

STANDARDS FOR ACTUARIAL WORK  
ESTABLISHED BY THE STATE OF  
MINNESOTA LEGISLATIVE COMMISSION  
ON PENSIONS AND RETIREMENT

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## PREFACE

These standards were adopted by the Legislative Commission on Pensions and Retirement as of June 30, 1985, and amended on July 21, 1986, July 28, 1986, August 26, 1987, August 22, 1988, September 20, 1989, July 8, 1992, June 13, 1996, August 23, 2001, and August 20, 2007. All actuarial work for retirement plans subject only to Minnesota Statutes, Section 356.215 and not subject to Minnesota Statutes, Section 356.216, as of dates after June 30, 1988, must be prepared in accordance with the appropriate standards in effect as of the date of the valuation.

The standards set out herein contain a number of technical pension actuarial terms. Definitions of these terms are found in Section X. Actuarial terminology used herein is in accordance with the terminology adopted by the American Academy of Actuaries. Where such terminology conflicts with the terminology of the Minnesota Statutes, the statutory term is noted in the definition.

These standards may be amended at any time by the Legislative Commission on Pensions and Retirement. Any such amendment is effective for the actuarial valuation performed as of the first valuation date following the effective date of the amendment except as otherwise provided by the Legislative Commission on Pensions and Retirement.

For each retirement plan subject to Minnesota Statutes, Section 356.215, the valuation date for each valuation performed under these standards shall be July 1.

These standards are adopted for actuarial purposes only. They do not constitute or reflect terms of a contract between the state, or a fund, and the members of a fund; nor do they constitute or reflect a promise by the state, or a fund, to maintain a current benefit or pension plan practice, or to implement a projected or authorized benefit or practice. A member of a fund should not rely upon the implementation or maintenance of a benefit or pension plan practice because of an assumption reflected in these standards.

I. Introduction

A. These standards have been promulgated by the Legislative Commission on Pension and Retirement in order to implement Minnesota Statutes, Section 356.215.

B. The purposes of these standards are:

- (1) To ensure that sound actuarial procedures are utilized in developing actuarial assumptions, actuarial valuations, and cost estimates for proposed legislation for each retirement plan.
- (2) To establish sufficient uniformity of actuarial procedure that financial comparability of the retirement plans of the State of Minnesota is maximized.
- (3) To facilitate the development of sound public policy decision making in the pension area by the Legislature and the Legislative Commission on Pensions and Retirement.

C. Scope of the standards

(1) These standards apply to the following retirement plans. When "plan" or "retirement plan" is used, such terms refer to statutory retirement provisions as constituted on the date of valuation of the following:

- (a) Minnesota State Retirement System ("MSRS"), including:
  - (i) General State Employees - Minnesota Statutes, Chapter 352
  - (ii) Correctional Employees - Minnesota Statutes, Chapter 352
  - (iii) Legislators - Minnesota Statutes, Chapter 3A
  - (iv) Judges - Minnesota Statutes, Chapter 490
  - (v) State Patrol - Minnesota Statutes, Chapter 352B
  - (vi) Elective State Officers - Minnesota Statutes, Chapter 352C
  - (vii) Military Affairs Department Special Coverage Program - Minnesota Statutes, Chapter 352

- (viii) Transportation Department Pilot Special Coverage Program  
- Minnesota Statutes, Chapter 352
- (ix) State Fire Marshal Division Employee Special Coverage  
Program – Minnesota Statutes, Chapter 352
- (x) University Hospital Employee Special Retirement Coverage  
– Minnesota Statutes, Chapter 352F.
- (b) Public Employee Retirement Association (PERA)
  - (i) General Employees - Minnesota Statutes, Chapter 353
  - (ii) Police and Fire - Minnesota Statutes, Chapter 353
  - (iii) Local Police and Fire Relief Association Consolidation  
Accounts - Minnesota Statutes, Chapters 353A and 353B
  - (iv) Local Government Correctional Service Retirement Plan -  
Minnesota Statutes, Chapter 353 E
  - (v) Privatized Public Employee Special Retirement Coverage –  
Minnesota Statutes, Chapter 353F.
- (c) Teachers Retirement Association (TRA) - Minnesota Statutes,  
Chapter 354.
- (d) Minneapolis Employees Retirement Fund (MERF) - Minnesota  
Statutes, Chapter 422A.
- (e) Minneapolis Teachers Retirement Fund Association - Minnesota  
Statutes, Chapter 354A.
- (f) St. Paul Teachers Retirement Fund Association - Minnesota  
Statutes, Chapter 354A.
- (g) Duluth Teachers Retirement Fund Association - Minnesota Statutes,  
Chapter 354A.
- (2) All actuarial valuations performed by an Actuary retained to do the work  
for any retirement plan as of a date on or after July 1, 1985 must be

developed in accordance with these standards. Special procedures for the Relief Association Accounts are contained in Section VII.

- (3) All experience studies performed by an Actuary retained to do the work for any retirement plan as of a date on or after July 1, 1985 must be developed in accordance with these standards.
- (4) All cost estimates relative to proposed legislative changes in the eligibility or benefit provisions of any retirement plan performed by an Actuary retained to do the work on or after July 1, 1985 must be developed in accordance with these standards.

D. Alternative to the Standards

- (1) The board of a retirement plan may use a different basis or assumptions as permitted by Minnesota Statutes, Section 356.23 for submitting alternative reports and valuations to the Legislature, if the different assumptions and basis are clearly disclosed.
- (2) The board of a retirement plan that prepares an alternative valuation must also prepare a supplemental valuation in accordance with Minnesota Statutes, Section 356.215, and these standards.

## II. Actuarial Assumptions

### A. General

- (1) Any actuarial valuation is based upon a projection of expected benefits to be paid in future years by a retirement plan. Any projection of future events requires the use of assumptions relative to the forces which affect those future events.
- (2) There are two general types of actuarial assumptions used in actuarial valuations of a retirement plan:
  - (a) Economic Assumptions
  - (b) Demographic Assumptions
- (3) Any event which triggers or terminates a benefit should be reflected in the set of actuarial assumptions. However, such an event need not be reflected in the assumptions if the impact of that omission on the results of the actuarial valuation is reasonably deemed by the Actuary not to be material. Any omission must be disclosed in the actuarial valuation along with a statement of the rationale for the omission.
- (4) Actuarial assumptions that are not set by statute may be initially established or subsequently changed only with the approval of the Commission.
- (5) Special assumptions for the Relief Association Accounts are in Section VII.

### B. Economic Assumptions

- (1) The purpose of economic assumptions is to project the effect of economic forces on the retirement plan.
- (2) Primary economic assumptions are:
  - (a) Rates of annual investment return
  - (b) Rates of annual individual compensation increase
  - (c) Rates of annual payroll growth (if applicable)

- (3) Each of these primary assumptions may be reviewed as having a base component and a plan specific component. The base component is related to general economics and market conditions which apply to all plans in a similar manner. The statutes have established the following base economic assumptions:

	<b>First Class City Teachers Retirement Fund Associations</b>	<b><u>MERF</u></b>	<b><u>All Others</u></b>
Investment Return Rates			
Pre-retirement	8.50%*	6.00%	8.50%
Post-retirement	8.50%*	5.00%	6.00%

\* *Adjusted as appropriate for plan specific post-retirement C-O-L-A provisions.*

Individual Compensation Increase Rates	5.00%	4.00%	5.00%
Payroll Growth Rates	5.00%	N/A	5.00%

- (4) The following plan specific components have been adopted by statute as of July 31, 1995:

	<b>Individual Compensation Increase Rates</b>	<b>Payroll Growth Rates</b>
First Class City Teachers Retirement Fund Associations	*	0.00%
Teachers' Retirement Association	*	0.00
Public Employees' Retirement Association	*	1.00
State Employees' Retirement Fund	*	0.00
All Others	0.00%	0.00%

\* *Plan-specific, age-related merit and seniority scale as shown in Appendix G.*

For the Legislators Plan, the Judges Plan, and the Elective State Officers Plan, the Individual compensation increase and payroll growth rates must

be adjusted to the extent of known future salary levels as provided in statute or in the recommendations from the Compensation Council.

C. Demographic Assumptions

- (1) The purpose of demographic assumptions is to project the flow of members through and out of the retirement plan.
- (2) There are a number of demographic assumptions:
  - (a) Primary Demographic Assumptions
    - (i) Rates of Turnover - reflect patterns of member terminations from the retirement plan for reasons other than retirement, death and disability. These patterns must be based on sex, age and years of service unless experience shows otherwise.
    - (ii) Rates of Retirement - reflect patterns by which members retire under the service retirement provisions of the plan. These patterns must be based on sex, age and years of service unless experience shows otherwise.
    - (iii) Rates of Mortality (Post-Retirement) - reflect mortality patterns of retired members. This determines the expected period over which benefits are to be paid. These patterns must be based on sex and age unless experience shows otherwise. Any use of sex-related rates are for funding purposes only and do not affect benefits.
  - (b) Other Demographic Assumptions
    - (i) Rates of Disablement - reflect patterns by which members become disabled under the plan. These patterns must be based on sex, age and type of disability (i.e., occupational, non-occupational) unless experience shows otherwise.

- (ii) Rates of Mortality (Pre-Retirement) - reflect mortality patterns of active members prior to retirement. These patterns must be based on sex and age unless experience shows otherwise.
  - (iii) Rates of Survivor Mortality - reflect mortality patterns of survivors of deceased members. These patterns must be based on sex and age unless experience shows otherwise.
  - (iv) Rates of Termination of Disability - reflect mortality and recovery patterns of disabled members. These patterns must be based on age and sex unless experience shows otherwise.
- (3) No change in a demographic assumption may be made unless that change has been established by a formal study of experience of the plan.
- (i) Primary demographic assumptions must be set in close accordance with actual experience. The other assumptions should follow the patterns of actual experience but may deviate more from that experience than may the primary assumptions. Assumptions should reference the experience period on which they are based and the extent they deviate from actual experience. Assumptions should not be changed based on experience which may be distorted by temporary conditions such as an early retirement program.
  - (ii) Demographic assumptions may be established by reference to a standard table so long as the Actuary can establish that such table, with appropriate age adjustments or projections to reflect mortality changes, relates reasonably to actual experience.
  - (iii) Certain decrements are as much a function of years of service as of age. As trends are observed from the experience studies, these

assumptions may be established on a basis that takes into account years of service under the plan, as well as years of age.

- (iv) Rates of Retirement - Based on trends observed from the experience studies, actuarial valuations must be completed using rates of retirement for various ages and, when appropriate, periods of service.
- (4) The occurrence of demographic assumptions must be assumed to be mid-year, with an exception for the Rates of Retirement for certain teacher plans. The occurrence of retirements for the Teachers Retirement Fund, Minneapolis Teachers Retirement Fund, the St. Paul Teachers Retirement Fund and the Duluth Teachers Retirement Fund must be assumed to be on the valuation date nearest the attainment of the retirement age or service.

D. Miscellaneous Assumptions

- (1) Social Security - Any Social Security benefit estimates required to estimate future benefit offsets of a plan must be calculated in accordance with the assumption that the Social Security laws in effect on the valuation date will remain unchanged. Economic factors used for such projected benefits will be consistent with the factors used to project plan benefits.
- (2) Future Expense - The future administrative and investment expenses of each retirement system must be estimated based on the assumption that such expenses will be a percentage of system payroll. For all plans other than MERF, that percentage must be equal to the ratio of such expenses to total covered payroll under the plan in the fiscal year preceding the valuation date. For MERF, the expenses for the prior year must be increased 3-1/2% and must be expressed as a percentage of the total covered payroll projected for the fiscal year following the valuation date.

- (3) Family Characteristics, Remarriage, Etc. - These assumptions must be based on the best information available from the retirement plan.
- (4) Members Remaining Active Beyond the Age at Which the Retirement Rate becomes 100% - Each remaining active member must be assumed to retire one year following the valuation date. Remaining active members must be included in the valuation for all purposes.
- (5) Discretionary Post Retirement Adjustments - Unless there is a clear historical pattern which renders such an assumption inappropriate, any discretionary post retirement adjustment authorized by law must be assumed to be paid each year in the future. A post retirement assumption does not, however, constitute or reflect a contractual obligation or promise to pay a discretionary post retirement adjustment in any future year. A post retirement adjustment must be assumed to be paid at a level consistent with the economic assumptions used in the valuation.

E. Asset Valuation

- (1) Actuarial Value of Assets for use in each actuarial valuation must be determined using the methodology described in the next paragraph which is intended to smooth the fluctuations of Market Value, while tracking to Market Value over time. For purposes of the actuarial valuation beginning with the July 1, 2007, valuation, assets allocated to the Minnesota Post-Retirement Investment Fund and to MERF's Retirement Benefit Fund must equal the Market Value of Assets on the valuation date.
- (2) The Actuarial Value of Assets on a Valuation Date must be determined as follows:
  - (a) The Market Value of Assets on the Valuation Date, less the following—

- (i) 80% of the Excess Return/(Return Shortfall) in the twelve month period ending on the Valuation Date;
  - (ii) 60% of the Excess Return/(Return Shortfall) in the twelve month period ending one year before the Valuation Date;
  - (iii) 40% of the Excess Return/(Return Shortfall) in the twelve month period ending two years before the Valuation Date;
- and
- (iv) 20% of the Excess Return/(Return Shortfall) in the twelve month period ending three years before the Valuation Date.
- (b) The Market Value of the assets of the fund must be the published price at the close of the trading day preceding the valuation date net of amounts due and unpaid as of the valuation date. The Market Value of any investment for which trade prices are not generally available must be established by appraisal or by any other technique which is recognized by persons expert in such assets as producing reasonable results.
- (c) For purposes of this calculation, “Excess Return” is the amount by which actual return on the Market Value of assets not held in the Minnesota Post-Retirement Investment Fund exceeds the expected return on those assets based on the assumed rate of 8.5%.
- (d) For purposes of this calculation, “Return Shortfall” is the amount by which actual return on the Market Value of assets not held in the Minnesota Post-Retirement Investment fund is less than the expected return on those assets based on the assumed rate of 8.5%.
- (e) For financial reporting purposes, assets allocated to the Minnesota Post-Retirement Investment Fund and to MERF’s Retirement

Benefit Fund must equal the Market Value of Assets on the valuation date.

### III. Actuarial Cost Methods

A. The Entry Age Actuarial Cost Method (defined in III.C.), applying the closed group technique, must be utilized for all actuarial valuations of each retirement plan except for the Relief Association Accounts. See Section VII for a description of the cost method.

(1) For each active member and for each separate benefit type provided under the plan, a Normal Cost is calculated as follows:

(a) The Actuarial Present Value ("APV") of the Projected Benefit (see Section X) for that member is calculated as of the Entry Age of that member.

(b) The Actuarial Present Value ("APV") of Future Compensation (see Section X) is calculated as of the Entry Age of that member. This calculation must be based on compensation for the year preceding the Valuation Date or the rate of annual compensation as of the Valuation Date. That compensation must be adjusted back to Entry Age reflecting assumed prior pay increases consistent with the combined base and plan specific individual compensation rate increases as in effect for the current valuation. Likewise, the projection of future compensation must assume pay increases which combine base and plan specific assumptions.

(c) The Normal Cost Rate for the member for that benefit is the ratio of (a) to (b).

(d) The dollar Normal Cost for the member for that benefit is the Normal Cost Rate multiplied by the estimated compensation for the year commencing on the valuation date. Estimated compensation must be the Actuary's best estimate of such compensation. Considerations in making this estimate are as follows:

- (i) If the actual compensation in the year preceding the valuation date is used as the base, the estimated compensation is equal to that base multiplied by the applicable combined base and plan specific individual compensation interest rate assumption in effect for the valuation (the known statutory compensation increases or the compensation increases recommended by the Compensation Council may be substituted for the Legislators' Plan, the Elective State Officers' Plan and the Judges' Plan).
  - (ii) If a compensation rate at the Valuation Date is used as the base, the estimated compensation must be calculated by adjusting such compensation rates appropriately using the assumed rate of annual salary increase.
  - (e) The total Normal Cost for each benefit type over the entire plan is the sum of Normal Costs for each member for that benefit type.
  - (f) The total Normal Cost Rate for each benefit type is the Normal Cost for that benefit divided by the total estimated compensation for the year following the valuation date, and adjusted for interest, if necessary, to reflect the expected timing of employer contributions to the plan.
  - (g) The total Normal Cost Rate for the plan is the total of Normal Cost Rates for each benefit type.
- (2) The Actuarial Accrued Liability ("AAL") for the plan must be calculated as of each valuation date as follows:
- (a) The APV of a specific Projected Benefit is calculated for each individual (see Section X).

- (b) The APV of Future Compensation of each active member of the plan is calculated (see Section X).
- (c) The APV of Future Normal Costs for that specific Projected Benefit is determined by multiplying the member's Normal Cost Rate for that Benefit by the member's APV of Future Compensation.
- (d) The AAL for the plan is the amount, (a)-(c), summed for all individuals and all Projected Benefits.
- (e) The Unfunded Actuarial Accrued Liability ("UAAL") is the AAL less the Actuarial Value of Assets.

B. Benefits to be recognized.

- (1) The Actuarial Present Value of the Projected Benefit must be recognized in the actuarial valuation for each type of benefit which is provided under the plan at the level provided under the plan. For example, the Actuarial Present Value ("APV") of Projected Benefits in the event of termination should be recognized. For years prior to the member's vesting date, the APV of Projected Benefits is based on the member's contributions accumulated with interest. The proper technique for recognizing terminations that are expected following the member's vesting date is to assume that the member selects the benefit with the greater value. Thus, for each year after the member's vesting date, the APV of Projected Benefits will be based on the larger of the member's contributions accumulated with interest or the present value of the member's vested deferred benefit (augmented, if appropriate) which is determined by using the valuation actuarial assumptions.
- (2) A particular benefit type or benefit level must be deemed to be provided under a plan if it is authorized by law in effect on the valuation date. The recognition of a particular benefit type or level for actuarial purposes does

not, however, constitute or reflect a contractual obligation or promise to maintain the benefit type or level in the future.

- (3) Any discretionary post retirement adjustment authorized by law must be assumed to be paid in all future years unless there is a clear historical pattern which would render such an assumption inappropriate. A post retirement adjustment assumption does not, however, constitute or reflect a contractual obligation or promise by the State of Minnesota or by the applicable pension plan to pay a discretionary post retirement adjustment in any future year. The type of post retirement adjustment and its relation to future investment earnings must determine the technique for recognizing the benefit liability.

In the case of Minneapolis Teachers, St. Paul Teachers, and Duluth Teachers, the discretionary benefit is available only when the return on assets exceeds the assumed 8.5%. The return on assets must be measured over the most recent five-year fiscal period using the average time weighted total rate of return for the five-year period, which must be calculated using the formula established by the State Board of Investment. For example, if the average time weighted return over the five-year period (ending June 30, 2001) is 12.4%, then the maximum benefit increase (on January 1, 2002) is 3.9%, which is 12.4% minus 8.5%. Members and survivors who are currently receiving benefits, unless they commenced in the last twelve months, will be entitled to the benefit increase the following January 1 (2002). The appropriate technique for recognizing the discretionary benefit liability is to increase the reserves for benefits to be paid after January 1 (2002), for those who are eligible for the benefit increase, by 3.9% of their reserve value on the valuation date. In the following year valuation (July 1, 2002), the actual benefit being paid (which would include any increase

granted the prior January 1) would be used in determining the reserves. The extent to which the new five-year (ending June 30, 2002) average time weighted total rate of return exceeds 8.5% will establish a liability for the next January 1 (2003) benefit increase. It is not necessary to estimate benefit increases further than one year in advance since the time weighted total rates of return can be expected to fluctuate considerably due to market value changes, even though they are based on a rolling five-year average. Furthermore, if the assets earn more than the assumed statutory rate of 8.5% in future years, any excess above 8.5% will be used to provide additional benefits.

- (4) Any benefit type or benefit level which is authorized by or approved by Minnesota law which is in effect on the valuation date, to be provided as of a future date must be recognized in the valuation. The recognition of such a future benefit type or level for actuarial purposes does not, however, constitute or reflect a contractual obligation or promise by the State of Minnesota or by the applicable retirement plan to pay such a benefit at the time authorized. Of course, the deferred effect of that benefit type or benefit level must be recognized. For example, suppose a retirement plan has a retirement benefit level of 1% of final average salary per year of service. Legislation is enacted which is effective July 1, 1989, providing that for retirement on and after July 1, 1991 the benefit level is to be 1-1/2% of final average salary per year of service. In the valuation as of July 1, 1989 retirement benefits projected to commence prior to July 1, 1991 are calculated based on the 1% formula and benefits projected to commence on or after July 1, 1991 are calculated based on the 1-1/2% formula.

