.
- <u>Laws 1969, Chapter 289</u>. Laws 1969, Chapter 289, revised the 1965 general employee pension plan actuarial reporting law by making the requirement applicable to the Minneapolis Employees Retirement Fund and to the three first class city teacher retirement fund associations. It also provided for an interest rate assumption to 3.5 percent as well as 3.0 percent for comparison purposes and added a salary assumption of 3.5 percent for funds with a final salary based benefit plan.
- <u>Laws 1973, Chapter 653, Section 45</u>. Laws 1973, Chapter 653, Section 45, modified the general employee pension plan actuarial reporting law by increasing the interest assumptions from 3.5 percent to 5 percent.
- <u>Laws 1975, Chapter 192</u>. Laws 1975, Chapter 192, recodified the general employee pension plan actuarial reporting law, previously coded as Minnesota Statutes 1974, Sections 356.21, 356.211, and 356.212, as Minnesota Statutes, Section 356.215.
- <u>Laws 1978, Chapter 563, Sections 9, 10, 11, and 31</u>. Laws 1978, Chapter 563, Sections 9 to 11 and 31, repealed the separate local police and fire relief association actuarial reporting law, Minnesota Statutes 1976, Sections 69.71 to 69.76, and required the local police and fire relief associations to report under the general employee pension plan actuarial reporting law with specific adaptations, coded as Minnesota Statutes, Section 356.216. It also amended the actuarial reporting law by requiring specific reporting of entry age and retirement age assumptions and the provision of a summary of the benefit plan provisions on which the actuarial valuation is based.
- <u>Laws 1979, Chapter 184</u>. Laws 1979, Chapter 184, modified the actuarial reporting law by replacing the 1997 amortization target date with a 2009 amortization target date and establishing a procedure for extending that target date in the event of substantial unfunded actuarial accrued

liabilities resulting from benefit increases, actuarial cost method changes or actuarial assumption changes.

- <u>Laws 1984, Chapter 564, Section 43</u>. Laws 1984, Chapter 564, Sections 43, substantially modified the actuarial reporting law. Actuarial valuations are required to comply with the Standards for Actuarial Work adopted by the Commission. The interest rate assumption was modified, with a post-retirement interest rate of five percent and a pre-retirement interest rate of eight percent for the major, statewide plans. The actuarial balance sheet requirement was also substantially modified, and was expanded to include reporting of current and expected future benefit obligations, current and expected future assets and current and expected future unfunded liabilities. The amortization contribution requirement was also modified, with a change from a level dollar annual amortization procedure to a level percentage of future covered payroll amortization procedure for the major, statewide and local general employee plans other than MERF.
- <u>Laws 2000, Chapter 461, Article 1</u>. Laws 2000, Chapter 461, Article 1, again substantially modified the actuarial reporting law. Salary assumptions and post-retirement interest rate assumptions were reset, and the actuarial value of assets also was changed to an approach that approaches, but smoothes, market values.
- <u>First Special Session Laws 2001, Chapter 10, Article 11, Section 18</u>. First Special Session Laws 2001, Chapter 10, Article 11, Section 18, exempted the General Employee Retirement Plan of the Public Employees Retirement Association (PERA-General) from the automatic amortization target date resetting provisions of Minnesota Statutes, Section 356.215, and sets a 2031 amortization target date for PERA-General.
- <u>Laws 2000, Chapter 392, Articles 9 and 11</u>. Laws 2000, Chapter 392, Articles 9 and 11, the select and ultimate salary increase assumptions (i.e., rates varying based on both age and length of service) for the General State Employees Retirement Plan of the Minnesota State Retirement System (MSRS-General), the General Employee Retirement Plan of the Public Employees Retirement Association (PERA-General), the Teachers Retirement Association (TRA), the Duluth Teachers Retirement Fund Association (DTRFA), the Minneapolis Teachers Retirement Fund Association (MTRFA) and the St. Paul Teachers Retirement Fund Association (SPTRFA) were revised based on the 2000 experience studies. The structure of Minnesota Statutes, Section 356.215, also was reorganized and revised as part of a recodification of Minnesota Statutes, Chapter 356.
- <u>Laws 2004, Chapter 223, Section 7</u>. Laws 2004, Chapter 223, Section 7, replaced a single contracting consulting actuary retained by the Legislative Commission on Pensions and Retirement to prepare the annual actuarial valuations of the various statewide and major local retirement plans with a single contracting consulting actuary retained jointly by the administrators of the seven retirement systems with Commission ratification.

Attachment C

Background Information: Demographic Actuarial Assumption Establishment and Revision

1. <u>In General</u>. Actuarial valuations are budgeting tools for recognizing pension costs and involve projecting future benefit expenditures and forecasting future economic and non-economic, or demographic, events. In determining the annual cost of a defined benefit pension plan and its financial health actuarially, there are two important factors, the actuarial cost method and the actuarial assumptions. Minnesota has considered the question of the appropriate actuarial cost method since the mid-1960s and requires in Minnesota Statutes, Sections 69.77, 69.773, and 356.215, the use of the Entry Age Normal Actuarial Cost Method.

In order to gauge the adequacy of actuarial assumptions, quadrennial experience studies are performed automatically for the three major retirement plans and are performed for the remaining statewide and major local retirement plans based upon ad hoc Commission action. Additionally, each actuarial valuation of a statewide or major local retirement plan is required to contain an actuarial gain and loss analysis, focusing on the major economic and demographic experience items, to assist in determining the continued accuracy of the various actuarial assumptions.

Experience studies are intended to provide the Commission with an opportunity to review the accuracy of the current actuarial assumptions, compared to the experience for a recent period and to revise those actuarial assumptions based on the recommendation of a consulting actuary and on input from plan administrators and others. The actuarial valuation process, as corrected or refined by the quadrennial experience process, is intended to provide policymakers and others with an accurate picture of the funded condition and financial requirements of a public pension plan and the process is not aided if it relies on incorrect or inadequate assumptions. If a trend line is established in recent experience, that trend line should be reflected in a plan's actuarial assumptions, even if those assumptions make the financing position of the plan appear worse than it would under different assumptions.

Minnesota public pension plan actuarial assumptions are specified in part in statute (interest/investment return, individual salary increase, and payroll growth) and are determined in part by other parties, with Commission approval (the balance of all actuarial assumptions, generally, the demographic assumptions). Economic assumptions function to project the **amount** of benefits that will be payable. Demographic assumptions function to project **when** benefits will be payable. Demographic assumptions are used to project the development of the population of the pension scheme and hence **when** the benefits to be provided will be paid. The demographic assumptions project when a member is likely to progress between the various categories of membership (active, deferred, or retired) and how long the person stays in each category. The types of economic assumptions used to measure obligations under a defined benefit pension plan include the following:

- (i) inflation;
- (ii) investment return (sometimes referred to as the valuation interest rate);
- (iii) compensation schedule; and
- (iv) other economic factors (e.g., Social Security, cost-of-living adjustments, growth of individual account balances, and variable conversion factors).

The types of demographic assumptions used to measure pension obligations include, but are not necessarily limited to, the following:

- (i) retirement;
- (ii) mortality;
- (iii) termination of employment;
- (iv) disability and disability recovery;
- (v) election of optional forms of benefits; and
- (vi) other assumptions, such as administrative expenses; household composition; marriage, divorce, and remarriage; open group assumptions; transfers; hours worked; and assumptions regarding missing or incomplete data.

The actuarial assumption selection process should result in assumptions that are reasonable in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the

measurement period. For any given measurement, two or more reasonable assumptions may be identified for the same contingency.