C. Special determinations.

- (1) Entry Age - For the purposes of the actuarial valuation, entry age for each member must be determined as the actual age at the valuation date less years of service recognized for the purpose of calculating benefits under the plan with the result rounded to the nearest whole year.
- (2) Amortizing the Unfunded Actuarial Accrued Liability - The Unfunded Actuarial Accrued Liability (UAAL) must be amortized over the Amortization Period. However, a surplus (i.e. a negative UAAL) is to be amortized over a thirty-year period. The additional annual contribution rate required to retire the UAAL for each retirement plan except MERF must be determined as follows:
  - (a) The total dollars paid in compensation to active members of the plan is determined for the year preceding the valuation date.
  - (b) The total payroll for the year following the valuation date is estimated. Generally, subsequent years salaries are estimated based on the prior year individual salary provided, increased with the assumed individual compensation increase assumption (base and plan specific). (See II.B.(3)).
  - (c) Assuming that compensation is paid at the end of each month, the present value at the valuation date of the payroll for the year following the valuation date is equal to the estimated payroll in (b) multiplied by .9570, based upon the assumed investment return rate of 8.5%.
  - (d) The Present Value of Future Payrolls must be calculated by multiplying the present value of payroll for the year following the valuation date (c, above) by a factor representing the present value of an annuity payable at the beginning of each year during the amortization period at the effective interest rate. The effective

interest rate is (one plus pre-retirement interest rate) divided by (one plus the payroll growth rate) minus one. For example if the pre-retirement interest is 8.5%, the payroll growth assumption is 5.0% and the Amortization Period is 25 years, the factor is 17.343.

- (e) The additional annual contribution rate must be calculated by dividing the UAAL as of the valuation date by the Present Value of Future Payrolls determined in (a) through (d), above.
- (3) For MERF, the additional annual contribution rate must be calculated as follows:
- (a) Assuming that contributions are made at the end of each month, the present value at the valuation date of \$1.00 paid in equal monthly payments during the year following the valuation date must be calculated, based upon the assumed investment return rate of 6%.
  - (b) The present value of future monthly contributions must be calculated by multiplying the present value of \$1.00 for the year following the valuation date (a, above) by a factor representing the present value of an annuity payable at the beginning of each year during the amortization period at the effective annual interest rate of 6.00%.
  - (c) The additional annual contribution must be calculated by dividing the UAAL as of the valuation date by the present value of future monthly contributions determined in (b), above.
  - (d) The additional annual contribution rate is the amount calculated in (c) expressed as a percentage of the Projected Annual Payroll.
- (4) Amortization Period - The amortization period at any valuation date is the period from the valuation date to the Amortization Date.

- (5) Amortization Date - The amortization date is the valuation date in the future calendar year that is determined under Minnesota Statutes, Section 356.215, Subdivision 4g. For example, suppose a plan, other than MERF, has a July 1 valuation date. Suppose further that for the valuation as of July 1, 1992 it is determined under Minnesota Statutes, Section 356.215, Subdivision 4g that amortization shall be complete in 2022. The resulting Amortization Date is July 1, 2022. The Amortization Date for MERF is June 30, 2017 and is not affected by changes in actuarial assumptions, benefits or actuarial cost method.

#### IV. Contents of an Actuarial Valuation Report

A. The Actuarial Valuation Report for each system (except for the Relief Association Accounts whose report is described in Section VII) must contain the actuarial balance sheet described in Minnesota Statutes, Section 356.215, Subdivision 4f. The following is to clarify certain of the concepts included:

- (1) “Current Assets” is the Actuarial Value of Assets developed under II.E. of these Standards.
- (2) “Expected Future Assets” must be based upon the statutory contribution rates and must be developed as follows:
  - (a) Contribution Rates - The Statutory Contribution Rate (expressed as a percentage of compensation) for the plan must be split as follows:
    - (i) Normal Cost Rate - The Normal Cost Rate developed in the current valuation of the plan.
    - (ii) Supplemental Contribution Rate - The total Statutory Contribution Rate less the Normal Cost Rate, and less the Expense Rate.
  - (b) Present Value of Expected Future Statutory Supplemental Contributions - The Supplemental Contribution Rate multiplied by the Present Value of Future Payrolls over the Amortization Period. The Present Value of Future Payrolls must be calculated in accordance with III.C.(2)(d). For MERF, Present Value of Supplemental Contributions is the balancing item needed so that Expected Future Assets equals Expected Benefit Obligations.
  - (c) Present Value of Future Normal Costs - The Normal Cost Rate multiplied by the APV of Future Compensation.
  - (d) Special Rules for Plans Where Normal Cost Rate Exceeds Statutory Contribution Rate - The amount of Expected Future Assets show as

Present Value of Future Normal Costs must be equal to the Statutory Contribution Rate, net of the Expense Rate, multiplied by the Present Value of Compensation. The Present Value of Supplemental Contributions will be zero.

- (3) Current Benefit Obligations is the APV of Credited Projected Benefits.
- (4) Benefit Obligation for Deferred Annuitants Benefits must include increases due to augmentation projected to the earliest age at which such benefits can commence without reduction for early commencement.

B. Additional Actuarial Disclosure - Each actuarial valuation report (except for the Relief Association Accounts whose report is described in Section VII) must include:

- (1) The Normal Cost Rates of the plan for each benefit type and the total Normal Cost Rate.
- (2) Development of the UAAL for the system as follows:
  - (a) APV of Projected Benefits.
  - (b) APV of their associated Normal Costs.
  - (c) AAL ((a) - (b)).
  - (d) Actuarial Value of Assets.
  - (e) UAAL ((c) - (d)).
  - (f) Present Value of Future Payrolls over the Amortization Period.
  - (g) Additional Annual Contribution Rate to Amortize the UAAL ((e)/(f)).
- (3) A breakdown of APV of Credited Projected Benefits and the APV of Projected Benefits by benefit type.
- (4) Development of several Funding Ratios:
  - (a) Accrued Benefit Funding Ratio - The ratio of Actuarial Value of Assets to APV of Credited Projected Benefit. This ratio is a

measure of current funding status, and when viewed over a period of years, presents a view of the progress of funding of the plan.

(b) Actuarial Liability Funding Ratio - The ratio of the Actuarial Value of Assets to the AAL (see III.A.(2), page 10). This is also a measure of funding status and funding progress. It is based upon the traditional measure of benefit obligations.

(c) Projected Benefit Funding Ratio - The ratio of the following items from the actuarial balance sheet:

(i) Total Current and Expected Future Assets to

(ii) Total Current and Expected Future Benefit Obligations.

This is a measure of adequacy or deficiency in the contribution level. A ratio of 100% or more means that contribution levels are adequate to cover the benefits provided in the plan based on current assumptions. A ratio under 100% indicates a deficiency in contribution levels.

(5) If there have been changes in the provisions of the plan or in actuarial assumptions for this valuation, the existence of those changes must be noted, and if the changes are deemed by the Actuary to be material, the report must contain:

(a) The following items based upon the provisions of the plan and the actuarial assumptions in place in the prior actuarial valuation:

(i) Total Contribution Rate

(ii) Funding Ratios

Accrued Benefit Funding Ratio

Actuarial Liability Funding Ratio

Projected Benefit Funding Ratio

- (b) The items shown in (a) based upon the new provisions of the plan and the actuarial assumptions used in the prior actuarial valuation. If there have been no changes in the provisions of the plan this step may be omitted.
  - (c) The items shown in (a) based upon the current provisions of the plan and the current set of actuarial assumptions. If there has been no change in the actuarial assumptions, this step may be omitted.
- (6) A breakdown of actuarial gains and losses based upon the provisions of the plan in place and the actuarial assumptions used in the prior actuarial valuation. The gains and losses must be broken down by source. Gains or losses must be shown separately for at least the following:
  - (a) Salary increases
  - (b) Investment return
  - (c) Minnesota Post-Retirement Investment Fund - Mortality
  - (d) Mortality of Other Benefit Recipients
  - (e) Other items
  - (f) Total

If item (e) accounts for a significant amount of the total gain or loss, an additional analysis must be performed to explain the major causes. Item (e) accounts for a significant amount of the total gain or loss if item (e) is greater than either 2% of the Actuarial Accrued Liability on the valuation date or \$50 million. The results of the additional analysis must be presented as part of the actuarial valuation commentary.

C. Additional information in each actuarial valuation report.

- (1) Description of the provisions of the plan. Any changes in the provisions of the plan since the last valuation must be highlighted.

- (2) Description of the actuarial basis for the valuation, the actuarial method and assumptions used in the actuarial valuation. The date of the experience analysis upon which the latest change in actuarial assumptions is based should be included. Any special techniques used must be disclosed here. Assumptions such as percent married, family composition, etc., must also be disclosed.
- (3) Description of the member data used including:
  - (a) The source of the data.
  - (b) Any material inconsistencies or other problems with the data and any steps taken to correct or compensate for such problems.
  - (c) Reconciliation of data with that used for the prior actuarial valuation.
  - (d) The number of active members and average annual compensation broken down by age and years of service in the plan.
  - (e) The number of persons receiving benefits and average amounts of monthly benefit by age and type of benefit (service retired, disability and survivor).
- (4) Description of the assets of the fund including:
  - (a) Market Value of assets by asset category.
  - (b) Development of Actuarial Assets from Market Value.
  - (c) A reconciliation of the Market Value of the assets of the plan as of the prior valuation date to the comparable Market Value as of the current valuation date.
  - (d) For reports on funds investing in the Minnesota Post-Retirement Investment Fund or MERF's Retirement Benefit Fund, a comparison of the following three asset values -

- (i) Actuarial Present Value of Projected Benefits based on the benefit amounts in force on the valuation date (i.e., the required reserves).
  - (ii) Adjusted Actuarial Asset Value (i.e., the required reserves plus the undistributed income which will be used for benefit increases the following January 1).
  - (iii) Market Value.
- (5) The valuation report must contain a statement signed by the Actuary responsible for the completion of the report, certifying that to the best of the knowledge and belief of the Actuary, the actuarial valuation was performed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of these Standards.

D. Additional information for specific plans.

- (1) MSRS Military Affairs Department Special Coverage Program - a separate exhibit indicating the normal cost of this special program must be included in the MSRS General State Employees Valuation Report. This normal cost must be determined by assuming that members retire at the age at which they may receive unreduced benefits.
- (2) MSRS Transportation Department Pilot Special Coverage Program - a separate exhibit indicating the normal cost of this special program must be included in the MSRS General State Employees Valuation Report. This normal cost must be determined by assuming that members retire at the age they may receive unreduced benefits.
- (3) State Fire Marshal Division Employee Special Coverage Program – a separate exhibit indicating the normal cost of this special program must be included in the MSRS General State Employees Valuation Report. This

normal cost must be determined by assuming that members retire at the age at which they may receive unreduced benefits.

- (4) PERA - separate exhibits for the Basic and Coordinated Benefit plans must show a comparison of the normal cost to the employee and employer statutory contribution rates.
- (5) TRA - separate exhibits for the Basic and Coordinated Benefit plans must show a comparison of the normal cost to the employee and employer statutory contribution rates.
- (6) Minneapolis Teachers - separate exhibits for the Basic and Coordinated Benefit plans must show a comparison of the normal cost to the employee and employer statutory contribution rates.
- (7) St. Paul Teachers - separate exhibits for the Basic and Coordinated Benefit plans must show a comparison of the normal cost to the employee and employer statutory contribution rates.
- (8) Duluth Teachers - separate exhibits for the Old Law and New Law Benefit plans must show a comparison of the normal cost to the employee and employer statutory contribution rates.

V. Experience Study

A. In accordance with Minnesota Statutes, Section 356.215 Subdivision 2, an experience study must be performed for each plan, as appropriate, as provided under D(4) of this section. The experience study is an analysis of actual experience under the plan compared to the experience expected under the actuarial assumptions then in use. No change in an actuarial assumption may be recommended by the Actuary for approval by the Commission unless the need for change has been established by an experience study. A complete experience report accumulating a significant amount of annual experience study data must be presented to the Commission periodically.

B. Economic Experience

(1) The annual investment return on the assets available for benefits must be calculated on a market value basis and on a current asset basis using the dollar weighted calculation technique. Assets invested in MPRIF or MERF's Retirement Benefit Fund must be excluded from this analysis since earnings that deviate from the assumed percentage (6% for MPRIF and 5% for MERF's RBF) do not affect the Unfunded Actuarial Accrued Liability. All cash flows in and out of the fund must be assumed to occur in the middle of the year with the exception of transfers to MPRIF or MERF's Retirement Benefit Fund, where the month of transfer is to be recognized in the calculation.

(2) Individual compensation increases for the year must be measured by the percentage change in compensation for members active on both valuation dates. These percentage changes must be aggregated and averaged by five year age and service groups similar to those displayed in the actuarial valuation reports. Increases or decreases in excess of a specified

percentage may be discarded from the study in order to prevent unusual changes in compensation from influencing the results of the study.

- (3) Payroll growth is the percentage change in total active members' compensation from one valuation report to the next. For MSRS administered plans, compensation means the annual rate based on the last four pay periods of the fiscal year before the valuation date. For all other plans, compensation means the pay over the 12 months prior to the valuation date. Pay is annualized for any new hires during the 12 month period.
- (4) Economic experience must be displayed as the difference between the actual results and the expected results.

C. Demographic Experience

- (1) Based on data accumulated for the period covered by the experience study, demographic experience must be analyzed as follows:
  - (a) Each actual occurrence of each death, disablement, quit or other pertinent event must be classified by age nearest birthday on the valuation date preceding that event and, if pertinent, years of service at that valuation date. In the case of death, the classification must be made based upon the status at the date of death.
  - (b) For each age (X) and, if pertinent, years of service (S), an exposure is calculated by counting the number of persons who during the study period are age X on an age nearest birthday with service S rounded to the nearest integer value at the beginning of a year. In the case of counting exposures for death, appropriate adjustments must be made to reflect a change in status prior to death in the same year.

- (c) Expected occurrences for each decrement at age X and service S are then calculated by multiplying the exposure at age X and service S by the assumed probability of occurrence of the event.
  - (d) The ratio of actual to expected events is the basic analytic tool in an experience study. For each decrement and each combination of sex, age and if pertinent, service, the ratio is the actual number of occurrences of the decrement (see (a), above) divided by the expected number of occurrences (see (c), above). The ratios may be reported in five year age and service groups, whenever it is a more feasible approach.
  - (e) If all assumptions precisely predict events, these ratios are 100%. If estimated events overstate actual events, these ratios are less than 100%. If they are understated, the ratios are over 100%.
  - (f) In lieu of using number of member-years of exposure and numbers of events, the Actuary may develop the experience analysis based upon salaries, actuarial values, or any other reasonable and consistent measure. The measure used in calculating any alternative must be described in the experience study and the rationale of any alternative must also be clearly reported.
- (2) Based on ratios of actual to expected decrements new assumptions may be established.
  - (3) There may be information available to the Actuary which would indicate that actual past experience should not be the only basis on which to establish actuarial assumptions. If any recommended new assumptions do not follow directly from past experience, the additional reasons for the recommended new assumptions must be clearly explained in the report of the experience study.

D. Report

- (1) The report of each experience study must set out the conclusions and recommendations of the Actuary relative to the actuarial assumptions.
- (2) The report must include sufficient statistics (such as ratios of actual to expected experience) so that a pension professional, whether an actuary or not, could assess the viability of the conclusions of the Actuary.
- (3) The analysis of retirement ages for new retirees and their average age at retirement, required in Minnesota Statutes, Section 356.215, Subdivision 5, must be performed and presented in the report.
- (4) An experience report on the Legislators Plan, Elective State Officers Plan, Local Government Correctional Service Plan and the consolidation accounts of the Public Employees Police and Fire Fund are inappropriate because of their small size. While not anticipated on a regular basis, periodically, an experience report may be appropriate for the Minneapolis Employees Retirement Fund, the Minneapolis Teachers Retirement Fund, the St. Paul Teachers Retirement Fund, the Duluth Teachers Retirement Fund and the Public Employees Police and Fire Fund. Such an experience study could be recommended by the Actuary or by the respective Plan Administrator, but must be approved by the Commission before preparation.
- (5) Experience of funds whose members have similar employment characteristics (e.g. teaching or public safety) may be combined for further analysis and recommendations.
- (6) Each experience report must show the results by each year and also must be combined for all of the years included.
- (7) If an assumption is changed, the experience report for the following year must reflect expected occurrences based on the new assumption for those

years following the change. Also, the expected occurrences for the prior years must be restated to estimate the expected values as if the new assumption had been in effect in the prior years.

VI. Cost Estimates of Legislative Proposals

- A. A statement of fiscal impact must be completed for each legislative proposal which would affect the amounts of or the eligibility for benefits in a retirement plan.
- B. The fiscal impact statement must contain the following:
  - (1) A brief statement describing the proposal accompanied by a detailed description of current provisions and the changes in those provisions which the proposal would affect.
  - (2) A table showing the current statutory contribution rate and the following items before the change, after the change and the difference resulting from the change:
    - (a) Total Actuarially Determined Contribution Rate
    - (b) That part of the Total Actuarially Determined Contribution Rate not provided by the Employee.
    - (c) Funding Ratios.
      - (i) Accrued Benefit Funding Ratio
      - (ii) Actuarial Liability Funding Ratio
      - (iii) Projected Benefit Funding Ratio
  - (3) Actuarially determined required contributions, as well as statutory contributions and the difference, must be shown in dollars for the next fiscal year. If the impact of the proposed change is spread over more than one fiscal year (such as a delayed change in the statutory rate), then the disclosure must contain all fiscal years until the impact is fully recognized.
  - (4) A statement of the actuarial basis of the estimate.
    - (a) If the estimate is based upon the latest actuarial valuation report, reference to the actuarial basis used in that report is sufficient.
    - (b) The Actuary must state whether or not the proposal would affect the experience of the plan (e.g., a change in normal retirement

eligibility could affect the assumed rates of retirement) and, if so, the changes in assumptions from the assumptions used in the latest valuation must be described.

(c) Any additional assumptions (e.g., the percentage eligible for a new option who would be assumed to elect such option) must be disclosed. In such situations, multiple cost estimates setting out a range of costs may be appropriate.

C. The statement of fiscal impact must contain a statement signed by the Actuary for the Commission certifying that, to the best of the Actuary's knowledge and belief, the statement was completed in accordance with the requirements of Minnesota Statutes, Section 356.215, and the requirements of these Standards.

VII. Actuarial Calculations for Local Relief Association Consolidation Accounts

A. Minnesota Statutes, Chapter 353A, describes the process for the voluntary consolidation of local relief associations with PERA Police and Fire. Appendix E provides a sample report showing the preliminary calculations and Appendix F contains a sample valuation report. The Actuary for the Commission is charged with performing certain calculations preliminary to consolidation and on an ongoing basis following consolidation. The actuarial calculations reported in the most recent relief association valuation report may not be utilized for this purpose, but must be compared to calculations by the Actuary for the Commission in order to illustrate the effect of different actuarial assumptions. The cost of the calculations performed preliminary to consolidation must be borne by the special fund of the relief association.

B. Preliminary Calculations

(1) The purpose of the calculation preliminary to consolidation is to determine the initial additional municipal contribution to be paid annually until December 31, 2010. The initial amount of additional municipal contribution must be calculated by assuming each member elects the pension program (i.e., their current Relief Association benefits or PERA Police and Fire benefits) with the greater Actuarial Present Value of Projected Benefits based on the total benefit plan. In addition, these preliminary calculations must determine the amount of funds that would be required to be transferred to the Minnesota Post-Retirement Investment Fund (MPRIF) if all current annuitants selected the PERA Police and Fire benefits. If the amount of funds to be transferred to MPRIF exceeds the available assets, the municipality is assumed to contribute the additional amount needed and the initial additional municipal contribution is revised

downward to demonstrate the impact of all members electing PERA Police and Fire benefits.