2. <u>Interest/Investment Rate Actuarial Assumption</u>. Because Minnesota public pension plan benefits are paid out over time and are paid from funds that are invested to obtain investment returns, future obligations are discounted for those future interest or investment earnings. In selecting the interest/investment rate actuarial assumption, the appropriate investment data should be reviewed, including the current yields to maturity of fixed income securities such as government securities and corporate bonds; any forecasts of inflation and of total returns for each asset class; historical investment data, including real risk-free returns, the inflation component of the return, and the real return or risk premium for each asset class; and the historical plan performance.

The interest/investment rate actuarial assumptions can be arrived at using one of two methods, either the building block method or the cash-flow matching method. Under the building-block method, the expected future investment return of each asset class is assembled as a combination of the components of investment return. These components are factors such as inflation and the real rate of return for the class. The best-estimate investment return range is determined by identifying a bestestimate range of expected future real returns for each broad asset class applicable to the plan, such as cash and cash equivalents, fixed income securities and equities, an average weighted real-return range reflecting the plan's expected asset class mix is computed and that range is combined with the expected inflation range. Under the cash flow matching method, the expected future investment return range is a combination of the internal rate of return on a bond portfolio with interest and principal payment approximately matching the plan's expected disbursements, and a risk adjustment range. The best-estimate investment return range is determined:

- by projecting the plan's benefit and expense disbursements to be valued in the measurement;
- by identifying a highly diversified portfolio available as of the measurement date of non-callable, high-quality corporate or U.S. government bonds with interest and principal payments approximately matching the projected disbursements;
- by computing the bond portfolio's internal rate of return;
- by establishing a risk adjustment range for the plan that reflects the uncertainties in the projected benefits and expenses, the expected returns on future contributions, the reinvestment of interest and principal payments not fully needed to pay current benefits, any mismatches between the benefit disbursement stream and the high-quality bond portfolio's interest and principal payment stream, and the current and expected future plan investments in equities or other asset classes besides high-quality bonds; and
- then by combining these figures.
- 3. <u>Compensation/Salary Scale Actuarial Assumption</u>. Compensation is a factor in determining participants' benefits in Minnesota public pension plans other than volunteer firefighter relief associations. Generally, a participant's compensation will change over the long term in accordance with inflation, productivity growth, and merit scale increases. The assumption used to measure the anticipated year-to-year change in compensation is referred to as the *compensation* or salary *scale*. It may be a single rate assumption, or, alternatively, it may be a select and ultimate rate assumption and vary by age and/or service, consistent with the merit scale component; or vary over future years, consistent with the inflation component.

In selecting the compensation or salary scale assumption, the appropriate compensation data should be reviewed, including the plan sponsor's current compensation practice and any anticipated changes in this practice; the current compensation distributions by age and/or service; historical compensation increases and the practices of the plan sponsor/sponsors; and historical national wage and productivity increases.

The compensation or salary scale assumption is generally constructed using a building-block method, which combines the best-estimate ranges for the components of compensation scale. These components include inflation, productivity growth, and merit scale.

4. <u>Retirement Age Assumption</u>. With only a few exceptions, where length of service is the determining factor, Minnesota public pension plan members are required to attain a specified minimum age at which retirement benefits are payable if the member also terminates active employment. The retirement age assumptions relate to the specific age at which retirement benefits are likely to begin or the ages with a specific probability of retirement benefit commencement. In selecting the

retirement age assumptions, in addition to data on the past experience of the plan membership, consideration should be given to the factors of the plan design, where specific incentives may influence when participants retire; the design of and the date of anticipated payment from Social Security and Medicare; and the availability of other employer-sponsored post-retirement benefit programs.