- (2) The member data used in the calculations must conform with the requirements of Section IX.C of these Standards unless a data item is inappropriate for the specific relief association plan benefits. The rate of annual compensation must be reported on two bases - the amount used to determine the member's contribution to the relief association and the amount used to determine the member's contribution to PERA Police and Fire. All data must be current. The Executive Director of the Commission is to coordinate the collection of the required demographic and financial data and of the required benefit plan information. Appropriate data and information supplied by the actuary who performed the most recent prior actuarial valuation may be used in making the preliminary calculations and may be relied upon by the Actuary for the Commission. A hard copy of the data or information submitted by the actuary performing that prior actuarial valuation must be supplied to the chief administrative officer of the relief association who must update the data and verify its accuracy.
- (3) The financial data provided for the calculations must include the market value of the fund assets of the relief association. If both a special and a general fund exist, only the special fund assets will be used. If the relief association includes volunteer firefighters as members of the relief association, the assets of the special fund must be allocated between the paid firefighters and the volunteer firefighters on the basis of their relative accrued actuarial liability using the most recent actuarial valuation prepared by an approved actuary.
- (4) The relief association benefits described in Minnesota Statutes, Chapter 353B, may be relied upon unless there are discrepancies with the benefits

described in the most recent actuarial valuation report of the relief association's plan. In the event of any discrepancies, or if more detailed information be required, the Actuary for the Commission must rely on the original documents describing the pension plan.

- (5) Three sets of actuarial calculations are prepared for each active member, a set for each deferred former member, a set for each retired member, and a set for each current beneficiary. Each set of calculations must contain the Actuarial Present Value (APV) of Projected Benefits, and the Normal Cost and Actuarial Accrued Liability determined using the Entry Age Actuarial Cost Method. The three sets of calculations are:
  - (a) Relief association plan benefits.
  - (b) PERA Police and Fire plan benefits.
  - (c) The above plan benefits, (a) or (b), which produced the larger APV of Projected Benefits based on the total benefit plan. The individual calculations must be totaled and reported for categories (a), (b) and (c) as shown in Appendix E.
- (6) The liabilities for the relief association plan benefits must be based on 8.5% interest (both pre- and post-retirement), and the salary increase assumption (base and plan specific) used for the most recent valuation by the PERA Police and Fire plan. Furthermore, post-retirement benefit increases must be assumed at the same rate as the base salary increase assumption. Furthermore, the assumed age and service for retirement must be identical to those assumed in the most recent actuarial valuation of the relief association prepared by an approved actuary. All other assumptions must be identical to those used in the most recent actuarial valuation by PERA Police and Fire. When performing the calculations for the relief association plan benefits, any automatic survivor benefits must be included.

The liabilities must also include the refund of any excess member contributions that may be made prior to the election of Relief Association benefits because a different definition of compensation is used to produce a higher member contribution.

- (7) The liabilities for the PERA Police and Fire plan benefits must be calculated in the same manner as those calculated for the PERA Police and Fire valuation, including the use of the compensation rate that is applicable for member contributions to PERA Police and Fire. The highest five successive years' average salary for those active members assumed to retire during the next five years must be based on the current total compensation rate that is applicable for member contributions to PERA Police and Fire projected the appropriate number of years forward and on the current compensation rate that is used to determine benefits under the relief association projected backward using the salary increase assumption (base and plan specific) used for the most recent valuation by PERA Police and Fire plan. When performing the calculations for the PERA Police and Fire plan benefits, the reserve factors for transferring assets to MPRIF must be the same factors that are currently used by PERA Police and Fire. All reserves transferred to MPRIF and any future mortality gains and losses must be determined for each relief association account. All future benefit increases paid to benefit recipients will be determined by MPRIF and not by the relief association. An initial MPRIF increase must be estimated for the following January 1 as though assets had been transferred to MPRIF at the time of the member's retirement (i.e. the eighteen month requirement for eligibility for a full increase and seven month requirement for eligibility for a partial increase will apply). The State Board of Investment will provide an estimate of the initial increase, or if the State Board of

Investment is unable to provide that estimate, the Actuary for the Commission will project an estimate based on the latest investment information available from the State Board. The same estimate of the initial MPRIF increase must be used in determining the distribution for annuitants who are not paid from MPRIF, but who would be eligible for an increase on the following January 1. The Actuary for the Commission must determine the MPRIF transfer required at the time of consolidation. The extent to which that required transfer amount exceeds assets must be reported as an immediate contribution to be paid by the municipality at the time of consolidation.

- (8) The initial additional municipal contribution also must be calculated and included in the preliminary report. This additional contribution is the fixed level dollar amortization payment required each year until December 31, 2010 which will pay for the portion of the APV of Projected Benefits that is not anticipated to be funded by future regular statutory contributions required from each active member and the municipality nor by current assets. Appendix E details the calculations and provides a report format.
- (9) The amount of any necessary transfer of reserves to MPRIF in the event that all current benefit recipients choose the PERA Police and Fire plan must be calculated. The amount by which those reserves exceed the market value of the assets of the relief association, if any, must be disclosed and the impact of that initial additional asset transfer on the initial additional municipal contribution must also be disclosed.

C. Ongoing Actuarial Work for Individual Consolidation Accounts

- (1) For any Relief Association consolidation account that did not merge into the PERA Police and Fire Fund effective July 1, 1999, an actuarial valuation should be performed annually on July 1. The purpose of the

valuation is to measure the ability of the current assets and future contributions to meet the liabilities of the future benefits determined by the election of the members. The valuation will produce an annual gain (loss) which must be amortized over 15 years. This annual amortization payment will increase (decrease) the previous years' additional municipal contribution.

- (2) The actuarial valuation must compare assets to liabilities. If assets exceed liabilities, the result is an actuarial gain. If assets are less than liabilities, the result is an actuarial loss. Assets are defined as current and expected future assets where expected future assets is made up of the present value of employee contributions, the present value of regular municipal contributions and the present value of additional municipal contributions. The liabilities are the Actuarial Present Value of Projected Benefits based on each member's election or, in the event of no election, the greater of the Relief Association benefits and the PERA Police and Fire benefits.
- (3) In the event that the valuation shows that assets exceed liabilities, the amount of the excess is an actuarial gain and the amount of gain is funded over 15 years from the valuation date as a reduction in the additional municipal contributions. Similarly, if liabilities exceed assets, there will be an actuarial loss. The amortization payment over 15 years for this loss will be an increase to the additional municipal contribution. The gain (loss) must be analyzed by determining the portion due to MPRIF mortality, the portion due to the election by members of the PERA Police and Fire benefits and the remaining sources of gain (loss).
- (4) The valuation report for each Relief Association consolidation account must contain the following information:
  - (a) determination of the additional municipal contribution.

- (b) the actuarial gain or loss.
- (c) Entry Age calculations of the Normal Cost, Actuarial Accrued Liability, Current Assets, and the Unfunded Actuarial Accrued Liability.

The information for the Relief Association consolidation accounts must be aggregated in the valuation report. The report also must contain aggregated information on membership data and assets as well as a description of the plan provisions and the actuarial basis for the valuation, all of which must be reported as described in Section IV C.

## VIII. Actuarial Factors

- A. Actuarial factors are required in the administration of a Fund. Each Fund requires optional annuity factors in order to translate the formula benefits from a life annuity to other optional forms such as a joint and 50% survivor, a joint and 100% survivor, a joint and 50% survivor with bounce back, a joint and 100% survivor with bounce back, a level Social Security and a term certain and life. Factors are also required by those Funds that calculate an early retirement reduction on an actuarial equivalent basis or that transfer money at the time of retirement to a post retirement fund such as MPRIF or MERF Retirement Benefit Fund. With consolidating local relief associations, automatic survivor benefit coverage also will require actuarial factors.
- B. Duties of the Actuary Retained by the Commission
- (1) Actuarial factors adopted on or after July 1, 1987 must be reviewed by and receive a written recommendation from the Actuary retained by the Commission. If the Fund retains an approved actuary as an actuarial advisor, the actuarial factors must be developed as a proposal by that actuarial advisor. If the Fund does not retain an approved actuary as an actuarial advisor, the actuarial factors must be developed by the Actuary retained by the Commission, with the cost of the development to be borne by the Fund. If the actuarial factors are developed by a Fund actuarial advisor, the recommendation from the Actuary retained by the Commission must be based on a review of the proposed actuarial factors. If the actuarial factors are developed by the Actuary retained by the Commission, no additional review by the Actuary retained by the Commission is required and the recommendation must be based on the developmental work on the proposed actuarial factors.

- (2) Whenever a fund wishes to adopt new factors or change existing factors, it must notify the Actuary retained by the Commission and the Executive Director of the Commission and supply the relevant information requested by the Actuary retained by the Commission.
- (3) If the actuarial factors are developed by the actuarial advisor of the Fund, the written recommendation of the Actuary retained by the Commission must be based on the following criteria:
  - (a) The mortality table used in generating the factors is appropriate and is based on the experience of the Fund. This must be accomplished by relating the mortality table to the experience of the Fund disclosed in the most recent experience study or studies of the Fund and any other relevant information, which must be disclosed by the Actuary retained by the Commission.
  - (b) The mathematical formulas that are used for producing the factors must result in actuarial equivalence to single life annuities. This must be accomplished by independently deriving the mathematical formulas and comparing the independent results with the proposed formulas.
  - (c) The actual factors derived are based on the stated formula and assumptions. This must be accomplished by random testing of the factors.
  - (d) The procedures for applying the factors are clearly documented in writing and are deemed appropriate. In those cases where the procedures are computerized, sample illustrations verified by computer output will suffice.

If the actuarial factors are developed by the Actuary retained by the Commission, the written recommendation of the Actuary retained by the

Commission must be based on the developmental work on the actuarial factors and a reasonable expectation that the actuarial factors result in actuarial equivalence to single life annuities.

IX. Data

- A. Each retirement plan must provide the Actuary with all financial and member data required to perform the annual actuarial valuation within eight weeks after the valuation date.
- B. Financial Information Required
- (1) A balance sheet of the Fund developed on an accrual basis as of June 30 immediately preceding the valuation date showing:
    - (a) Cash balances.
    - (b) Receivables such as employee contributions receivable, employer contributions receivable, investment return receivable, etc.
    - (c) Investments by investment category at both market value and cost value.
    - (d) Current amounts due and unpaid from the Fund.
    - (e) Assets available for benefits  $((a) + (b) + (c) - (d))$ .
  - (2) A statement of revenue and disbursements of the fund on an accrual basis for the year ending immediately prior to the valuation date including sufficient detail regarding expenses to allow the separate identification of investment related expenses and other administrative expenses.
  - (3) Such other financial information as may be required by the Actuary to comply with Minnesota Statutes, Section 356.215, and these standards.
  - (4) If audited financial information is available, the audited financial information must be provided. If no audited financial information is available in a timely fashion, but financial information which is determined by the fund administrator to be reasonably accurate and reliable is available, that financial information must be provided and must be supplemented by audited financial information when the audited financial information is available.

- C. Member Data - The following are general lists of data items required.
- (1) For each active member, the following data must be provided:
    - (a) Social Security Number or Member Number.
    - (b) Sex.
    - (c) Birthdate.
    - (d) Hire Date (most recent).
    - (e) Years of Service for determining eligibility.
    - (f) Years of Credited Service for calculation of benefits.
    - (g) Credited Service for calculation of benefits earned in the 12-month period ending on the valuation date.
    - (h) Actual plan compensation for the 12 month period ending on the valuation date.
    - (i) Rate of annual compensation as of the valuation date.
    - (j) Total employee contributions to the valuation date.
    - (k) Interest on employee contributions to the valuation date.
    - (l) Any additional information required in order that the Actuary comply with Minnesota Statutes, Section 356.215, and generally acceptable actuarial practices and procedures.
  - (2) In addition, the following data must be provided for each person who was active as of the prior valuation date and is no longer active:
    - (a) All data set out in (1)(a) through (1)(l).
    - (b) Date of status change.
    - (c) Status as of valuation date.
  - (3) For each person receiving benefits, the following data must be provided:
    - (a) Social Security Number or Member Number.
    - (b) Sex.
    - (c) Birthdate.

- (d) Date benefit commenced - original date of benefit commencement.  
For example, if a survivor after the death of the retiree under a joint and survivor form, this should be date of retirement of the retiree.
  - (e) Date of latest status change. For example, in the case above, date of death of retiree.
  - (f) Type of Benefit (retirement, disability, survivor, post retirement death, etc.)
  - (g) Form of Benefit (life only, 100% J&S, etc.)
  - (h) Current monthly benefit amount.
  - (i) Original monthly benefit amount - if a survivor is receiving benefit of a deceased former retiree, include the original benefit of the retiree.
  - (j) Years of Credited Service used in calculating the original monthly benefit.
  - (k) Final average compensation used in calculating the original monthly benefit.
  - (l) Joint Annuitant sex, if applicable.
  - (m) Joint Annuitant birthdate, if applicable.
  - (n) Retired under Rule of 85 or under Rule of 90.
  - (o) Benefit received under the Combined Service Annuity, the Combined Service Disability Benefit or the Combined Service Survivor Benefit.
- (4) In addition, the following data must be provided for each person who was receiving a monthly benefit as of the prior valuation date and has changed status as of the current valuation date:
- (a) All data set out in (2)(a) through (2)(n).
  - (b) Date of status change.

- (c) Status as of valuation date.
- (5) For each inactive member who has retained a right to a benefit from the system (including non-vested members who have not yet received refunds) the following data must be provided:
  - (a) Social Security Number or Member Number.
  - (b) Sex.
  - (c) Birthdate.
  - (d) Years of Service for determining eligibility at termination.
  - (e) Years of Credited Service at termination for calculation of benefit.
  - (f) Final Average Compensation at termination.
  - (g) Vested monthly benefit under normal form at date of termination.
  - (h) Vested monthly benefit including augmentation (if applicable) to the date specified in (l) below.
  - (i) Employee contributions to date of termination.
  - (j) Interest on employee contributions to valuation date.
  - (k) Date of termination.
  - (l) Earliest date on which benefit could commence without reduction for early commencement.
- (6) In addition, the following data must be provided with the data on vested terminated members for each person who was vested terminated as of the prior valuation date and has changed status as of the current valuation date:
  - (a) All data set out in (5)(a) through (5)(l).
  - (b) Date of status change.
  - (c) Status as of the valuation date.
- (7) The member data must be provided in the format provided for in Appendix A.

D. Member Data Reconciliation

- (1) Using the member data provided in C(1) through C(6), the actuary shall reconcile the data provided with that utilized in the prior valuation.
  - (a) Active Members on the last valuation date, plus new entrants and transfers to active status, less retirements during the period since the last valuation, less deaths during the period since the last valuation, less disabilities during the period since the last valuation, less other terminations since the last valuation must equal Active Members on this valuation date.
  - (b) Similar analyses must be made of retirees, preferably by types of retirement, and vested terminateds.
- (2) If the member reconciliation reveals material imbalances in that data, the retirement plan shall provide the Actuary with any assistance needed to correct that imbalance.
- (3) The Actuary may request additional collateral information from the plan to verify the reasonableness of the data.

E. Data Retention - Valuations as of July 1, 1985 and later

- (1) The data provided to the Actuary retained by the Commission for development of the actuarial valuations must be retained by the Actuary retained by the Commission for a period not less than five years from the valuation date for which it is provided. Prior to the destruction of any valuation data, the Actuary retained by the Commission shall consult with and obtain the approval of the Executive Director of the Commission.
- (2) The Actuary retained by the Commission shall use this data for the periodic experience studies as well as for actuarial valuation purposes. However, the Actuary retained by the Commission may request additional information to supplement the data accumulated in accordance with this section for experience study purposes.

F. Data Retention - Valuations as of dates prior to June 30, 1985

- (1) The Actuary for each retirement plan or the chief administrator officer of the retirement plan, whichever applies, shall retain all data which was provided by the plan for the purpose of developing actuarial valuations of the plan as of dates prior to June 30, 1985, which is in existence on June 30, 1987. Prior to the destruction of any actuarial valuation data for actuarial valuations prepared prior to June 30, 1985 in existence on June 30, 1987, the Actuary for the retirement plan or the chief administrative officer of the retirement plan, whichever applies, shall consult with and obtain the approval of the Executive Director of the Commission.
- (2) Upon request by the Actuary retained by the Commission or by the Executive Director of the Commission, the Actuary for the Plan shall provide the data described in paragraph (1) to the Actuary retained by the Commission or to the Executive Director of the Commission, whichever applies.
- (3) To the extent that the Actuary for the Plan has not retained the data required by paragraph (1), the Actuary retained by the Commission may request the required data from the plan. The plan shall provide such data within three months of the date of such request.

X. Important Definitions

- A. Actuary - Any person who shall satisfy the requirements of an "approved actuary" under Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (c).
- B. Actuary retained by the Commission - The Actuary or the firm of Actuaries retained by the Legislative Commission on Pensions and Retirement.
- C. Actuary for the Plan - The Actuary or the firm of Actuaries retained by a Retirement Plan.
- D. Actuarial Value of Assets - The asset value determined in accordance with Section II.E. hereof and Minnesota Statutes, Section 356.215, Subdivision 1, Paragraph (f), as of the valuation date. Such asset value is used for the purposes of determining the Unfunded Actuarial Accrued Liability and the Funding Ratios of the retirement plan.
- E. Projected Benefit - A benefit estimated from a valuation date to a future payment commencement date based upon the provisions of the retirement plan for calculating such benefits, estimated future increases in compensation, estimated increases in service, and such other assumptions as may be required.
- F. Credited Projected Benefit - A benefit estimated from a valuation date to a future payment commencement date based upon the provisions of the retirement plan for calculating such benefits, estimated future increases in compensation, service to the valuation date, and such other assumptions as may be required.
- G. Actuarial Present Value ("APV") of Projected Benefits - The number of dollars required as of a valuation date such that those dollars plus investment returns on those dollars must equal all expected future benefit payments under the plan to current members. For each active member, and for each benefit type provided in the plan this value must be calculated as follows:
  - (1) A Projected Benefit must be calculated for each year in the future assuming that benefits would become payable in that year.

- (2) If the benefit is paid as a series of periodic payments (e.g., service retirement), an appropriate annuity factor is calculated for each year's Projected Benefit. The product of the annuity factor and the Projected Benefit for a particular year in the future is the single sum value of the benefit assuming the event which causes that benefit to commence occurs in that year. If the benefit is in the nature of a single sum benefit (e.g., withdrawal of employee contributions with interest), this step is foregone.
- (3) Using all of the demographic assumptions, the probabilities that an active member at the valuation date remains continuously active to each future year for which values from (2) exist must be calculated.
- (4) The probability of the occurrence of the event which causes the benefit to commence (i.e., retirement, disability, death, termination, etc.) for each successive year must be determined.
- (5) Using the assumed rates of investment return, the present value at the valuation date of \$1 paid at the point in each such year at which events are assumed to occur must be calculated. For an assumed rate of investment return of  $i$  the present value for the  $n$ th year from the valuation date is  $V^{n+f}$  where:
  - (a) 
$$V = \frac{1}{1+i}$$
  - (b)  $f$  is a fraction, reflecting the point during the year at which events are deemed to occur. This fraction will often be  $1/2$ , reflecting occurrence of events at mid-year.
- (6) The product of corresponding values of (2), (3), (4) and (5) is the APV of the Projected Benefit for year  $n$ .
- (7) The sum of (6) for all years is the APV of Projected Benefit for a specific benefit type and for a specific member.

(8) The sum of all such actuarial present values of the specific Projected Benefit for all active members is the APV of Projected Benefit for the specific benefit type for the plan.

(9) The sum of actuarial present values over all benefit types is the Total APV of Projected Benefits for active members of the plan.

The APV of Projected Benefits for persons receiving benefits at the valuation date must be equal to (i) the amount of the monthly benefit currently being paid, multiplied by (ii) an appropriate annuity value taking into account the form of the benefit being paid (e.g., life annuity, 100% Joint and Survivor) the type of benefit being paid (e.g., disability, surviving spouse, child, etc.) and the sex and age of the payee.

The APV of Projected Benefits for vested terminated members must be calculated as the greater of (1) the benefit calculated for persons receiving benefits, except that (i) the vested benefit recognized must be that benefit, calculated under the law in effect at the date of termination, determined under the normal annuity form under the system with augmentation to the earliest age at which the benefit could commence without reduction for early commencement and (ii) the annuity value must be calculated assuming commencement of the benefit at such age, or (2) the balance of employee contributions with interest to the valuation date.

The APV of Projected Benefits for non-vested inactive members must be the balance of employee contributions with interest to the valuation date.

H. Actuarial Present Value ("APV") of Credited Projected Benefits - A calculation which is identical to that described in F, above, except that for active members the benefits used at each future year must be the Credited Projected Benefits rather than the Projected Benefits.