- 5. <u>Turnover/Termination of Employment Assumptions</u>. The termination of public employment by a Minnesota public pension plan member determines the amount of the person's accrued service credit. Minnesota public pension plans utilize service credit in determining retirement benefit amounts. The termination/withdrawal/turnover assumption predicts the amount of service credit to be acquired by plan members and also predicts the extent of any gain expected to be accrued from plan members who terminate without vesting. In selecting the termination assumption, in addition to data on the past experience of the plan, consideration should be given to the factors of employer-specific or job-related factors such as occupation, employment policies, work environment, unionization, hazardous conditions, and location of employment; and applicable plan provisions, such as any early retirement benefits, the vesting schedule, or the payout options.
- 6. <u>Mortality Assumptions</u>. Generally, Minnesota public retirement plan benefits terminate upon the death of the recipient, or if a joint and survivor optional annuity form was chosen, upon the death of the survivor. The mortality assumption is the measure of the expected lifetimes of active members, retired members, deferred retirees, disabilitants, and survivors. In addition to data on the past experience of the plan, in selecting the mortality assumptions, consideration should be given to the likelihood and extent of mortality improvement in the future.
- 7. <u>Disability Assumption</u>. Except for the Legislators Retirement Plan, the Elected State Officers Retirement Plan, and some volunteer firefighter relief associations, Minnesota public pension plans pay disability benefits. The disability assumption is a prediction of the occurrence of disabilities, which constitute a premature commencement of benefits. In selecting the disability assumption, in addition to analyzing the data on the past experience of the plan, consideration should be given to the plan's definition of disability and the potential for recovery.
- 8. <u>Optional Annuity Form Election Assumption</u>. Most statewide and major local Minnesota public pension plans provide optional annuity forms, whereby the number adjusts the timeframe over which the benefit will be paid in return for a modification in the amount of the benefit. Many of these plans have a subsidized bounce back joint and survivor optional annuity form, the selection of which will increase the liability of the plan. The optional annuity form election assumption implements expectations about the future selections of optional annuity forms. In addition to analyzing the data on the past experience of the plan, in selecting the optional annuity form election assumption, consideration should be given to the benefit forms and benefit commencement dates available under the plan and the degree to which particular benefit forms may be subsidized.
- 9. <u>Time Horizon for Setting Actuarial Assumptions</u>. The actuarial assumption selection or revision process should result in assumptions that are reasonable in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period. For any given measurement, two or more reasonable assumptions may be identified for the same contingency. At a minimum, when a revision of an actuarial assumption is considered, the new actuarial assumption should be consistent with the recent experience in that area unless experience is in flux, and then the new actuarial assumption should attempt to reasonably anticipate the progression of any identifiable trend.

In particular with respect to mortality, in addition to data on the past experience of the plan, in selecting the mortality assumptions, consideration should be given to the likelihood and extent of mortality improvement in the future.

Where a retirement plan is closed to new members, such as the Minneapolis Employees Retirement Fund (MERF), the Minneapolis Firefighters Relief Association (MFRA), or the Minneapolis Police Relief Association (MPRA), the consideration of an appropriate mortality table may be different because of that fact. The consideration is shaped by the fact that the total covered population is known, that the population is somewhat less susceptible to developments in longevity compared to plans with open active memberships due to a likely greater average age, and that any mortality losses will be required to be funded relatively quickly due to relatively short remaining amortization periods.

10. <u>Context in Which Actuarial Assumptions are Set; Complications</u>. Changing actuarial assumptions, when the quadrennial experience study indicates a need to do so, is not always an easy proposition. In the 1993-1995 round of experience studies, several assumptions that were identified for modification by the Commission actuary ultimately were not modified because of opposition from pension plan actuaries and administrators and several assumption changes were subject to dispute because of apparent stylistic disagreements among actuaries and because of the actuarial cost impact of the change on the potential for additional future benefit increases.

Frequently in the past, actuarial assumptions have been changed in combination with benefit improvements (principally 1973 and 1989 for the statewide plans) or in combination with contribution restructurings (1984 for the statewide and major local plans; 1991 for the Minneapolis Employees Retirement Fund (MERF)).

Attachment D

Background Information: Revising Mortality Actuarial Assumptions for Closed Membership Defined Benefit Retirement Plans

Minnesota has seven defined benefit retirement plans which have been closed to new members in the past. The retirement plans are the Legislators Retirement Plan, the Elective State Officers Retirement Plan, the Minneapolis Employees Retirement Fund Plan (MERF), the Fairmont Police Relief Association, the Minneapolis Firefighters Relief Association, the Minneapolis Police Relief Association, and the Virginia Fire Department Relief Association.