I. Actuarial Present Value ("APV") of Future Compensation - The estimated number of dollars required today such that those dollars plus investment return on those

dollars are sufficient to pay estimated compensation for each active member of the system from the valuation date to termination from active status. The APV of Future Compensation must be calculated as follows for each active member:

- (1) Compensation levels must be estimated for each year in the future using the individual compensation increase assumption.
- (2) Using all of the demographic assumptions, the probability that the member will remain active in the group to the beginning of each year must be determined.
- (3) If events terminating active status are deemed to occur during the year (e.g., at the middle of the year), weighted averages of those probabilities must be calculated reflecting such timing, using acceptable actuarial methodology.
- (4) Using assumed rates of investment return, the present value at the valuation date of \$1 paid at the mid-point of each future year must be calculated. For an assumed rate of investment of  $i$  the present value for year  $n$  is  $V^n + .5$  where  $V = \frac{1}{1+i}$
- (5) The product of (1), (3) and (4) is the APV of the estimated compensation in year  $n$  for an active member.
- (6) The sum of such Actuarial Present Values for each future year is the Actuarial Present Value of Future Compensation for that member.
- (7) The sum of such Actuarial Present Values of Future Compensation over all active members is the Actuarial Present Value of Future Compensation for the plan.

The Calculation of Actuarial Present Values of Compensation from entry-age must be calculated as above using estimated compensation at entry-age determined by adjusting current compensation with the current individual compensation increase assumption.

- J. Funding Ratios - The ratios described and defined in IV.B.(4).
- K. Valuation Date - The date as of which all financial and member data is provided for an actuarial valuation and the date as of which all actuarial present values are calculated in that valuation.
- L. Present Value of Future Payroll - The value developed for use in amortizing the UAAL over the Amortization Period. It represents the present value of total payrolls over the amortization period. It must be based upon the assumed rates of investment return and payroll growth. The decrements for active lives must not be used.

**APPENDIX A**  
**INFORMATION TO BE REQUESTED OF EACH PLAN**

## APPENDIX A

### INFORMATION TO BE REQUESTED OF EACH PLAN

An actuarial valuation is a study which is based upon information to be provided by the plan. The quality of the valuation can be no better than the quality of the information underlying it.

In general, the following information will be required in order to process the annual actuarial valuation. This information shall be due eight weeks after the valuation date.

1. Copy of Applicable Laws and Bylaws. In addition, changes that have taken effect since the prior valuation must be identified.
2. Balance sheet and statement of revenue and disbursements of the Fund for the Fiscal year ending immediately prior to the valuation date. (See Section VII B)
3. Member data (as described on the following pages) for all active members, members and beneficiaries who are currently receiving benefits or who have a right to a deferred benefit, and inactive members who have not withdrawn their member contributions.
4. Member data (as described on the following pages) for persons who were included in Item 3 on the prior valuation date, but who are not included as of the current valuation date due to a change of status.

## DATA FORMAT

The following is a description of the data which will be used to process the valuations. Not all of this information is required for each system and individual data request letters will be prepared upon request. The systems are also not expected to construct files with the following characteristics; but rather when their data is provided, it will be converted into a standard format.

Field Number	Name of Field	Number of Columns	Remarks
1.	Social Security Number	9-N	If applicable
2.	Member Number	7-N	If applicable
3.	Employer Code	4-A	
4.	Department Code	4-A	
5.	Status Code	2-N	See attachment
6.	Sex	1-A	1 or M for Male, 2 or F for Female
7.	Birthdate	6-N	MMDDYY
8.	Marital Status	1-A	M for Married, S for Single
9.	Spouse's Birthdate	6-N	MMDDYY
10.	Compensation Rate	8-N	\$ <sup>c</sup> Annual compensation rate as of the valuation date
11.	Prior Year's Compensation	8-N	\$ <sup>c</sup> Actual compensation for the 12 months ending on the valuation date
12.	Participation Date	6-N	MMDDYY Date of entry into the Plan
13.	Date of Hire	6-N	MMDDYY Most recent hire date
14.	Prior year's Service	6-N	x.xxxxx Service earned in the 12 months ending on the valuation date
15.	Credited Service	7-N	xx.xxxxx For benefit accrual
16.	Credited Service	7-N	xx.xxxxx Prior service period or service for alternate formula

17.	Credited Service	7-N	xx.xxxxxx Prior service period or service for alternate formula
18.	Employee Contributions	8-N	\$ <sup>c</sup>
19.	Interest on Employee Contributions	7-N	\$ <sup>c</sup>
20.	Employer Contributions	8-N	\$ <sup>c</sup>
21.	Interest on Employer Contributions	7-N	\$ <sup>c</sup>
22.	Formula Code	2-A	For plans where members can elect benefit Formula
23.	Termination Date	6-N	MMDDYY
24.	Final Average Compensation	8-N	\$ <sup>c</sup> At termination
25.	Annual Accrued Annuity	8-N	\$ <sup>c</sup> At termination
26.	Retirement Date	6-N	MMDDYY
27.	Optional Annuity Code	2-N	See attachment
28.	Beneficiary's Sex	1-A	1 or M for Male, 2 or F for Female
29.	Beneficiary's Birthdate	6-N	MMDDYY
30.	Original Pension Amount	8-N	\$ <sup>c</sup>
31.	Annual Pension Amount	8-N	\$ <sup>c</sup>
32.	Secondary Pension Amount	8-N	\$ <sup>c</sup> For level income option, or Joint and Survivor Option
33.	Commencement Date for Secondary Pension	6-N	MMDDYY (blank for J&S)
34.	Date of Death	6-N	MMDDYY
35.	Lump Sum Death Benefit	6-N	\$
36.	Combined Service Annuity applicable	1-A	Y or N
37.	Combined Service Disability Benefit applicable	1-A	Y or N
38.	Combined Service Survivor Benefit applicable	1-A	Y or N

## Status Codes

### Code

01	Active	
10	Retired	- Normal
11		- Early
12		- Rule of 85
13		- After Disability
14		- Rule of 90
20	Terminated	- Vested, Eligible for Deferred Benefit
21		- Vested, Withdrew Contributions
22		- Nonvested, Left Contributions in Fund
23		- Nonvested, Withdrew Contributions
30	Disabled	- Ordinary
31		- Occupational
40	Active Member	- Without Survivor
	Deceased	- With Survivor
50	Leave of Absence	
60	Deceased Retiree	- Without Survivor
61		- With Survivor (lump sum distribution)
62		- With Survivor (monthly annuity)

## ANNUITY OPTION CODES

### Code

01	Lifetime only annuity
02	Guaranteed refund annuity
03	Life only annuity with 3 years guaranteed.
04	Life only annuity with 3 years guaranteed. (1)
05	Life only annuity with 5 years guaranteed.
06	Life only annuity with 5 years guaranteed. (1)
10	Life only annuity with 10 years guaranteed.
11	Life only annuity with 10 years guaranteed. (1)
15	Life only annuity with 15 years guaranteed.
16	Life only annuity with 15 years guaranteed. (1)
50	Joint and 50% Survivor annuity.
51	Joint and 50% Survivor annuity. (1)
52	Joint and 50% Survivor annuity. (2)
53	50% Bounce Back Joint and Survivor annuity.
70	Joint and 75% Survivor annuity.
71	Joint and 75% Survivor annuity. (1)
72	Joint and 75% Survivor annuity. (2)
73	75% Bounce Back Joint and Survivor annuity.
80	Joint and 100% Survivor annuity.
81	Joint and 100% Survivor annuity. (1)
82	Joint and 100% Survivor annuity. (2)
83	100% Bounce Back Joint and Survivor annuity.
90	Joint and Survivor annuity (reversionary benefit is fixed dollar amount).
91	Joint and Survivor annuity (reversionary benefit is fixed dollar amount). (1)
92	Joint and Survivor annuity (reversionary benefit is fixed dollar amount). (2)

(1) Pensioner deceased, beneficiary receiving payments.

(2) Beneficiary deceased, pensioner receiving payments.

**APPENDIX B**  
**SAMPLE ACTUARIAL VALUATION REPORT**

**Teachers Retirement Association Fund**  
***ACTUARIAL VALUATION REPORT***

**July 1, 1995**



# MILLIMAN & ROBERTSON, INC.

Actuaries & Consultants

*Internationally WOODROW MILLIMAN*

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Chairman Emeritus

December 15, 1995

Legislative Commission on  
Pensions and Retirement  
55 State Office Building  
St. Paul, Minnesota 55155

RE: **Teachers Retirement Association Fund**


Commission Members:

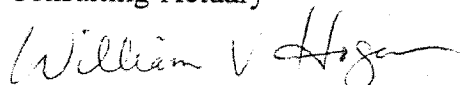
Pursuant to the terms of our Actuarial Services Contract, we have performed an actuarial valuation of the Fund as of July 1, 1995.

The results of our calculations are set forth in the following report, as are the actuarial assumptions upon which our calculations have been made. We have relied on the basic employee data and asset figures as submitted by the Teachers Retirement Association.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with the requirements of Section 356.215, Minnesota Statutes, and the requirements of the Standards for Actuarial Work, adopted by the Commission on July 8, 1992.

Respectfully submitted,

  
Thomas K. Custis, F.S.A., M.A.A.A.  
Consulting Actuary

  
William V. Hogan, F.S.A., M.A.A.A.  
Consulting Actuary

TKC/WVH/bh

Teachers Retirement Association Fund

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Teachers Retirement Association Fund

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Teachers Retirement Association Fund

**Report Highlights**  
(dollars in thousands)

	07/01/94 Valuation	07/01/95 Valuation
<b>A. CONTRIBUTIONS (Table 11)</b>		
1. Statutory Contributions - Chapter 354 % of Payroll	14.66%	14.66%
2. Required Contributions - Chapter 356 % of Payroll	14.73%	14.30%
3. Sufficiency (Deficiency): (A.1. - A.2.)	-0.07%	0.36%
<b>B. FUNDING RATIOS</b>		
1. Accrued Benefit Funding Ratio		
a. Current Assets (Table 1)	\$7,611,935	\$8,348,124
b. Current Benefit Obligations (Table 8)	\$8,463,676	\$9,049,649
c. Funding Ratio: (a/b)	89.94%	92.25%
2. Accrued Liability Funding Ratio		
a. Current Assets (Table 1)	\$7,611,935	\$8,348,124
b. Actuarial Accrued Liability (Table 9)	\$9,115,266	\$9,717,623
c. Funding Ratio: (a/b)	83.51%	85.91%
3. Projected Benefit Funding Ratio (Table 8)		
a. Current and Expected Future Assets	\$11,407,437	\$12,234,567
b. Current and Expected Future Benefit Obligations	\$11,434,495	\$12,095,200
c. Funding Ratio: (a/b)	99.76%	101.15%
<b>C. PLAN PARTICIPANTS</b>		
1. Active Members		
a. Number (Table 3)	66,514	67,558
b. Projected Annual Earnings	\$2,235,636	\$2,325,059
c. Average Annual Earnings (Actual \$)	\$33,612	\$34,416
d. Average Age	42.8	42.9
e. Average Service	12.5	12.5
2. Others		
a. Service Retirements (Table 4)	20,563	21,458
b. Survivors (Table 5)	1,229	1,331
c. Disability Retirements (Table 6)	345	379
d. Deferred Retirements (Table 7)	4,499	5,103
e. Terminated Other Non-vested (Table 7)	16,147	16,411
f. Total	42,783	44,682

## Teachers Retirement Association Fund

### Commentary

#### *Purpose*

The purpose of this valuation is to determine the financial status of the Plan. In order to achieve this purpose, an actuarial valuation is made at the beginning of each fiscal year as required by Section 356.215 of Minnesota Statutes.

#### *Report Highlights*

The financial status of the Plan can be measured by three different funding ratios:

- The Accrued Benefit Funding Ratio is a measure of current funding status and, when viewed over a period of years, presents a view of the funding progress. It is based upon benefits which have been earned by service to the valuation date. This year's ratio is 92.25%. The corresponding ratio for the prior year was 89.94%.
- The Accrued Liability Funding Ratio is also a measure of funding status and funding progress. It is based on the actuarial cost method that has historically been used by the State. For 1995 the ratio is 85.91%, which is an increase from the 1994 value of 83.51%.
- The Projected Benefit Funding Ratio is a measure of the adequacy or deficiency in the contribution level. This year's ratio of 101.15% verifies that the current statutory contributions are sufficient.

#### *Asset Information (Tables 1 and 2)*

Minnesota Statutes require that the asset value used for actuarial purposes recognize only a third of the unrealized gains and losses. This requirement exists because market values (which include all unrealized gain and losses) are typically volatile and can produce erratic changes in the contribution requirements from year to year.

The calculation of the Actuarial Value of Assets is shown in Table 1 on lines F1 to F6. It combines the cost value of the Assets Available for Benefits and one-third of the difference between the market value and cost value of those assets.

The term "Actuarial Value of Assets" is used to indicate that the value was determined for use in this actuarial valuation. Since Minnesota Statutes refer to this value as "Current Assets", the latter phrase will be used in the remainder of this report.

This Plan participates in the Minnesota Post Retirement Investment Fund (i.e. MPRIF). After the MPRIF liability has been calculated for each participating Plan, the State Board of Investments, (i.e. SBI), will determine each Plan's portion of the excess earnings for the January benefit increase as well as the Plan's allocated market share of MPRIF.

### *Actuarial Balance Sheet (Table 8)*

An actuarial balance sheet provides a method for evaluating current and future levels of funding.

The Current Benefit Obligation used to measure current funding levels is calculated in accordance with Statement No. 5 of the Governmental Accounting Standards Board (GASB). Those requirements are:

- For Active Members - salary and service are projected to retirement to determine benefits for each member and the ratio of credited service to total service establishes the portion of the projected benefit to be used in calculating the current funding level.
- For Non-active Members - the discounted value of benefits, including augmentation in cases where benefits have not commenced.

### *GASB Disclosure*

The Current Benefit Obligation amounts in Table 8 are required to be disclosed by Statement No. 5 of the Governmental Accounting Standards Board (GASB). However, Statement No. 5 uses the terms "Actuarial Present Value of Credited Projected Benefits" and "Pension Benefit Obligation" rather than "Current Benefit Obligation".

The JULY 1, 1995 Pension Benefit Obligation reported in Table 8 is reformatted for GASB reporting purposes in the following table:

Retirees and beneficiaries currently receiving benefits and terminated employees not yet receiving benefits	\$4,069,675,000
Current Employees	
Accumulated employee contributions including allocated investment income	\$2,397,859,000
Employer-financed vested	2,306,963,000
Employer-financed nonvested	<u>275,152,000</u>
Total Pension Benefit Obligation	\$9,049,649,000
Net Assets Available for Benefits at Cost	\$8,226,082,000
Total Benefit Obligation less Assets	\$823,567,000
Funded Ratio	90.90%

### *Actuarial Cost Method (Table 9)*

The approach used by the State of Minnesota to determine contribution sufficiency is the Entry Age Normal Actuarial Cost Method. The primary characteristic of this method is that it allocates costs as a level percentage of payroll.

A comparison of this actuarial method (Table 9) to the actuarial balance sheet (Table 8) illustrates the two techniques for allocating liabilities of active Members to past and future. As noted in the prior section, the balance sheet allocates benefits and the corresponding liabilities, on the basis of service. The method used in Table 9 allocates liabilities so that the cost each year will be a constant percentage of payroll. Both approaches, however, calculate the value of all future benefits the same way (see line F of Table 8 and line A6, column 1, of Table 9).

An Unfunded Actuarial Accrued Liability is computed under the Entry Age Normal Actuarial Cost Method by comparing the liabilities allocated to past service (Actuarial Accrued Liability) to the Current Assets. This amount, line B3, is funded over the remaining years to the amortization date by a series of payments that remain a constant percentage of payroll each year.

The payments will increase 5.00% each year because that is the assumed rate of increase in payroll. Although the payment schedule will be adequate to amortize the existing unfunded, the lower payments in the earlier years will not be sufficient to cover the interest on the unfunded liability. After a few years, the annual payment will cover the interest and also repay a portion of the unfunded.

### *Sources of Actuarial Gains and Losses (Table 10)*

The assumptions used in making the calculations using the Entry Age Normal Actuarial Cost Method are based on long-term expectations. Each year the actual experience will deviate from the long-term expectation. For a detailed analysis of the major components, refer to Table 10.

### *Contribution Sufficiency (Table 11)*

This report determines the adequacy of Statutory Contributions by comparing the Statutory Contributions to the Required Contributions.

The Required Contributions, set forth in Chapter 356, consist of:

- Normal costs based on the Entry Age Normal Actuarial Cost Method.
- A Supplemental Contribution for amortizing any Unfunded Actuarial Accrued Liability.
- An Allowance for Expenses.

Table 11 shows the Plan has a contribution sufficiency since the Statutory Contribution Rate is 14.66% compared to the Required Contribution Rate of 14.30%.

*Changes in Actuarial Assumptions*

There were no changes in Actuarial Assumptions for the current valuation.

*Changes in Plan Provisions*

There were no change in Plan Provisions which affected plan costs for the current valuation.

## Teachers Retirement Association Fund

**Accounting Balance Sheet**  
(dollars in thousands)

JULY 1, 1995

	Market Value	Cost Value
A. ASSETS		
1. Cash, Equivalents, Short-term Securities	\$59,914	\$59,914
2. Investments		
a. Fixed Income	1,312,024	1,286,035
b. Equity	3,409,373	3,069,236
c. Real Estate	0	0
3. Equity in Minnesota Post-Retirement Investment Fund (MPRIF)	3,790,813	3,790,813
4. Other	42,991	42,991
	\$8,615,115	\$8,248,989
B. TOTAL ASSETS		
C. AMOUNTS CURRENTLY PAYABLE	\$22,907	\$22,907
D. ASSETS AVAILABLE FOR BENEFITS		
1. Member Reserves	\$1,070,347	\$1,070,347
2. Employer Reserves	3,731,048	3,364,922
3. MPRIF Reserves	3,790,813	3,790,813
4. Non-MPRIF Reserves	0	0
5. Total Assets Available for Benefits	\$8,592,208	\$8,226,082
E. TOTAL AMOUNTS CURRENTLY PAYABLE AND ASSETS AVAILABLE FOR BENEFITS	\$8,615,115	\$8,248,989

F. DETERMINATION OF ACTUARIAL VALUE OF ASSETS

1. Cost Value of Assets Available for Benefits (D5)		\$8,226,082
2. Market Value (D5)	\$8,592,208	
3. Cost Value (D5)	8,226,082	
4. Market Over Cost: (F2-F3)	\$366,126	
5. 1/3 of Market Over Cost: (F4)/3		122,042
6. Actuarial Value of Assets (F1+F5) (Same as "Current Assets")		\$8,348,124

## Teachers Retirement Association Fund

**Change In Assets Available For Benefits**  
*(dollars in thousands)*

YEAR ENDING JUNE 30, 1995

	<u>Market Value</u>	<u>Cost Value</u>
A. ASSETS AVAILABLE AT BEGINNING OF PERIOD	\$7,651,376	\$7,592,216
B. OPERATING REVENUES		
1. Member Contributions	\$143,536	\$143,536
2. Employer Contributions	179,672	179,672
3. Investment Income	368,949	368,949
4. MPRIF Income	297,153	297,153
5. Net Realized Gain (Loss)	0	0
6. Other	553	553
7. Net Change in Unrealized Gain (Loss)	<u>306,966</u>	<u>0</u>
8. Total Revenue	<u>\$1,296,829</u>	<u>\$989,863</u>
C. OPERATING EXPENSES		
1. Service Retirements	\$328,765	\$328,765
2. Disability Benefits	4,967	4,967
3. Survivor Benefits	5,125	5,125
4. Refunds	4,619	4,619
5. Investment Fees	6,847	6,847
6. Administrative Expenses	3,666	3,666
7. Other	<u>2,008</u>	<u>2,008</u>
8. Total Disbursements	<u>\$355,997</u>	<u>\$355,997</u>
D. OTHER CHANGES IN RESERVES	0	0
E. ASSETS AVAILABLE AT END OF PERIOD	<u>\$8,592,208</u>	<u>\$8,226,082</u>