The Legislators Retirement Plan and the Elective State Officers Retirement Plan were closed to new members in 1997, the Minneapolis Employees Retirement Fund Plan was closed to new members in 1979, the Fairmont Police Relief Association was closed to new members in 1977, the Minneapolis Firefighters Relief Association and the Minneapolis Police Relief Association were closed to new members in 1980, and the Virginia Fire Department Relief Association was closed to new members in 1974. The Legislators Retirement Plan and the Elective State Officers Retirement Plan are not funded on an actuarial basis, although actuarial work for the plans are prepared annually, and the plans are funded on a current disbursements or "pay as you go" basis month to month from the State General Fund. The Minneapolis Employees Retirement Fund Plan is funded on an actuarial basis, with a 2020 amortization date. The Minneapolis Firefighters Relief Association are funded on an actuarial basis, with a 2010 amortization date. The Minneapolis Firefighters Relief Association is funded on an actuarial basis, with a 2020 amortization date, subject to extensions upon future actuarial losses. The Minneapolis Police Relief Association is also funded on an actuarial basis, with a 2020 amortization date, reset from 2010 by 2005 special legislation.

With a closed retirement plan and a membership that has an increasing average age and average length of service credit, several actuarial assumptions become largely or wholly unimportant, such as turnover. The mortality assumption, however, remains an important actuarial assumption, along with the interest assumption, and, especially with the local police and paid firefighter relief associations covered by active pay-related benefit escalator provisions, the salary increase assumption. The mortality assumption, which projects life expectancy for retirees, is a primary factor in determining the total amount of retirement benefits payable to the plan membership. The salary assumption is the basis for projecting the amount of the final compensation used to calculate the initial retirement benefit and, when salary related, the amount of the periodic increases in the benefit. The interest assumption is the discount rate used in calculating the present value of each retirement benefit, totaled as a significant component of the actuarial accrued liability of the retirement plan.

Mortality tables are typically constructed by insurance companies, the National Center for Health Statistics, and actuarial organizations.

For the statewide and major local general employee retirement plans, with the exception of the Minneapolis Employees Retirement Fund Plan (MERF), the mortality table in force for the active membership and non-disabled retired membership is the 1983 Group Annuity Mortality Table (1983 GAM) with specific set backs and set forwards. MERF uses the 1986 Projected Experience Mortality Table. The four remaining local police and salaried firefighter relief associations use the 1984 Uninsured Pensioner Mortality Table (UP-1984), with specific set backs and set forwards.

The 1983 GAM mortality table is based on group annuitant experience from the period 1964-1968, was constructed in 1985, and was developed after the Group Annuity Mortality-1971 (GAM-1971) mortality table was reviewed and the experience if insurance companies indicated that the GAM-1971 mortality table was inadequate, projected additional mortality improvements to 1983 based on 1966-1975 trends, and added a ten percent conservatism margin. The 1983 GAM mortality table has led to the development of a 1994 Group Annuity Mortality Table (1994 GAM) after a study of 1986-1990 annuitant experience indicated its weaknesses in predicting male mortality. The 1994 GAM mortality table is derived from the same underlying data as the 1983 GAM mortality tables, with the 1994 GAM adding a seven percent margin.

The UP-1984 mortality table was issued in 1974 and projected mortality improvements to 1984, based on experience from the late 1960s period. The UP-1984 mortality table was primarily designed to be a unisex table, although the Society of Actuaries Uninsured Pensioner Mortality Subcommittee in 1995 believed that sex-distinct tables are more appropriate for actuarial valuations. The UP-1984 mortality table has been replaced by the 1994 Uninsured Pensioner Mortality Table (UP-1994), which was

developed by the Society of Actuaries as a result of a study of 1985-1989 mortality experience of 29 retirement plans which indicates a significant departure in the UP-1984 mortality table from actual mortality (actual mortality equal to 82 to 86 percent of predicted mortality).