TABLE 3

## Teachers Retirement Association Fund

ACTIVE MEMBERS AS OF JUNE 30, 1995

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	1,490	183							1,673
25-29	2,946	4,102	604						7,652
30-34	954	2,490	3,142	430	1				7,017
35-39	1,096	1,643	2,030	2,157	533	1			7,460
40-44	1,168	1,858	1,953	1,590	3,269	937	1		10,776
45-49	908	1,564	1,821	1,425	2,216	4,520	1,601		14,055
50-54	508	688	895	938	1,168	2,070	3,593	531	10,391
55-59	220	332	412	415	617	907	1,640	1,730	6,273
60-64	146	164	116	110	192	329	477	371	1,905
65+	85	64	31	26	24	36	44	46	356
ALL	9,521	13,088	11,004	7,091	8,020	8,800	7,356	2,678	67,558

## AVERAGE ANNUAL EARNINGS

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	15,565	24,079							16,496
25-29	13,821	24,270	28,454						20,577
30-34	12,248	22,484	30,330	34,355	27,524				25,334
35-39	12,111	22,374	30,602	35,684	39,558	28,911			28,182
40-44	11,472	20,433	31,007	36,668	41,238	43,239	33,241		32,069
45-49	11,674	18,947	31,204	36,208	41,511	44,415	45,654		36,605
50-54	10,086	18,038	28,736	34,939	41,841	46,247	47,170	47,875	39,989
55-59	8,614	14,251	25,094	31,887	40,141	45,876	48,185	49,396	41,615
60-64	9,021	9,313	22,821	29,938	39,316	47,074	48,787	49,789	38,616
65+	4,796	4,419	22,399	29,054	41,449	45,117	53,020	52,788	26,743
ALL	12,773	21,643	30,115	35,495	41,158	44,972	47,204	49,207	32,457

## PRIOR FISCAL YEAR EARNINGS (IN MILLIONS) BY YEARS OF SERVICE

AGE	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
ALL	122	283	331	252	330	396	347	132	2,193

TABLE 4

**Teachers Retirement Association Fund**  
**SERVICE RETIREMENTS AS OF JUNE 30, 1995**

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50		1						1
50-54	13	10						23
55-59	597	1,156	22	1				1,776
60-64	550	3,126	898	5				4,579
65-69	190	1,651	2,102	823	4			4,770
70-74	15	220	1,493	1,572	260	3		3,563
75-79	1	20	187	1,461	861	112	1	2,643
80-84			13	189	1,326	449	69	2,046
85+		1	1	4	159	1,323	569	2,057
ALL	1,366	6,185	4,716	4,055	2,610	1,887	639	21,458

AVERAGE ANNUAL BENEFIT

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50		11,507						11,508
50-54	18,060	15,015						16,736
55-59	22,514	19,798	15,897	3,005				20,654
60-64	19,580	21,889	17,605	13,561				20,763
65-69	14,348	15,821	16,806	16,080	5,098			16,232
70-74	8,536	16,819	14,216	16,212	8,973	13,582		14,851
75-79	3,475	9,973	13,326	14,847	13,697	6,205	14,044	13,958
80-84			8,006	13,295	13,217	10,169	5,289	12,255
85+		698	4,293	2,321	10,225	8,742	7,770	8,569
ALL	19,988	19,644	15,969	15,538	12,758	8,939	7,512	15,942

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	27,304	121,498	75,310	63,007	33,298	16,868	4,800	342,083

TABLE 5

**Teachers Retirement Association Fund**  
**SURVIVORS AS OF JUNE 30, 1995**

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	10	34	9		1			54
50-54	11	26	4	1	1		1	44
55-59	14	49	19	7	2	1		92
60-64	15	96	54	21	5	3	2	196
65-69	22	93	87	43	7	6	4	262
70-74	17	125	91	47	23	3	4	310
75-79	15	68	72	39	7	9	6	216
80-84	3	31	27	18	20	7	7	113
85+	1	11	7	4	8	6	7	44
ALL	108	533	370	180	74	35	31	1,331

**AVERAGE ANNUAL BENEFIT**

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	9,422	9,476	3,393		2,256			8,319
50-54	13,211	11,035	7,522	2,314	4,997		3,423	10,752
55-59	15,561	12,957	8,113	7,960	7,381	8,696		11,806
60-64	20,310	15,466	12,180	14,075	12,855	6,212	3,715	14,455
65-69	14,445	15,767	13,238	13,694	13,089	9,295	3,494	14,070
70-74	17,888	13,439	13,543	12,812	13,344	9,291	5,719	13,472
75-79	12,917	14,622	14,337	12,580	16,828	14,995	4,296	13,841
80-84	21,622	9,856	12,353	10,371	13,518	8,292	3,857	11,027
85+	9,486	10,029	6,915	8,136	5,902	9,758	6,074	7,933
ALL	15,297	13,669	12,624	12,525	12,435	10,358	4,613	12,990

AGE	TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
ALL	1,652	7,286	4,671	2,255	920	363	143	17,290

TABLE 6

**Teachers Retirement Association Fund**  
**DISABILITY RETIREMENTS AS OF JUNE 30, 1995**

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	6	39	13	3				61
50-54	9	35	14	7				65
55-59	9	55	26	11	4	1		106
60-64	6	60	49	15	7	1		138
65-69		5	2	2				9
70-74								
75-79								
80-84								
85+								
ALL	30	194	104	38	11	2		379

**AVERAGE ANNUAL BENEFIT**

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	9,399	7,684	5,430	3,953				7,189
50-54	11,660	12,067	8,983	16,791				11,855
55-59	18,610	14,291	10,998	7,880	6,029	2,547		12,762
60-64	21,837	17,265	13,670	17,155	8,030	6,548		15,630
65-69		10,108	17,103	12,921				12,288
70-74								
75-79								
80-84								
85+								
ALL	15,329	13,374	11,408	13,138	7,303	4,548		12,743

AGE	TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
ALL	460	2,595	1,186	499	80	9		4,830

TABLE 7

## Teachers Retirement Association Fund

*Reconciliation Of Members*

	Actives	Terminated	
		Deferred Retirement	Other Non-Vested
A. ON JUNE 30, 1994	66,514	4,499	16,147
B. ADDITIONS	6,772	881	3,392
C. DELETIONS			
1. Service Retirement	(1,151)	(227)	0
2. Disability	(44)	0	0
3. Death	(59)	(50)	0
4. Terminated - Deferred	(3,948)	0	0
5. Terminated - Refund	(526)	0	(912)
6. Terminated - Other Non-Vested	0	0	(1,169)
7. Returned as Active	0	0	(1,301)
8. Transferred to Other Fund	0	0	0
D. DATA ADJUSTMENTS	0	0	254
Vested	50,211		
Non-Vested	17,347		
E. TOTAL ON JUNE 30, 1995	67,558	5,103	16,411
		Recipients	
	Retirement Annuitants	Disabled	Survivors
A. ON JUNE 30, 1994	20,563	345	1,229
B. ADDITIONS	1,373	85	174
C. DELETIONS			
1. Service Retirement	0	(18)	0
2. Death	(480)	(21)	(19)
3. Annuity Expired	(3)	0	(50)
4. Returned as Active	0	(12)	0
D. DATA ADJUSTMENTS	5	0	(3)
E. TOTAL ON JUNE 30, 1995	21,458	379	1,331

## Teachers Retirement Association Fund

**Actuarial Balance Sheet**  
(dollars in thousands)

JULY 1, 1995

A. CURRENT ASSETS (TABLE 1, F6)				\$8,348,124
B. EXPECTED FUTURE ASSETS				
1. Present Value of Expected Future Statutory Supplemental Contributions (See Table 11)				\$1,508,866
2. Present Value of Future Normal Costs				2,377,577
3. Total Expected Future Assets				<u>\$3,886,443</u>
C. TOTAL CURRENT AND EXPECTED FUTURE ASSETS				<u>\$12,234,567</u>
D. CURRENT BENEFIT OBLIGATIONS	<u>Non-Vested</u>	<u>Vested</u>		<u>Total</u>
1. Benefit Recipients				
a. Retirement Annuities		\$3,674,555		\$3,674,555
b. Disability Benefits		46,792		46,792
c. Surviving Spouse and Child Benefits		145,347		145,347
2. Deferred Retirements with Future Augmentation		187,866		187,866
3. Former Members without Vested Rights		15,115		15,115
4. Active Members				
a. Retirement Annuities	12,675	4,540,724		4,553,399
b. Disability Benefits	218,659	0		218,659
c. Survivor's Benefits	42,900	0		42,900
d. Deferred Retirements	918	114,830		115,748
e. Refund Liability Due to Death or Withdrawal	0	49,268		49,268
5. Total Current Benefit Obligations	<u>\$275,152</u>	<u>\$8,774,497</u>		<u>\$9,049,649</u>
E. EXPECTED FUTURE BENEFIT OBLIGATIONS				<u>\$3,045,551</u>
F. TOTAL CURRENT AND EXPECTED FUTURE BENEFIT OBLIGATIONS				<u>\$12,095,200</u>
G. CURRENT UNFUNDED ACTUARIAL LIABILITY (D5-A)				\$701,525
H. CURRENT AND FUTURE UNFUNDED ACTUARIAL LIABILITY (F-C)				(\$139,367)

## Teachers Retirement Association Fund

**Determination Of Unfunded Actuarial Accrued Liability (UAAL)  
And Supplemental Contribution Rate**  
(dollars in thousands)

JULY 1, 1995

	Actuarial Present Value of Projected Benefits <i>(1)</i>	Actuarial Present Value of Future Normal Costs <i>(2)</i>	Actuarial Accrued Liability <i>(3)=(1)-(2)</i>
<b>A. DETERMINATION OF ACTUARIAL ACCRUED LIABILITY (AAL)</b>			
1. Active Members			
a. Retirement Annuities	\$7,326,546	\$1,854,809	\$5,471,737
b. Disability Benefits	355,712	141,125	214,587
c. Survivor's Benefit	66,601	24,942	41,659
d. Deferred Retirements	176,951	96,015	80,936
e. Refunds Due to Death or Withdrawal	99,715	260,686	(160,971)
f. Total	<u>\$8,025,525</u>	<u>\$2,377,577</u>	<u>\$5,647,948</u>
2. Deferred Retirements With Future Augmentation	187,866		187,866
3. Former Members Without Vested Rights	15,115		15,115
4. Annuitants in MPRIF	3,790,813		3,790,813
5. Recipients Not in MPRIF	<u>75,881</u>		<u>75,881</u>
6. Total	<u>\$12,095,200</u>	<u>\$2,377,577</u>	<u>\$9,717,623</u>
<b>B. DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)</b>			
1. AAL (A6)			\$9,717,623
2. Current Assets (Table 1, F6)			8,348,124
3. UAAL (B1-B2)			<u>\$1,369,499</u>
<b>C. DETERMINATION OF SUPPLEMENTAL CONTRIBUTION RATE</b>			
1. Present Value of Future Payrolls Through the Amortization Date of July 1, 2020			\$38,589,912
2. Supplemental Contribution Rate (B3/C1)			3.55%

## Teachers Retirement Association Fund

**Changes In Unfunded Actuarial Accrued Liability (UAAL)**  
*(dollars in thousands)*

YEAR ENDING JUNE 30, 1995

A. UAAL AT BEGINNING OF YEAR	\$1,503,331
B. CHANGE DUE TO INTEREST REQUIREMENTS AND CURRENT RATE OF FUNDING	
1. Normal Cost and Expenses	\$241,086
2. Contribution	(323,208)
3. Interest on A, B1 and B2	124,293
4. Total (B1+B2+B3)	<u>\$42,171</u>
C. EXPECTED UAAL AT END OF YEAR (A+B4)	\$1,545,502
D. INCREASE (DECREASE) DUE TO ACTUARIAL LOSSES (GAINS) BECAUSE OF EXPERIENCE DEVIATIONS FROM EXPECTED	
1. Salary Increases	(\$155,334)
2. Investment Return	(113,139)
3. MPRIF Mortality	3,922
4. Mortality of Other Benefit Recipients	3
5. Other Items	88,545
6. Total	<u>(\$176,003)</u>
E. UAAL AT END OF YEAR BEFORE PLAN AMENDMENTS AND CHANGES IN ACTUARIAL ASSUMPTION (C+D6)	\$1,369,499
F. CHANGE IN ACTUARIAL ACCRUED LIABILITY DUE TO PLAN AMENDMENTS	0
G. CHANGE IN ACTUARIAL ACCRUED LIABILITY DUE TO CHANGES IN ACTUARIAL ASSUMPTIONS	0
H. UAAL AT END OF YEAR (E+F+G)	<u><u>\$1,369,499</u></u>

## Teachers Retirement Association Fund

**Determination Of Contribution Sufficiency***(dollars in thousands)*

JULY 1, 1995

	Percent of Payroll	Dollar Amount
<b>A. STATUTORY CONTRIBUTIONS - CHAPTER 354</b>		
1. Employee Contributions	6.51%	\$151,332
2. Employer Contributions	8.15%	189,462
3. Total	<u>14.66%</u>	<u>\$340,794</u>
<b>B. REQUIRED CONTRIBUTIONS - CHAPTER 356</b>		
1. Normal Cost		
a. Retirement Benefits	8.32%	\$193,350
b. Disability benefits	0.62%	14,325
c. Survivors	0.11%	2,641
d. Deferred Retirement Benefits	0.39%	9,126
e. Refunds Due to Death or Withdrawal	1.15%	26,841
f. Total	<u>10.59%</u>	<u>\$246,283</u>
2. Supplemental Contribution Amortization by July 1, 2020 of UAAL	3.55%	82,540
3. Allowance for Expenses	0.16%	3,720
4. Total	<u>14.30%</u>	<u>\$332,543</u>
<b>C. CONTRIBUTION SUFFICIENCY (DEFICIENCY) [A3-B4]</b>	0.36%	\$8,251

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1995 is \$2,325,059.

## Teachers Retirement Association Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	<b>Pre-Retirement:</b> 8.5% per annum <b>Post-Retirement:</b> 5.0% per annum																
<i>Salary Increases:</i>	Reported salary for prior fiscal year, with new hires annualized, increased according to the table below to current fiscal year and annually for each future year.																
<i>Mortality:</i>	<p><b>Pre-Retirement:</b></p> <p>Male - 1983 Group Annuity Mortality Table for males set back eight years.</p> <p>Female - 1983 Group Annuity Mortality Table for females set back four years.</p> <p><b>Post-Retirement:</b></p> <p>Male - Same as above except set back four years.</p> <p>Female - Same as above except set back two years.</p> <p><b>Post-Disability:</b></p> <p>Male - 1977 Railroad Retirement Board Mortality for Disabled Annuitants.</p> <p>Female - 1977 Railroad Retirement Board Mortality for Disabled Annuitants.</p>																
<i>Retirement Age:</i>	Age 62 or if over age 62, one year from valuation date. In addition, 45% of Basic Members and 30% of Coordinated Members are assumed to retire each year that they are eligible for the Rule of 90.																
<i>Separation:</i>	Select and ultimate rates were based on plan experience as of June 30, 1989. Ultimate rates after the third year are shown in rate table. Select rates are as follows:																
	<table> <thead> <tr> <th></th> <th><u>First Year</u></th> <th><u>Second Year</u></th> <th><u>Third Year</u></th> </tr> </thead> <tbody> <tr> <td>Less than 35</td> <td>.3</td> <td>.15</td> <td>.1</td> </tr> <tr> <td>35-44</td> <td>.25</td> <td>.125</td> <td>.08</td> </tr> <tr> <td>45-60</td> <td>.3</td> <td>.15</td> <td>.1</td> </tr> </tbody> </table>		<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>	Less than 35	.3	.15	.1	35-44	.25	.125	.08	45-60	.3	.15	.1
	<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>														
Less than 35	.3	.15	.1														
35-44	.25	.125	.08														
45-60	.3	.15	.1														
<i>Disability:</i>	Rates as shown in table.																

<i>Expenses:</i>	Prior year expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	85% of male Members and 65% of female Members are assumed to be married. Female is three years younger than male. Assume Members have no children.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Special Consideration:</i>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males -           15% elect 50% J&S option 50% elect 100% J&S option  Females -        10% elect 50% J&S option 10% elect 100% J&S option
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 5% per annum.

TABLE 12  
(Continued)

Teachers Retirement Association Fund

**SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS**

Separations Expressed as the Number of Occurrences Per 10,000:

Age	Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
20	3	1	600	600	4	4	0	0	7.25%
21	3	2	600	600	4	4	0	0	7.25
22	3	2	600	600	4	4	0	0	7.25
23	3	2	600	600	5	5	0	0	7.20
24	3	2	600	600	5	5	0	0	7.15
25	3	2	600	600	5	5	0	0	7.10
26	4	2	600	600	5	5	0	0	7.05
27	4	2	600	600	5	5	0	0	7.00
28	4	2	600	600	5	5	0	0	7.00
29	4	3	580	580	5	5	0	0	7.00
30	4	3	565	565	6	6	0	0	7.00
31	4	3	540	540	6	6	0	0	7.00
32	4	3	520	520	6	6	0	0	7.00
33	5	3	500	500	6	6	0	0	7.00
34	5	3	480	480	6	6	0	0	7.00
35	5	4	440	440	6	6	0	0	7.00
36	5	4	370	370	7	7	0	0	7.00
37	6	4	330	330	7	7	0	0	7.00
38	6	4	280	280	8	8	0	0	6.90
39	6	5	240	240	8	8	0	0	6.80
40	7	5	210	210	8	8	0	0	6.70
41	7	5	195	195	9	9	0	0	6.60
42	8	6	185	185	9	9	0	0	6.50
43	9	6	175	175	10	10	0	0	6.35
44	9	7	160	160	10	10	0	0	6.20
45	10	7	145	145	11	11	0	0	6.05
46	10	8	130	130	12	12	0	0	5.90
47	11	8	115	115	13	13	0	0	5.75
48	12	9	100	100	14	14	0	0	5.70
49	14	10	85	85	16	16	0	0	5.65

TABLE 12  
(Continued)

Teachers Retirement Association Fund

**SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS**

Separations Expressed as the Number of Occurrences Per 10,000:

Age	Preretirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
50	15	11	70	70	17	17	0	0	5.60%
51	17	12	55	55	19	19	0	0	5.55
52	19	14	40	40	22	22	0	0	5.50
53	22	15	25	25	26	26	0	0	5.45
54	25	16	10	10	30	30	0	0	5.40
55	28	18	0	0	36	36	0	0	5.35
56	31	19	0	0	41	41	0	0	5.30
57	35	21	0	0	47	47	0	0	5.25
58	39	23	0	0	52	52	0	0	5.25
59	43	25	0	0	58	58	0	0	5.25
60	48	28	0	0	63	63	0	0	5.25
61	52	31	0	0	69	69	0	0	5.25
62	57	34	0	0	0	0	10,000	10,000	5.25
63	61	38	0	0	0	0	0	0	5.25
64	66	42	0	0	0	0	0	0	5.25
65	71	47	0	0	0	0	0	0	5.25
66	77	52	0	0	0	0	0	0	5.25
67	84	58	0	0	0	0	0	0	5.25
68	92	64	0	0	0	0	0	0	5.25
69	101	71	0	0	0	0	0	0	5.25

TABLE 3A  
BASIC

Teachers Retirement Association Fund  
ACTIVE MEMBERS AS OF JUNE 30, 1995

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25									
25-29									
30-34									
35-39									
40-44									
45-49									
50-54							1		1
55-59						1	10	40	51
60-64						1	6	37	44
65+	1						3	7	11
ALL	1					2	20	84	107

AVERAGE ANNUAL EARNINGS

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25									
25-29									
30-34									
35-39									
40-44									
45-49									
50-54							45,570		45,570
55-59						7,829	48,895	46,531	46,236
60-64						34,301	41,310	46,865	45,822
65+	12,969						48,062	41,702	40,825
ALL	12,969					21,065	46,328	46,276	45,503

PRIOR FISCAL YEAR EARNINGS (IN THOUSANDS) BY YEARS OF SERVICE

AGE	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
ALL	13					42	927	3,887	4,869

TABLE 4A  
BASIC

Teachers Retirement Association Fund  
SERVICE RETIREMENTS AS OF JUNE 30, 1995

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50								
50-54								
55-59	29	164	9					202
60-64	29	456	282	4				771
65-69	15	166	515	347	1			1,044
70-74	3	28	246	541	115	3		936
75-79		2	38	390	353	66	1	850
80-84			2	43	474	205	58	782
85+			1		50	332	298	681
ALL	76	816	1,093	1,325	993	606	357	5,266

AVERAGE ANNUAL BENEFIT

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50								
50-54								
55-59	31,798	32,632	16,576					31,798
60-64	29,968	30,857	24,217	14,714				28,312
65-69	25,126	23,686	26,633	24,949	4,543			25,562
70-74	13,810	32,530	22,415	23,923	12,870	13,582		22,361
75-79		3,215	18,645	22,639	18,314	8,145	14,044	19,484
80-84			14,967	22,015	16,831	12,926	5,632	15,258
85+			4,293		11,923	12,578	10,285	11,515
ALL	29,073	29,745	24,658	23,724	16,641	12,219	9,540	21,307

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	2,210	24,272	26,951	31,434	16,525	7,405	3,406	112,203

TABLE 5A  
BASIC

Teachers Retirement Association Fund  
SURVIVORS AS OF JUNE 30, 1995

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50			1		1			2
50-54	1	1			1		1	4
55-59		5	2	3	1	1		12
60-64	6	20	13	11	5	3	2	60
65-69	3	19	21	17	5	5	4	74
70-74	6	28	22	12	7	2	4	81
75-79	4	21	16	17	5	7	6	76
80-84	1	7	9	3	6	2	6	34
85+		4	1	1	1	1	5	13
ALL	21	105	85	64	32	21	28	356

AVERAGE ANNUAL BENEFIT

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50			13,619		2,256			7,938
50-54	34,548	15,913			4,997		3,423	14,720
55-59		16,069	18,179	13,174	13,225	8,696		14,846
60-64	25,675	21,566	17,616	20,227	12,855	6,212	3,715	18,787
65-69	25,147	22,378	19,618	17,706	12,756	8,107	3,494	17,999
70-74	22,724	23,248	20,651	17,279	15,388	12,226	5,719	19,803
75-79	21,812	18,699	22,804	18,322	14,823	15,955	4,296	17,998
80-84	46,305	15,370	15,446	12,898	17,788	5,480	3,704	13,869
85+		12,064	7,656	13,401	3,466	22,452	5,262	9,350
ALL	25,426	20,498	19,493	17,718	13,768	11,306	4,358	17,632

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	534	2,152	1,657	1,134	441	237	122	6,277

TABLE 6A  
BASIC

Teachers Retirement Association Fund  
DISABILITY RETIREMENTS AS OF JUNE 30, 1995

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50								
50-54								
55-59		1						1
60-64		7	3	2	1			13
65-69				1				1
70-74								
75-79								
80-84								
85+								
ALL		8	3	3	1			15

AVERAGE ANNUAL BENEFIT

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50								
50-54								
55-59		37,779						37,780
60-64		33,675	51,753	68,588	28,792			42,843
65-69				22,457				22,457
70-74								
75-79								
80-84								
85+								
ALL		34,189	51,753	53,211	28,792			41,146

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL		274	155	160	29			617

Teachers Retirement Association Fund

**Determination Of Contribution Sufficiency**  
(dollars in thousands)

JULY 1, 1995

	Percent of Payroll	Dollar Amount
<b>A. STATUTORY CONTRIBUTIONS - CHAPTER 354</b>		
1. Employee Contributions	10.50%	\$538
2. Employer Contributions	12.14%	622
3. Total	<u>22.64%</u>	<u>\$1,160</u>
 <b>B. REQUIRED CONTRIBUTIONS - CHAPTER 356</b>		
1. Normal Cost		
a. Retirement Benefits	14.04%	\$720
b. Disability benefits	0.96%	49
c. Survivors	0.29%	15
d. Deferred Retirement Benefits	0.35%	18
e. Refunds Due to Death or Withdrawal	2.52%	129
f. Total	<u>18.16%</u>	<u>\$931</u>

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1995 is \$5,128.

Teachers Retirement Association Fund

*Summary of Plan Provisions*

GENERAL

*Eligibility:* A public school or community college teacher who is not covered by the Social Security Act, except for teachers employed by Minneapolis, St. Paul or Duluth public schools or by the University of Minnesota.

No community college teacher is a Member if that person elects coverage under Sec. 354B.

*Contributions:*

*Member:* 10.5% of salary.

*Employer:* 12.14% of salary.

*Allowable Service:* A day of credit is earned if five hours are taught that day. A year is earned if 170 days of service are credited. Credit may also be provided for certain leaves if contributions are paid into the fund.

*Salary:* Compensation used for contribution purposes excluding lump-sum annual or sick leave payments, severance payments, and any payments made in lieu of employer paid fringe benefits or expenses.

*Average Salary:* Average of the five highest successive years of salary. Average Salary is based on all Allowable Service if less than five years.

RETIREMENT

*Normal Retirement:*

*Eligibility:* First hired before July 1, 1989:  
Age 65 and three years of Allowable Service. Age 62 and 30 years of Allowable Service. Proportionate Retirement

TABLE 13A  
BASIC  
(Continued)

Annuity is available at age 65 and one year of Allowable Service.

First hired after June 30, 1989:

The greater of age 65 or the age eligible for full Social Security retirement benefits and three years of Allowable Service. Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.

*Early Retirement Eligibility:*

*Eligibility:*

First hired before July 1, 1989:

Age 55 and three years of Allowable Service.

Any age with 30 years of Allowable Service.

Rule of 90: Age plus Allowable Service totals 90.

First hired after June 30, 1989:

Age 55 with three years of Allowable Service.

*Retirement Amount:* First hired before July 1, 1989:

The greater of 2.13% of Average Salary for each of the first 10 years of Allowable Service and 2.63% of Average Salary for each subsequent year with reduction of 0.25% for each month the Member is under age 65 at time of retirement or under age 62 if 30 years of Allowable Service. No reduction if age plus years of Allowable Service totals 90;

OR

2.63% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3% per year and actuarial reduction for each month the Member is under age 65.

First hired after June 30, 1989:

2.63% of Average Salary for each year of Allowable Service assuming augmentation to the age eligible for full Social Security retirement benefits at 3% per year and actuarial reduction for each month the Member is under the full Social Security benefit retirement age.

TABLE 13A  
BASIC  
(Continued)

*Form of Payment:* Life annuity.  
Actuarially equivalent options are:  
50%, 75% or 100% joint and survivor with bounce back  
feature without additional reduction.  
15 year certain and life.  
Guaranteed refund.

*Benefit Increases:* Benefits may be increased each January 1 depending on the investment performance of the Minnesota Post Retirement Investment Fund (MPRIF). A Member who has been receiving a benefit for at least 12 full months as of June 30 will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months will receive a partial pro rata increase.

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

## DISABILITY

*Disability Benefit:*

*Eligibility:* Total and permanent disability before normal retirement age with three years of Allowable Service.

*Amount:* Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for commencement before normal retirement age unless an optional annuity plan is selected. Supplemental benefit of \$25 per month.

TABLE 13A  
BASIC  
(Continued)

Payments stop at normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment. If death occurs before retirement status, the surviving spouse and dependent children are eligible for survivor benefits.

*Form of Payment:* Same as for retirement.

*Benefit Increases:* Adjusted by TRA to provide same increase as MPRIF.

***Retirement After Disability:***

*Eligibility:* Normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later.

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

*Benefit Increases:* Same as for retirement.

**DEATH**

***Surviving Spouse Benefit:***

*Eligibility:* Active Member with 18 months of Allowable Service or Member receiving a disability benefit.

*Amount:* 50% of salary for the last full fiscal year preceding death. Maximum family benefit is \$1,000 per month. Benefits paid until spouse's death.

Surviving spouse optional annuity or refund of contributions may be elected in lieu of this benefit.

*Surviving Dependent Child Benefit:*

- Eligibility:* Active Member with 18 months of Allowable Service or Member receiving a disability benefit.
- Amount:* 10% of salary for the last full fiscal year preceding death. Family benefit minimum (including spouse's benefit) of 50% of salary and maximum \$1,000 per month. Benefits paid until child marries, dies, or attains age 18 (age 22 if full-time student.)

*Surviving Spouse Optional Annuity:*

- Eligibility:* Member or former Member with three years of Allowance Service who dies before retirement or disability benefits commence.
- Amount:* Survivor's payment of the 100% joint and survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.
- Benefit Increases:* Adjusted by TRA to provide same increase as MPRIF except surviving spouse optional annuity benefit increases which are paid from MPRIF.

*Refund of Contributions:*

- Eligibility:* Member dies before receiving any retirement benefits and survivor benefits are not elected.
- Amount:* The excess of the Member's contributions over any disability benefits paid plus 5% interest compounded annually if death occurred before May 16, 1989 and 6% interest compounded annually if death occurred on or after May 16, 1989.

## TERMINATION

### *Refund of Contributions:*

<i>Eligibility:</i>	Thirty days following termination of teaching service.
<i>Amount:</i>	Member's contributions with 5% interest compounded annually if termination occurred before May 16, 1989 and 6% interest compounded annually if termination occurred on or after May 16, 1989. A deferred annuity may be elected in lieu of a refund.

### *Deferred Benefit:*

<i>Eligibility:</i>	Three years of Allowable Service.
<i>Amount:</i>	Benefit computed under law in effect at termination and increased by the following percentage compounded annually: 0% before 7/1/71; 5% from 7/1/71 to 1/1/81; and 3% thereafter until January 1 of the year following attainment of age 55 and 5% thereafter until the annuity begins. Amount is payable as a normal or early retirement.

## SUMMARY OF SIGNIFICANT CHANGES

No significant changes were made for the current valuation.

TABLE 3B  
COORDINATED

Teachers Retirement Association Fund  
ACTIVE MEMBERS AS OF JUNE 30, 1995

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	1,490	183							1,673
25-29	2,946	4,102	604						7,652
30-34	954	2,490	3,142	430	1				7,017
35-39	1,096	1,643	2,030	2,157	533	1			7,460
40-44	1,168	1,858	1,953	1,590	3,269	937	1		10,776
45-49	908	1,564	1,821	1,425	2,216	4,520	1,601		14,055
50-54	508	688	895	938	1,168	2,070	3,592	531	10,390
55-59	220	332	412	415	617	906	1,630	1,690	6,222
60-64	146	164	116	110	192	328	471	334	1,861
65+	84	64	31	26	24	36	41	39	345
ALL	9,520	13,088	11,004	7,091	8,020	8,798	7,336	2,594	67,451

AVERAGE ANNUAL EARNINGS

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	15,565	24,079							16,496
25-29	13,821	24,270	28,454						20,577
30-34	12,248	22,484	30,330	34,355	27,524				25,334
35-39	12,111	22,374	30,602	35,684	39,558	28,911			28,182
40-44	11,472	20,433	31,007	36,668	41,238	43,239	33,241		32,069
45-49	11,674	18,947	31,204	36,208	41,511	44,415	45,654		36,605
50-54	10,086	18,038	28,736	34,939	41,841	46,247	47,172	47,875	39,989
55-59	8,614	14,251	25,094	31,887	40,141	45,920	48,181	49,474	41,581
60-64	9,021	9,313	22,821	29,938	39,316	47,114	48,883	50,120	38,448
65+	4,698	4,419	22,399	29,054	41,449	45,117	53,384	54,782	26,294
ALL	12,773	21,643	30,115	35,495	41,158	44,978	47,208	49,310	32,437

PRIOR FISCAL YEAR EARNINGS (IN MILLIONS) BY YEARS OF SERVICE

AGE	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
ALL	122	283	331	252	330	396	346	128	2,188

TABLE 4B  
COORDINATED

Teachers Retirement Association Fund  
SERVICE RETIREMENTS AS OF JUNE 30, 1995

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50		1						1
50-54	13	10						23
55-59	568	992	13	1				1,574
60-64	521	2,670	616	1				3,808
65-69	175	1,485	1,587	476	3			3,726
70-74	12	192	1,247	1,031	145			2,627
75-79	1	18	149	1,071	508	46		1,793
80-84			11	146	852	244	11	1,264
85+		1		4	109	991	271	1,376
ALL	1,290	5,369	3,623	2,730	1,617	1,281	282	16,192

AVERAGE ANNUAL BENEFIT

AGE	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50		11,507						11,508
50-54	18,060	15,015						16,736
55-59	22,040	17,676	15,428	3,005				19,223
60-64	19,002	20,358	14,578	8,952				19,235
65-69	13,424	14,941	13,617	9,615	5,283			13,618
70-74	7,218	14,528	12,598	12,166	5,882			12,175
75-79	3,475	10,724	11,969	12,010	10,488	3,421		11,338
80-84			6,741	10,727	11,206	7,852	3,481	10,398
85+		698		2,321	9,446	7,456	5,004	7,112
ALL	19,453	18,109	13,348	11,565	10,374	7,387	4,946	14,197

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS RETIRED

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	25,094	97,227	48,360	31,573	16,775	9,463	1,395	229,878

TABLE 5B  
COORDINATED

Teachers Retirement Association Fund  
SURVIVORS AS OF JUNE 30, 1995

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	10	34	8					52
50-54	10	25	4	1				40
55-59	14	44	17	4	1			80
60-64	9	76	41	10				136
65-69	19	74	66	26	2	1		188
70-74	11	97	69	35	16	1		229
75-79	11	47	56	22	2	2		140
80-84	2	24	18	15	14	5	1	79
85+	1	7	6	3	7	5	2	31
ALL	87	428	285	116	42	14	3	975

AVERAGE ANNUAL BENEFIT

AGE	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	9,422	9,476	2,115					8,334
50-54	11,077	10,840	7,522	2,314				10,355
55-59	15,561	12,603	6,929	4,050	1,537			11,350
60-64	16,734	13,861	10,456	7,308				12,543
65-69	12,756	14,070	11,208	11,072	13,923	15,231		12,523
70-74	15,251	10,607	11,277	11,280	12,449	3,422		11,233
75-79	9,682	12,801	11,918	8,143	21,841	11,632		11,583
80-84	9,280	8,248	10,807	9,865	11,688	9,417	4,777	9,804
85+	9,486	8,867	6,792	6,381	6,250	7,219	8,103	7,339
ALL	12,852	11,993	10,576	9,660	11,420	8,936	6,995	11,294

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS SINCE DEATH

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	1,118	5,133	3,014	1,121	480	125	21	11,012

TABLE 6B  
COORDINATED

Teachers Retirement Association Fund  
DISABILITY RETIREMENTS AS OF JUNE 30, 1995

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	6	39	13	3				61
50-54	9	35	14	7				65
55-59	9	54	26	11	4	1		105
60-64	6	53	46	13	6	1		125
65-69		5	2	1				8
70-74								
75-79								
80-84								
85+								
ALL	30	186	101	35	10	2		364

AVERAGE ANNUAL BENEFIT

AGE	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	9,399	7,684	5,430	3,953				7,189
50-54	11,660	12,067	8,983	16,791				11,855
55-59	18,610	13,856	10,998	7,880	6,029	2,547		12,524
60-64	21,837	15,098	11,187	9,242	4,569	6,548		12,800
65-69		10,108	17,103	3,386				11,017
70-74								
75-79								
80-84								
85+								
ALL	15,329	12,479	10,209	9,704	5,154	4,548		11,572

TOTAL ANNUAL BENEFIT (IN THOUSANDS) BY YEARS DISABLED

AGE	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
ALL	460	2,321	1,031	340	52	9		4,212

Teachers Retirement Association Fund

*Determination Of Contribution Sufficiency*  
*(dollars in thousands)*

JULY 1, 1995

	Percent of Payroll	Dollar Amount
A. STATUTORY CONTRIBUTIONS - CHAPTER 354		
1. Employee Contributions	6.50%	\$150,793
2. Employer Contributions	8.14%	188,840
3. Total	<u>14.64%</u>	<u>\$339,633</u>
 B. REQUIRED CONTRIBUTIONS - CHAPTER 356		
1. Normal Cost		
a. Retirement Benefits	8.30%	\$192,630
b. Disability benefits	0.62%	14,275
c. Survivors	0.11%	2,627
d. Deferred Retirement Benefits	0.39%	9,108
e. Refunds Due to Death or Withdrawal	1.15%	26,712
f. Total	<u>10.57%</u>	<u>\$245,352</u>

Note: Projected Annual Payroll for Fiscal Year Beginning on JULY 1, 1995 is \$2,319,898.

Teachers Retirement Association Fund Coordinated

*Summary of Plan Provisions*

GENERAL

*Eligibility:*

A public school, community college or state university teacher who is not covered by the Social Security Act, except for teachers employed by Minneapolis, St. Paul or Duluth public schools or by the University of Minnesota.

No community college or state university teacher is a Member except for purposes of Social Security coverage if that person elects coverage under Sec. 354B.

*Contributions:*

*Member:* 6.5% of salary.

*Employer:* 8.14% of salary.

*Allowable Service:* A day of credit is earned if five hours are taught that day. A year is earned if 170 days of service are credited. Credit may also be provided for certain leaves if contributions re paid into the fund.

*Salary:* Compensation used for contribution purposes excluding lump-sum annual or sick leave payments, severance payments, any payments made in lieu of employer paid fringe benefits or expenses, and employer contributions to a Section 457 deferred compensation plan.

*Average Salary:* Average of the five highest successive years of salary. Average salary is based on all Allowable Service if less than five years.

## RETIREMENT

### *Normal Retirement:*

#### *Eligibility:*

First hired before July 1, 1989:

Age 65 and three years of Allowable Service. Age 62 and 30 years of Allowable Service. Proportionate Retirement Annuity is available at age 65 and one year of Allowable Service.

First hired after June 30, 1989:

The greater of age 65 or the age eligible for full Social Security retirement benefits and three years of Allowable Service. Proportionate Retirement Annuity is available at normal retirement age and one year of Allowable Service.

### *Early Retirement:*

#### *Eligibility:*

First hired before July 1, 1989:

Age 55 and three years of Allowable Service.

Any age with 30 years of Allowable Service.

Rule of 90: Age plus Allowable Service totals 90.

First hired after June 30, 1989:

Age 55 with three years of Allowable Service.

*Retirement Amount:* First hired before July 1, 1989:

The greater of 1.13% of Average Salary for each of the first 10 years of Allowable Service and 1.63% of Average Salary for each subsequent year with reduction of 0.25% for each month the Member is under age 65 at time of retirement (age 62 if 30 years of Allowable Service). No reduction if age plus years of Allowable Service totals 90;

**OR**

1.63% of Average Salary for each year of Allowable Service assuming augmentation to age 65 at 3% per year and actuarial reduction for each month the Member is under age 65.

TABLE 13B  
COORDINATED  
(Continued)

First hired after June 30, 1989:

1.63% of Average Salary for each year of Allowable Service assuming augmentation to age eligible for full Social Security retirement benefits at 3% per year and actuarial reduction for each month the Member is under the full Social Security benefit retirement age.

*Form of Payment:*

Life annuity.

Actuarially equivalent options are:

50%, 75% or 100% joint and survivor with bounce back feature without additional reduction.

15 year certain and life.

Guaranteed refund.

*Benefit Increases:*

Benefits may be increased each January 1 depending on the investment performance of the Minnesota Post Retirement Investment Fund (MPRIF). A Member who has been receiving a benefit for at least 12 full months as of the previous June 30 will receive a full increase. Members receiving benefits for at least one full month but less than 12 full months will receive a partial pro rata increase.

Members retired under laws in effect before July 1, 1973 receive an additional lump-sum payment from TRA each year. In 1989, this lump-sum payment was the greater of \$25 times each full year of Allowable Service. In each following year, the lump-sum payment increases by the same percentage increase that is applied to regular annuities paid from MPRIF.

## DISABILITY

*Disability Benefit:*

*Eligibility:*

Total and permanent disability before normal retirement age with three years of Allowable Service.

*Amount:*

Normal Retirement Benefit based on Allowable Service and Average Salary at disability without reduction for com-

**TABLE 13B**  
**COORDINATED**  
(Continued)

mencement before normal retirement age unless an optional annuity plan is selected.

Payments stop at normal retirement age or the five year anniversary of the effective date of the disability benefit, whichever is later. Payments stop earlier if disability ceases or death occurs. Benefits may be reduced on resumption of partial employment.

*Form of Payment:* Same as for retirement.

*Benefit Increases:* Adjusted by TRA to provide same increase as MPRIF.

***Retirement After Disability:***

*Eligibility:* Normal retirement age.

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

*Benefit Increases:* Same as for retirement.

## DEATH

***Surviving Spouse Optional Annuity:***

*Eligibility:* Member or former Member with three years of Allowable Service who dies before retirement benefits commence.

*Amount:* Survivor's payment of the 100% joint and survivor benefit or an actuarial equivalent term certain annuity. If commencement is prior to age 65 (age 62 if 30 years of service), the benefit is reduced same as early retirement with half the applicable reduction factor used from age 55 to the actual commencement age. If no surviving spouse, then an actuarial equivalent dependent child benefit is paid to age 20 or for five years if longer.