The following compares the life expectancy or age at death results (current age plus expected future durations) for the three base tables for various sample ages and includes, for comparison, the 1994 Group Annuity Reserving Mortality Table (GAR-1994), an intended update of the 1983 GAM mortality table prepared by the Society of Actuaries projected to 1994 for the insurance industry, reflecting the constraints of insurance company reserve valuation laws:

Age	1983 GAM	UP-1984	UP-1994	GAR-1994
20	77.9	73.8	78.6	84.6
25	78.0	74.1	78.8	84.3
30	78.1	74.3	79.0	84.0
35	78.3	74.6	79.2	83.7
40	78.5	74.9	79.4	83.4
45	78.7	75.4	79.7	83.1
50	79.2	76.0	80.0	82.9
55	79.8	76.9	80.5	82.9
60	80.6	78.1	81.2	83.1
65	81.7	79.7	82.3	83.7
70	83.2	81.7	83.8	84.9
75	85.2	84.0	85.7	86.4
80	87.6	86.8	88.0	88.5
85	90.7	90.0	90.9	91.3
90	94.3	93.5	94.2	94.4
95	98.2	97.4	97.9	98.2

Statewide and Major Local Retirement Plans: Comparison of Mortality Tables

A. General Employee Retirement Plans

1. <u>General State Employees Retirement Plan of the Minnesota State Retirement System (MSRS-General)</u>

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back five years. 1983 Group Annuity Mortality Table for females set back two years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back two years. 1983 Group Annuity Mortality Table for females set back one year.
Disabled:	Male:	1965 RRB rates through age 54. For ages 55 to 64, graded rates between 1965 RRB rates and the Healthy Post-Retirement mortality table. For ages 65 and later, the Healthy Post-Retirement mortality table.
	Female:	1965 RRB rates through age 54. For ages 55 to 64, graded rates between 1965 RRB rates and the Healthy Post-Retirement mortality table. For ages 65 and later, the Healthy Post-Retirement mortality table.

2. General Employee Retirement Plan of the Public Employees Retirement Association (PERA-General)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back eight years. 1983 Group Annuity Mortality Table for females set back seven years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back one year. 1983 Group Annuity Mortality Table for females set back one year.
Disabled:	Male:	1965 RRB through age 54. For ages 55 to 64, graded rates between 1965 RRB and the healthy post-retirement mortality table. For ages 65 and later, the healthy post-retirement mortality table.
	Female:	1965 RRB through age 54. For ages 55 to 64, graded rates between 1965 RRB and the healthy post-retirement mortality table. For ages 65 and later, the healthy post-retirement mortality table.

3. Teachers Retirement Association (TRA)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 12 years 1983 Group Annuity Mortality Table for females set back 10 years
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 6 years 1983 Group Annuity Mortality Table for females set back 3 years
Disabled:	Male: Female:	1965 Railroad Retirement Board (RRB) rates through age 54. For ages 55 to 64, graded rates between 1965 RRB rates and the Healthy Post-Retirement mortality table. For ages 65 and later, the Healthy Post-Retirement mortality table. 1965 Railroad Retirement Board (RRB) rates through age 54. For ages 55 to 64, graded rates between 1965 RRB rates and the Healthy Post-Retirement mortality table. For ages 65 and later, the Healthy Post-Retirement mortality table. For ages 65 and later, the Healthy Post-Retirement mortality table.