TABLE 13B  
COORDINATED  
(Continued)

*Benefit Increases:* Same as for retirement.

*Refund of Contributions:*

*Eligibility:* Member dies before receiving any retirement benefits and the surviving spouse optional annuity is not elected.

*Amount:* The excess of the Member's contributions over any disability benefits paid plus 5% interest compounded annually if death occurred before May 16, 1989 and 6% interest compounded annually if death occurred on or after May 16, 1989.

**TERMINATION**

*Refund of Contributions:*

*Eligibility:* Thirty days following termination of teaching service.

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

*Deferred Benefit:*

*Eligibility:* Three years of Allowable Service.

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

**SUMMARY OF SIGNIFICANT CHANGES**

No significant changes were made for the current valuation.

**APPENDIX C**  
**SAMPLE EXPERIENCE STUDY REPORT**

**MINNEAPOLIS TEACHERS  
RETIREMENT FUND ASSOCIATION**

**1990-94 EXPERIENCE STUDY**

February 8, 1995

MILLIMAN & ROBERTSON, INC.



## MILLIMAN & ROBERTSON, INC.

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February 8, 1995

Board of Trustees  
c/o Karen Kilberg  
Executive Director  
Minneapolis Teachers Retirement Fund Association  
730 Second Avenue South  
Minneapolis, Minnesota 55402

RE: 1990-94 Experience Study

Ladies and Gentlemen:

We have prepared this experience study for the period from June 30, 1990 to June 30, 1994 based on membership and financial data supplied by the Fund. The purpose of an experience study is to evaluate the appropriateness of the assumptions used in the actuarial valuation. This study is performed by comparing the actual experience of the Fund to that which was expected based on prior valuation assumptions. These comparisons are displayed in the tables which follow.

While completing this study, we did encounter some difficulties working with the census data provided. Over the last four years, significant effort has been expended, and progress made, in compiling reliable census data for valuation purposes. In analyzing this data as part of the experience study process, we found it difficult to track from one year's data to the next. While better in the later years, there are still two significant areas which caused us problems: (1) large numbers of ins-and-outs among short service and/or very low salary participants; and (2) lack of unique identifier which would allow tracking of individuals from one status to another (e.g. active one year retired the next; active employee numbers have been included with annuitant data in the 1993 and 1994 data sets).

Albany • Atlanta • Boston • Chicago • Cincinnati • Dallas • Denver • Hartford • Houston  
Indianapolis • Irvine • Los Angeles • Milwaukee • Minneapolis • New York • Omaha • Philadelphia • Phoenix  
Portland • St. Louis • Salt Lake City • San Diego • San Francisco • Seattle • Tokyo • Washington, D.C.

International: WOODBROW MILLIMAN

Argentina • Australia • Austria • Belgium • Bermuda • Canada • Channel Islands • Denmark  
France • Germany • Ireland • Italy • Japan • Mexico • Netherlands • New Zealand  
Philippines • Spain • Sweden • United Kingdom • United States • West Indies

For purposes of the experience study, we were more concerned with analyzing credible data that would provide meaningful input to the assumption setting process than we were with trying to reconcile to census experience reflected in the valuation reports. To arrive at comparable active data sets for each of the five valuation points, we started with the complete initial file then excluded the following:

- ◆ Those coded as deferred vested.
- ◆ Those with a coded date of termination before the valuation date.
- ◆ Those without a date of hire.
- ◆ Those whose date of hire was in the twelve-month period immediately preceding the valuation date.
- ◆ Those who had \$0 in the salary field, unless they were specifically coded as on leave of absence.

We believe this produces a workable set of data for purposes of analyzing decremental and salary increase experience. The results of using this data set will be to avoid some of the distortion caused in the salary review and withdrawal analysis by experience among short service participants with little or no accrued liability.

The annuitant data seemed to be more consistent, although we did have difficulty trying to match the new retirements each year as reflected in the respective valuations. Accordingly, we view the retirement results as shown herein as only partially credible.

Nonetheless, overall we believe the experience as reflected in this study does provide a reasonable starting point for developing recommended changes in the actuarial assumptions for future valuations. Our observations, rationale and final recommendations are all covered in the appropriate sections of this report. In arriving at our recommendations, we have attempted to give appropriate consideration to (1) observed results; (2) future expectations; (3) current assumptions and overall gain/loss experience; and (4) consistency with other State of Minnesota programs (in particular TRA) as well as an overall prudent level of conservatism.

Board of Trustees  
February 8, 1995  
Page Three

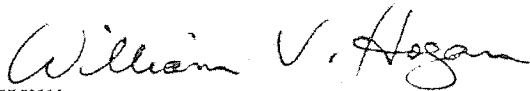
We have not, at this point, determined plan costs under the proposed set of actuarial assumptions. We would be willing to do so if the Trustees believes this is vital information to have before approving any assumption changes. We would be happy to try and answer any other questions which may arise out of these study results or recommendations.

Respectfully submitted,

MILLIMAN & ROBERTSON, INC.



Thomas K. Custis, F.S.A.  
Consulting Actuary



William V. Hogan, F.S.A.  
Consulting Actuary

TKC/WVH/bh

# MINNEAPOLIS TEACHERS' RETIREMENT FUND

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#### Appendices

	Compilation of Recommended Changes
A	Detailed Age-Related Salary Increase Assumption

# MINNEAPOLIS TEACHERS' RETIREMENT FUND

## Summary of Observations and Resulting Recommendations

### *INTEREST ASSUMPTION*

Investment experience over the last four years has been above expected. Gross investment return on a dollar weighted basis based on actuarial asset values has averaged 12.4%. Data provided in the last three years indicates that investment-related expenses have been 35-50 basis points; so the true net investment yield has been slightly below 12%. During this period, interest rates in the marketplace dropped dramatically and have recovered modestly. We believe that 8.5% is still a reasonable long-term expected rate and do not recommend consideration of a change in this basic rate at this time.

### *SALARY INCREASES*

Individual salary increases have averaged 3.6% over the last four years for the selected continuing participants; less than the assumed 6.5%. *Table 1* demonstrates that individual salary increases are related to both age and service. For structural consistency with other State of Minnesota plans as well as to create an assumption which will more closely reflect future expectations we think an age-related table should be adopted. This table should have a base underlying assumption component. We believe this should be 5.0%. This is consistent with the 8.5% interest assumption as well as with the other Minnesota plans. The specific age-related table recommended is laid out in Appendix A.

### *PAYROLL GROWTH ASSUMPTION*

Currently this assumption is set at 6.5%; the same as the current flat salary increase assumption. This ignores the potential for increases (or decreases) in the numbers of covered participants as well as the impact of replacing retired or terminating workers with newly hired employees (presumably at a lower starting salary).

The payroll growth assumption should be established taking into account the following two components: (1) the base salary scale assumption (5.0%); and (2) the expected growth in the number of active participants. This latter component is somewhat touchy based on recent experience. Numbers of active participants have increased significantly over the last four years due in large part to the inclusion of reserve teachers starting in 1993. If the increase over the last four years is expected to continue for the foreseeable future, then a payroll growth assumption of 6.0% or even 7.0% may be appropriate. If a stable teacher population

is a more realistic long-term assumption, then 5.0% would be a more appropriate payroll growth assumption.

We recommend adoption of a 5.0% payroll growth assumption unless the Board has a strong feeling that it should be higher.

### ***RETIREMENT ASSUMPTION***

*Table 2* shows observed retirement rates by age for three segments of participants: (1) those that are eligible for early or normal retirement who have not met the 30-year or Rule-of-90 criteria; (2) those in the first year following eligibility under the 30-year or Rule-of-90; and (3) those beyond the first year of eligibility under the 30-year or Rule-of-90.

For those Basic participants not eligible under the 30-year criteria, observed rates are higher than the 0% assumed rates up to age 60 and considerably lower than the assumed 100% at age 60 and above. For those eligible under the 30-year criteria, observed experience is slightly lower than assumed. There does not seem to be a major select effect for those in their first year of 30-year eligibility.

We looked at Basic and Coordinated participants separately due to their different early retirement provisions. Unfortunately, there have not yet been very many Coordinated participants reaching retirement eligibility so their retirement numbers are very small.

The four-year results are dominated by, and somewhat distorted by, the large number of retirements in 1992-93, the year of the early retirement incentive program. Retirement rates were obviously higher in that year than in the two prior years. Not surprisingly, the rates in 1993-94 are lower than earlier years (many of those that might have been expected to retire in 1993-94 already retired in 1992-93 due to the early retirement incentives).

Nonetheless, we believe the data supports the following conclusions: (1) There should be some assumed probability of retirement among those eligible for reduced early retirement; (2) Assumed rates for those eligible for unreduced retirement (whether 30-year, Rule-of-90 or age) should remain at 30 or higher, but not 100.

Accordingly, our recommendation for retirement assumption until another experience study suggests otherwise is as follows:

	Basic	Coordinated
30-year or Rule-of-90 Eligible	30%	30%
Otherwise:		
Ages 55-59	3	2
60-62	12	8
63-64	30	20
65-69	50	50
70+	75	75

### ***ANNUITY OPTIONS SELECTED***

*Table 3* shows the distribution of annuity options actually selected over the last four years separated by sex. This reflects the combined effect of the marriage assumption and the optional form assumption. The reader should be aware that all certain and life annuity forms are lumped in the straight life category. One can see that the current assumptions are not too far off. However, it is probably wise to reflect the availability of the 75% bounce back form. Also one can see a very definite trend in the male elections toward more survivor annuity elections.

We recommend that the marriage assumption remain the same (males 80%, females 60%) and that the form election assumption be modestly modified as follows:

	Percentage of Married Males Electing		Percentage of Married Females Electing	
	Current	Recommended	Current	Recommended
Straight Life	35%	25%	80%	70%
50% Bounce Back	15	15	10	15
75% Bounce Back	0	20	0	5
100% Bounce Back	50	40	10	10

### *ACTIVE DISABILITY*

*Table 4* shows that active disabilities have been very few. In aggregate, less than 15% of expected under the current assumption. The actual experience is not sufficient to develop a plan specific table. The current table being used reflects very low rates of expected disability. We do not recommend any change in this assumption at this time.

### *ACTIVE TERMINATIONS*

Based on valuation census numbers, total terminations have been dramatically higher-than-expected. However, the analysis reflected in *Table 5* shows that withdrawal excluding all experience activity for those participants with one year or less of service is modestly below expected. Granting that first year experience should not be totally discounted, we believe that the current set of assumptions remains appropriate.

### *ANNUITANT MORTALITY*

*Table 6* shows observed annuitant and survivor mortality versus expected. The observations by age and sex clearly demonstrate that the current mortality table creates some distortion.

- (1) Aggregate A/E ratio for all ages = 1.00 while aggregate A/E ratios for ages 65-84 = .68.
- (2) Aggregate A/E ratio for males = 1.12 while aggregate A/E ratios for females = .98.

We feel strongly that a more up-to-date table should be adopted which would require less setback (this is the major cause of distortion at the older ages). Also we believe that adoption of sex distinct tables for valuation purposes is advisable. We can draw on the experience study completed for the Minnesota TRA to provide further guidance in making a specific recommendation. Using their general structure but fitting to your experience, we developed the following recommendation. It would produce a more reasonable pattern of A/E ratios at most age groups:

**Males:** 1983 Group Annuity Mortality Table for Males with a four-year setback.

**Females:** 1983 Group Annuity Mortality Table for Females with a two-year setback.

## *DISABILITY MORTALITY*

*Table 7* summarizes disability mortality experience. Clearly, there is not enough plan-specific data to make a valid judgment as to future expectations. Nonetheless, we believe that a separate disability mortality table makes good sense. Mortality rates of disabled participants are certainly likely to be higher than those of healthy retirees or healthy active participants of the same age. Accordingly, we recommend adoption of the 1977 Railroad Retirement Board Mortality for Disabled Annuitants. This is the table recently adopted for this purpose by Minnesota TRA.

## *ACTIVE MORTALITY*

We were not able to track the specific individuals who died while active during the four-year study period. Since there were only eleven in total, we would not be able to arrive at any specific conclusions relating to rates by age and sex in any event. *Table 8* does show that aggregate experience over the four-year period produced significantly fewer deaths in total than was expected based on the assumptions in use. While not definitive, this evidence does support the common practice of reflecting moderately lower mortality expectations among the active population. We recommend adoption of active mortality tables which are the tables as specified for use by healthy annuitants with an additional two-year setback in each case.

MINNEAPOLIS TEACHERS RETIREMENT FUND

SUMMARY  
1990-1994

SUMMARY OF 1990-1994 EXPERIENCE STUDY

	ACTUAL (A)	EXPECTED (E)	DIFFERENCE (A-E)	RATIO (A/E)
<u>ECONOMIC ASSUMPTIONS</u>				
Investment Rate of Return (Active Fund Only)				
Actuarial Value	12.4%	8.5%	3.9%	146%
Individual Salary Increases	3.6%	6.5%	-2.9%	55%
Payroll Growth (Projected Annual Earnings)	7.6%	6.5%	1.1%	117%
<u>DEMOGRAPHIC ASSUMPTIONS</u>				
Retirements				
Number of Actives	417	1,091	(674)	38%
Active Average Age	59.4	62.5	-3.1	95%
Number of Disabilities				
Males	0	13	(13)	0%
Females	7	40	(33)	18%
Total	7	53	(46)	13%
Number of Terminations				
Males	122	129	(7)	95%
Females	293	387	(94)	76%
Total	415	517	(102)	80%
Number of Deaths				
Annuitants and Survivors				
Males	67	60	7	112%
Females	279	285	(6)	98%
Total	346	344	2	100%
Disabled				
Males	2	1	1	333%
Females	1	3	(2)	40%
Total	3	3	(0)	97%
Actives				
Males	*	*	*	*
Females	*	*	*	*
Total	11	47	(36)	23%

MINNEAPOLIS TEACHERS RETIREMENT FUND

SUMMARY  
1993-1994

SUMMARY OF 1993-1994 EXPERIENCE STUDY

	ACTUAL (A)	EXPECTED (E)	DIFFERENCE (A-E)	RATIO (A/E)
<b><u>ECONOMIC ASSUMPTIONS</u></b>				
Investment Rate of Return (Active Fund Only)				
Actuarial Value	12.5%	8.5%	4.0%	147%
Individual Salary Increases	3.6%	6.5%	-2.9%	55%
Payroll Growth (Projected Annual Earnings)	14.9%	6.5%	8.4%	229%
<b><u>DEMOGRAPHIC ASSUMPTIONS</u></b>				
Retirements				
Number of Actives	40	231	(191)	17%
Active Average Age	58.6	62.7	-4.1	93%
Number of Disabilities				
Males	0	3	(3)	0%
Females	3	11	(8)	28%
Total	3	14	(11)	22%
Number of Terminations				
Males	40	37	3	108%
Females	92	122	(30)	75%
Total	132	159	(27)	83%
Number of Deaths				
Annuitants and Survivors				
Males	20	17	3	117%
Females	60	70	(10)	86%
Total	80	87	(7)	92%
Disabled				
Males	2	0	2	1000%
Females	0	1	(1)	0%
Total	2	1	1	222%
Actives				
Males	*	*	*	*
Females	*	*	*	*
Total	1	12	(11)	8%

MINNEAPOLIS TEACHERS RETIREMENT FUND

SUMMARY  
1992-1993

SUMMARY OF 1992-1993 EXPERIENCE STUDY

	<u>ACTUAL</u> (A)	<u>EXPECTED</u> (E)	<u>DIFFERENCE</u> (A-E)	<u>RATIO</u> (A/E)
<b><u>ECONOMIC ASSUMPTIONS</u></b>				
Investment Rate of Return (Active Fund Only)				
Actuarial Value	14.4%	8.5%	5.9%	170%
Individual Salary Increases	3.1%	6.5%	-3.4%	48%
Payroll Growth (Projected Annual Earnings)	-1.0%	6.5%	-7.5%	-15%
<b><u>DEMOGRAPHIC ASSUMPTIONS</u></b>				
Retirements				
Number of Actives	221	259	(38)	85%
Active Average Age	60.0	62.5	-2.5	96%
Number of Disabilities				
Males	0	3	(3)	0%
Females	2	10	(8)	20%
Total	2	13	(11)	15%
Number of Terminations				
Males	20	31	(11)	66%
Females	33	92	(59)	36%
Total	53	122	(69)	43%
Number of Deaths				
Annuitants and Survivors				
Males	22	16	6	137%
Females	66	70	(4)	94%
Total	88	86	2	102%
Disabled				
Males	0	0	(0)	0%
Females	1	1	0	167%
Total	1	1	0	125%
Actives				
Males	*	*	*	*
Females	*	*	*	*
Total	4	12	(8)	34%

MINNEAPOLIS TEACHERS RETIREMENT FUND

SUMMARY  
1991-1992

SUMMARY OF 1991-1992 EXPERIENCE STUDY

	ACTUAL (A)	EXPECTED (E)	DIFFERENCE (A-E)	RATIO (A/E)
<b><u>ECONOMIC ASSUMPTIONS</u></b>				
Investment Rate of Return (Active Fund Only)				
Actuarial Value	12.7%	8.5%	4.2%	149%
Individual Salary Increases	4.1%	6.5%	-2.4%	63%
Payroll Growth (Projected Annual Earnings)	15.0%	6.5%	8.5%	230%
<b><u>DEMOGRAPHIC ASSUMPTIONS</u></b>				
Retirements				
Number of Actives	95	303	(208)	31%
Active Average Age	60.1	62.6	-2.5	96%
Number of Disabilities				
Males	0	4	(4)	0%
Females	2	10	(8)	20%
Total	2	14	(12)	15%
Number of Terminations				
Males	36	31	5	117%
Females	98	89	9	110%
Total	134	120	14	112%
Number of Deaths				
Annuitants and Survivors				
Males	17	14	3	121%
Females	79	72	7	110%
Total	96	86	10	112%
Disabled				
Males	0	0	(0)	0%
Females	0	1	(1)	0%
Total	0	1	(1)	0%
Actives				
Males	*	*	*	*
Females	*	*	*	*
Total	0	12	(12)	0%

MINNEAPOLIS TEACHERS RETIREMENT FUND

SUMMARY  
1990-1991

SUMMARY OF 1990-1991 EXPERIENCE STUDY

	<u>ACTUAL</u> (A)	<u>EXPECTED</u> (E)	<u>DIFFERENCE</u> (A-E)	<u>RATIO</u> (A/E)
<b><u>ECONOMIC ASSUMPTIONS</u></b>				
Investment Rate of Return (Active Fund Only)				
Actuarial Value	10.1%	8.5%	1.6%	119%
Individual Salary Increases	3.9%	6.5%	-2.6%	60%
Payroll Growth (Projected Annual Earnings)	2.4%	6.5%	-4.1%	38%
<b><u>DEMOGRAPHIC ASSUMPTIONS</u></b>				
Retirements				
Number of Actives	61	298	(237)	20%
Active Average Age	60.4	62.4	-2.0	97%
Number of Disabilities				
Males	0	3	(3)	0%
Females	0	9	(9)	0%
Total	0	12	(12)	0%
Number of Terminations				
Males	26	30	(4)	86%
Females	70	85	(15)	83%
Total	96	115	(19)	83%
Number of Deaths				
Annuitants and Survivors				
Males	8	12	(4)	66%
Females	74	73	1	102%
Total	82	85	(3)	96%
Disabled				
Males	0	0	(0)	0%
Females	0	1	(1)	0%
Total	0	1	(1)	0%
Actives				
Males	*	*	*	*
Females	*	*	*	*
Total	6	11	(5)	54%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 1  
1990-1994

1990-1994 INDIVIDUAL SALARY INCREASES

ACTIVE MEMBERS\*

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	14							14
25-29	*	307	55						362
30-34	*	383	356	27					766
35-39	*	367	373	143	44				927
40-44	*	452	413	286	391	318			1,860
45-49	*	303	336	238	296	1,030	280		2,483
50-54	*	161	231	180	179	477	556	71	1,855
55-59	*	61	74	73	115	261	227	100	911
60-64	*	25	23	42	54	107	79	57	387
65+	*	11	4	5	5	13	5	18	61
ALL	*	2,084	1,865	994	1,084	2,206	1,147	246	9,626

SALARY INCREASES

AGE	YEARS OF SERVICE								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	8.6%							8.6%
25-29	*	5.2%	4.6%						5.1%
30-34	*	5.3%	6.8%	6.2%					6.1%
35-39	*	4.3%	4.8%	4.4%	3.7%				4.5%
40-44	*	4.8%	3.5%	2.6%	3.0%	3.1%			3.4%
45-49	*	5.1%	3.7%	3.1%	3.6%	3.4%	3.0%		3.5%
50-54	*	4.2%	4.5%	3.4%	3.0%	3.3%	2.7%	1.7%	3.2%
55-59	*	5.8%	2.6%	2.3%	1.5%	3.4%	2.8%	2.5%	2.9%
60-64	*	1.3%	3.6%	3.8%	3.4%	2.2%	3.0%	3.9%	3.0%
65+	*	1.7%	3.2%	3.7%	-2.2%	2.2%	5.9%	3.5%	2.8%
ALL	*	4.8%	4.4%	3.2%	3.1%	3.3%	2.8%	2.6%	3.6%

\* This analysis excludes members whose pay changed by more than 20% over the prior year and members with less than 1 year of service.