4. Duluth Teachers Retirement Fund Association (DTRFA)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for Males set back 10 years 1983 Group Annuity Mortality Table for Females set back 7 years
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for Males set back 2 years 1983 Group Annuity Mortality Table for Females
Disabled:	Male: Female:	1977 Railroad Retirement Board Mortality Table for Disabled Lives 1977 Railroad Retirement Board Mortality Table for Disabled Lives

5. Minneapolis Teachers Retirement Fund Association (MTRFA)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 12 years 1983 Group Annuity Mortality Table for females set back 10 years
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 4 years 1983 Group Annuity Mortality Table for females set back 1 year
Disabled:	Male: Female:	1977 Railroad Retirement Board Mortality Table for Disabled Lives 1977 Railroad Retirement Board Mortality Table for Disabled Lives

6. St. Paul Teachers Retirement Fund Association (SPTRFA)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 7 years 1983 Group Annuity Mortality Table for females set back 5 years
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back 3 years 1983 Group Annuity Mortality Table for females set back 1 year
Disabled:	Male: Female:	1977 Railroad Retirement Board Mortality Table for Disabled Lives 1977 Railroad Retirement Board Mortality Table for Disabled Lives

7. Minneapolis Employees Retirement Fund (MERF)

Healthy:Average of male and female rates of 1986 Projected Experience Table with a 1-year age setbackDisabled:Average of male and female rates of 1986 Projected Experience Table with a 1-year age setback

B. Public Safety Employee Retirement Plans

1. State Patrol Retirement Plan

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back one year. 1983 Group Annuity Mortality Table for females.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set forward two years. 1983 Group Annuity Mortality Table for females set forward two years.
Disabled:	Male: Female:	Combined Annuity Mortality. Combined Annuity Mortality.

2. Public Employees Police and Fire Retirement Plan (PERA-P&F)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back six years. 1983 Group Annuity Mortality Table for females set back six years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back one year. 1983 Group Annuity Mortality Table for females set back one year.
Disabled:	Male: Female:	1965 RRB rates up to age 40. For ages 41 to 59, graded rates between 1965 RRB and the Healthy Post-Retirement Mortality Table. For ages 60 and later, the Healthy Post-Retirement Mortality Table. 1965 RRB rates up to age 40. For ages 41 to 59, graded rates between 1965 RRB and the Healthy Post-Retirement Mortality Table. For ages 60 and later, the Healthy Post-Retirement Mortality Table.

3. <u>Correctional State Employees Retirement Plan of the Minnesota State Retirement System (MSRS-Correctional)</u>

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back one year. 1983 Group Annuity Mortality Table for females.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set forward two years. 1983 Group Annuity Mortality Table for females set forward two years.
Disabled:	Male: Female:	Combined Annuity Mortality Table. Combined Annuity Mortality Table.

4. Local Government Correctional Employees Retirement Plan of the Public Employees Retirement Association (PERA-Correctional)

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back one year. 1983 Group Annuity Mortality Table for females.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set forward two years. 1983 Group Annuity Mortality Table for females set forward two years.
Disabled:	Male: Female:	Combined Annuity Mortality Table. Combined Annuity Mortality Table.

C. Specialty Retirement Plans

1. <u>Elective State Officers Retirement Plan</u>

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back four years. 1983 Group Annuity Mortality Table for females set back two years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males. 1983 Group Annuity Mortality Table for females.
Disabled:	Male: Female:	N/A N/A

2. Legislators Retirement Plan

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back four years. 1983 Group Annuity Mortality Table for females set back two years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males. 1983 Group Annuity Mortality Table for females.
Disabled:	Male: Female:	N/A N/A

3. Judges Retirement Plan

Healthy Pre-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males set back four years.1983 Group Annuity Mortality Table for females set back two years.
Healthy Post-Retirement:	Male: Female:	1983 Group Annuity Mortality Table for males. 1983 Group Annuity Mortality Table for females.
Disabled:	Male: Female:	Combined Annuity Mortality Table. Combined Annuity Mortality Table.

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moves that the Legislative Commission on Pensions and Retirement approve under Minnesota Statutes, Section 356.215, Subdivision 18, a change in the mortality table for the Minneapolis Firefighters Relief Association from the UP-1984 Mortality Table, set forward two years for males and set back three years for females, to the 1983 GAM mortality table, set forward two years for females.