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 1  
1993-1994

1993-1994 INDIVIDUAL SALARY INCREASES

ACTIVE MEMBERS IN BOTH THE 1993 AND 1994 VALUATIONS\*

7/1/93 AGE	YEARS OF SERVICE AS OF 7/1/93								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	11							11
25-29	*	123	7						130
30-34	*	158	106	11					275
35-39	*	120	116	37	6				279
40-44	*	157	124	68	64	36			449
45-49	*	93	102	81	69	247	101		693
50-54	*	51	79	61	44	119	184	19	557
55-59	*	22	31	24	31	52	58	18	236
60-64	*	10	8	8	12	23	22	9	92
65+	*	3	1	2		2	2	3	13
ALL	*	748	574	292	226	479	367	49	2,735

SALARY INCREASES

7/1/93 AGE	YEARS OF SERVICE AS OF 7/1/93								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	8.3%							8.3%
25-29	*	5.5%	5.9%						5.6%
30-34	*	5.8%	6.9%	5.9%					6.2%
35-39	*	4.5%	4.7%	2.6%	2.6%				4.3%
40-44	*	5.3%	2.9%	3.9%	3.0%	3.6%			3.9%
45-49	*	5.9%	3.7%	2.8%	3.0%	2.9%	3.4%		3.4%
50-54	*	4.0%	4.4%	1.8%	2.8%	2.8%	2.4%	1.0%	2.8%
55-59	*	7.5%	3.5%	2.6%	0.6%	2.9%	2.3%	3.1%	2.9%
60-64	*	3.3%	1.8%	2.7%	0.9%	0.1%	1.0%	2.6%	1.3%
65+	*	-5.3%	1.3%	2.3%		-1.0%	11.0%	0.9%	1.7%
ALL	*	5.3%	4.3%	2.9%	2.5%	2.8%	2.6%	2.1%	3.6%

\* This analysis excludes members whose pay changed by more than 20% over the prior year and members with less than 1 year of service.

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 1  
1992-1993

1992-1993 INDIVIDUAL SALARY INCREASES

ACTIVE MEMBERS IN BOTH THE 1992 AND 1993 VALUATIONS\*

7/1/92 AGE	YEARS OF SERVICE AS OF 7/1/92								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	2							2
25-29	*	59	14						73
30-34	*	84	110	9					203
35-39	*	85	101	33	11				230
40-44	*	121	113	73	80	71			458
45-49	*	88	106	64	76	278	81		693
50-54	*	47	62	53	41	115	147	18	483
55-59	*	17	24	16	30	66	37	13	203
60-64	*	10	4	9	10	21	16	8	78
65+	*	4	1	2	1	2	1	2	13
ALL	*	517	535	259	249	553	282	41	2,436

SALARY INCREASES

7/1/92 AGE	YEARS OF SERVICE AS OF 7/1/92								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	7.9%							7.9%
25-29	*	6.9%	7.6%						7.1%
30-34	*	5.6%	7.3%	6.1%					6.6%
35-39	*	5.6%	4.7%	2.8%	0.4%				4.5%
40-44	*	5.3%	4.0%	1.4%	1.5%	1.2%			2.9%
45-49	*	4.4%	3.5%	3.5%	2.4%	2.2%	1.0%		2.6%
50-54	*	5.5%	3.5%	3.9%	1.2%	2.6%	1.6%	1.7%	2.6%
55-59	*	5.0%	1.2%	5.1%	1.6%	2.4%	0.9%	-0.6%	2.1%
60-64	*	-1.3%	2.2%	1.7%	3.2%	1.5%	4.2%	3.4%	2.2%
65+	*	4.4%	2.2%	9.3%	-5.8%	1.7%	2.0%	1.2%	2.5%
ALL	*	5.2%	4.5%	3.1%	1.8%	2.2%	1.5%	1.2%	3.1%

\* This analysis excludes members whose pay changed by more than 20% over the prior year and members with less than 1 year of service.

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 1  
1991-1992

1991-1992 INDIVIDUAL SALARY INCREASES

ACTIVE MEMBERS IN BOTH THE 1991 AND 1992 VALUATIONS\*

7/1/91 AGE	YEARS OF SERVICE AS OF 7/1/91								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	1							1
25-29	*	44	9						53
30-34	*	65	80	4					149
35-39	*	70	73	32	11				186
40-44	*	80	83	57	94	88			402
45-49	*	61	58	42	72	243	55		531
50-54	*	30	41	36	42	118	111	17	395
55-59	*	12	10	13	23	67	66	35	226
60-64	*	3	5	15	14	27	20	20	104
65+	*	2		1	1	5	1	7	17
ALL	*	368	359	200	257	548	253	79	2,064

SALARY INCREASES

7/1/91 AGE	YEARS OF SERVICE AS OF 7/1/91								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*	13.2%							13.2%
25-29	*	7.3%	1.6%						6.2%
30-34	*	5.4%	6.6%	4.1%					6.0%
35-39	*	4.3%	4.6%	3.8%	4.8%				4.4%
40-44	*	5.5%	4.9%	2.7%	4.6%	3.7%			4.3%
45-49	*	6.2%	5.8%	2.7%	3.9%	4.6%	3.9%		4.6%
50-54	*	2.8%	6.9%	3.8%	4.1%	3.5%	2.6%	0.2%	3.4%
55-59	*	4.8%	6.0%	0.6%	5.3%	5.3%	0.6%	2.0%	3.0%
60-64	*	6.9%	5.8%	5.8%	2.9%	1.8%	3.0%	2.1%	3.0%
65+	*	8.4%		0.7%	-13.5%	1.5%	2.6%	2.4%	1.3%
ALL	*	5.3%	5.5%	3.2%	4.2%	4.2%	2.4%	1.6%	4.1%

\* This analysis excludes members whose pay changed by more than 20% over the prior year and members with less than 1 year of service.

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 1  
1990-1991

1990-1991 INDIVIDUAL SALARY INCREASES

ACTIVE MEMBERS IN BOTH THE 1990 AND 1991 VALUATIONS\*

7/1/90 AGE	YEARS OF SERVICE AS OF 7/1/90								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*								
25-29	*	81	25						106
30-34	*	76	60	3					139
35-39	*	92	83	41	16				232
40-44	*	94	93	88	153	123			551
45-49	*	61	70	51	79	262	43		566
50-54	*	33	49	30	52	125	114	17	420
55-59	*	10	9	20	31	76	66	34	246
60-64	*	2	6	10	18	36	21	20	113
65+	*	2	2		3	4	1	6	18
ALL	*	451	397	243	352	626	245	77	2,391

SALARY INCREASES

7/1/90 AGE	YEARS OF SERVICE AS OF 7/1/90								ALL
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	
<25	*								
25-29	*	2.1%	3.5%						2.5%
30-34	*	4.2%	5.6%	11.1%					4.9%
35-39	*	2.6%	5.5%	8.2%	5.6%				4.9%
40-44	*	2.4%	2.2%	2.6%	2.9%	3.5%			2.8%
45-49	*	3.8%	2.1%	3.1%	5.1%	3.9%	5.0%		3.9%
50-54	*	4.0%	4.1%	5.4%	3.9%	4.4%	4.6%	4.1%	4.4%
55-59	*	4.4%	-0.3%	0.5%	-0.3%	3.1%	6.8%	4.1%	3.6%
60-64	*	-5.9%	5.5%	4.0%	5.9%	4.3%	4.5%	6.7%	5.0%
65+	*	-1.8%	5.9%		3.8%	5.4%	4.1%	7.4%	5.5%
ALL	*	3.0%	3.6%	4.0%	3.6%	3.9%	5.3%	5.0%	3.9%

\* This analysis excludes members whose pay changed by more than 20% over the prior year and members with less than 1 year of service.

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1990-1994

1990-1994 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

BASIC

<u>AGE</u>	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>YEARS OF SERVICE</u>			<u>ACTUAL</u>	<u>EXPECTED</u>
	<u>&lt;30</u>	<u>30</u>	<u>30+</u>		
<55	0.0%	10.7%	15.4%	57	0.0
55	2.9%	37.7%	15.5%	35	0.0
56	1.7%	29.1%	22.2%	28	0.0
57	3.7%	20.5%	11.1%	24	0.0
58	4.0%	15.3%	23.8%	28	0.0
59	9.0%	29.0%	29.4%	40	0.0
60	13.2%	45.4%	22.2%	40	246.5
61	6.8%	0.0%	13.3%	15	192.7
62	13.3%	16.6%	29.0%	28	165.6
63	13.7%	20.0%	26.3%	22	134.7
64	23.0%	100.0%	23.8%	22	87.1
65	28.2%	50.0%	25.0%	17	58.3
66	36.0%	14.2%	9.0%	11	42.5
67	12.5%	0.0%	40.0%	6	27.6
68	38.4%	0.0%	0.0%	5	16.7
69	50.0%	0.0%	20.0%	5	12.8
70	60.0%	0.0%	0.0%	3	6.8
71+	33.3%	0.0%	100.0%	2	3.9
				----- 388	----- 995.9
AVERAGE AGES	60.6	56.7	59.4	59.3	62.3

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1993-1994

1993-1994 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

BASIC

<u>AGE</u>	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>YEARS OF SERVICE</u>			<u>ACTUAL</u>	<u>EXPECTED</u>
	<u>&lt;30</u>	<u>30</u>	<u>30+</u>		
<55	0.0%	8.1%	20.0%	11	0.0
55	1.0%	20.0%	27.2%	5	0.0
56	0.0%	0.0%	0.0%	0	0.0
57	1.3%	0.0%	33.3%	2	0.0
58	1.6%	0.0%	20.0%	2	0.0
59	4.0%	33.3%	14.2%	4	0.0
60	2.0%	0.0%	0.0%	1	53.0
61	2.7%	0.0%	0.0%	1	38.1
62	17.6%	0.0%	0.0%	3	20.4
63	2.7%	14.2%	0.0%	2	45.5
64	14.2%	0.0%	20.0%	2	11.8
65	14.2%	0.0%	0.0%	1	8.9
66	20.0%	0.0%	0.0%	1	6.9
67	0.0%	0.0%	0.0%	0	7.9
68	0.0%	0.0%	0.0%	0	1.9
69	0.0%	0.0%	0.0%	0	1.9
70	100.0%	0.0%	0.0%	1	0.9
71+	0.0%	0.0%	0.0%	0	0.0
				----- 36	----- 197.7
AVERAGE AGES	60.6	55.8	56.2	58.2	62.2

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1992-1993

1992-1993 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

BASIC

AGE	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>YEARS OF SERVICE</u>			<u>ACTUAL</u>	<u>EXPECTED</u>
	<u>&lt;30</u>	<u>30</u>	<u>30+</u>		
<55	0.0%	30.3%	16.6%	31	0.0
55	5.6%	71.4%	20.0%	17	0.0
56	5.1%	100.0%	77.7%	21	0.0
57	11.5%	33.3%	33.3%	14	0.0
58	10.6%	57.1%	46.6%	18	0.0
59	21.3%	66.6%	66.6%	25	0.0
60	20.8%	66.6%	100.0%	21	59.9
61	14.2%	0.0%	42.8%	6	27.3
62	14.8%	20.0%	75.0%	14	58.4
63	46.6%	100.0%	33.3%	12	25.7
64	38.4%	100.0%	50.0%	9	18.8
65	45.4%	33.3%	100.0%	7	14.8
66	42.8%	0.0%	0.0%	3	10.8
67	33.3%	0.0%	100.0%	3	4.9
68	100.0%	0.0%	0.0%	1	2.9
69	33.3%	0.0%	100.0%	2	3.9
70	0.0%	0.0%	0.0%	0	0.0
71+	0.0%	0.0%	100.0%	1	0.9
				----- 205	----- 228.9
AVERAGE AGES	59.9	56.5	59.6	58.8	62.3

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1991-1992

1991-1992 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

BASIC

AGE	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>YEARS OF SERVICE</u>			<u>ACTUAL</u>	<u>EXPECTED</u>
	<u>&lt;30</u>	<u>30</u>	<u>30+</u>		
<55	0.0%	5.2%	14.2%	10	0.0
55	4.1%	29.4%	12.5%	11	0.0
56	1.1%	11.1%	11.1%	3	0.0
57	0.0%	30.7%	4.7%	5	0.0
58	1.1%	11.1%	5.8%	3	0.0
59	5.6%	6.6%	11.1%	6	0.0
60	33.3%	33.3%	0.0%	13	46.1
61	4.6%	0.0%	6.6%	4	78.3
62	9.0%	0.0%	11.1%	4	44.8
63	25.0%	0.0%	33.3%	8	33.6
64	20.0%	0.0%	33.3%	6	27.7
65	27.2%	100.0%	33.3%	6	17.8
66	33.3%	0.0%	20.0%	3	10.8
67	33.3%	0.0%	100.0%	3	6.9
68	42.8%	0.0%	0.0%	3	8.8
69	100.0%	0.0%	0.0%	2	1.9
70	0.0%	0.0%	0.0%	0	3.9
71+	100.0%	0.0%	0.0%	1	0.9
				-----	-----
				91	282.1
AVERAGE AGES	61.4	56.5	60.6	60.3	62.5

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1990-1991

1990-1991 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

BASIC

AGE	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>YEARS OF SERVICE</u>			<u>ACTUAL</u>	<u>EXPECTED</u>
	<u>&lt;30</u>	<u>30</u>	<u>30+</u>		
<55	0.0%	0.0%	7.6%	5	0.0
55	1.0%	11.1%	0.0%	2	0.0
56	1.1%	12.0%	0.0%	4	0.0
57	3.1%	0.0%	0.0%	3	0.0
58	3.6%	7.6%	20.0%	5	0.0
59	4.0%	42.8%	0.0%	5	0.0
60	5.5%	0.0%	5.8%	5	87.4
61	10.5%	0.0%	0.0%	4	48.9
62	13.3%	33.3%	20.0%	7	41.9
63	0.0%	0.0%	0.0%	0	29.7
64	20.0%	0.0%	11.1%	5	28.7
65	20.0%	0.0%	14.2%	3	16.8
66	42.8%	20.0%	0.0%	4	13.8
67	0.0%	0.0%	0.0%	0	7.9
68	33.3%	0.0%	0.0%	1	2.9
69	33.3%	0.0%	0.0%	1	4.9
70	100.0%	0.0%	0.0%	2	1.9
71+	0.0%	0.0%	0.0%	0	1.9
				-----	-----
				56	287.1
AVERAGE AGES	61.1	58.6	60.7	60.6	62.3

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1990-1994

1990-1994 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

COORDINATED

RULE OF 90 STATUS	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>NOT ELIGIBLE</u>	<u>FIRST YEAR ELIGIBLE</u>	<u>BEYOND FIRST ELIGIBILITY</u>	<u>ACTUAL</u>	<u>EXPECTED</u>
<u>AGE</u>					
<55	3.0%	0.0%	0.0%	4	0.0
55	2.1%	0.0%	0.0%	2	0.0
56	1.3%	0.0%	0.0%	1	0.0
57	1.8%	0.0%	0.0%	1	0.0
58	0.0%	0.0%	0.0%	0	0.0
59	8.8%	0.0%	0.0%	3	0.0
60	15.6%	0.0%	0.0%	5	0.0
61	0.0%	0.0%	0.0%	0	0.0
62	7.8%	0.0%	0.0%	3	0.0
63	17.8%	0.0%	0.0%	5	27.7
64	14.2%	0.0%	0.0%	2	13.8
65	11.1%	0.0%	0.0%	2	17.8
66	0.0%	0.0%	0.0%	0	13.8
67	0.0%	0.0%	0.0%	0	7.9
68	0.0%	0.0%	0.0%	0	7.8
69	0.0%	0.0%	0.0%	0	2.9
70	0.0%	0.0%	0.0%	0	1.9
71+	100.0%	0.0%	0.0%	1	0.9
				-----	-----
				29	94.9
AVERAGE AGES	60.2	0.0	0.0	60.2	65.1

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1993-1994

1993-1994 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

COORDINATED

RULE OF 90 STATUS	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>NOT ELIGIBLE</u>	<u>FIRST YEAR ELIGIBLE</u>	<u>BEYOND FIRST ELIGIBILITY</u>	<u>ACTUAL</u>	<u>EXPECTED</u>
<u>AGE</u>					
<55	1.8%	0.0%	0.0%	1	0.0
55	0.0%	0.0%	0.0%	0	0.0
56	0.0%	0.0%	0.0%	0	0.0
57	0.0%	0.0%	0.0%	0	0.0
58	0.0%	0.0%	0.0%	0	0.0
59	6.6%	0.0%	0.0%	1	0.0
60	0.0%	0.0%	0.0%	0	0.0
61	0.0%	0.0%	0.0%	0	0.0
62	0.0%	0.0%	0.0%	0	0.0
63	0.0%	0.0%	0.0%	0	7.9
64	0.0%	0.0%	0.0%	0	5.9
65	20.0%	0.0%	0.0%	1	4.9
66	0.0%	0.0%	0.0%	0	5.9
67	0.0%	0.0%	0.0%	0	1.9
68	0.0%	0.0%	0.0%	0	5.9
69	0.0%	0.0%	0.0%	0	0.0
70	0.0%	0.0%	0.0%	0	0.0
71+	100.0%	0.0%	0.0%	1	0.9
				-----	-----
				4	33.6
AVERAGE AGES	62.2	0.0	0.0	62.2	65.3

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1992-1993

1992-1993 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

COORDINATED

RULE OF 90 STATUS	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>NOT ELIGIBLE</u>	<u>FIRST YEAR ELIGIBLE</u>	<u>BEYOND FIRST ELIGIBILITY</u>	<u>ACTUAL</u>	<u>EXPECTED</u>
<u>AGE</u>					
<55	0.0%	0.0%	0.0%	0	0.0
55	0.0%	0.0%	0.0%	0	0.0
56	3.4%	0.0%	0.0%	1	0.0
57	0.0%	0.0%	0.0%	0	0.0
58	0.0%	0.0%	0.0%	0	0.0
59	25.0%	0.0%	0.0%	2	0.0
60	50.0%	0.0%	0.0%	4	0.0
61	0.0%	0.0%	0.0%	0	0.0
62	33.3%	0.0%	0.0%	3	0.0
63	33.3%	0.0%	0.0%	3	8.9
64	50.0%	0.0%	0.0%	2	3.9
65	14.2%	0.0%	0.0%	1	6.9
66	0.0%	0.0%	0.0%	0	1.9
67	0.0%	0.0%	0.0%	0	5.9
68	0.0%	0.0%	0.0%	0	0.0
69	0.0%	0.0%	0.0%	0	0.0
70	0.0%	0.0%	0.0%	0	1.9
71+	0.0%	0.0%	0.0%	0	0.0
				----- 16	----- 29.6
AVERAGE AGES	61.3	0.0	0.0	61.3	65.0

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1991-1992

1991-1992 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

COORDINATED

RULE OF 90 STATUS	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>NOT ELIGIBLE</u>	<u>FIRST YEAR ELIGIBLE</u>	<u>BEYOND FIRST ELIGIBILITY</u>	<u>ACTUAL</u>	<u>EXPECTED</u>
<u>AGE</u>					
<55	9.0%	0.0%	0.0%	2	0.0
55	0.0%	0.0%	0.0%	0	0.0
56	0.0%	0.0%	0.0%	0	0.0
57	16.6%	0.0%	0.0%	1	0.0
58	0.0%	0.0%	0.0%	0	0.0
59	0.0%	0.0%	0.0%	0	0.0
60	12.5%	0.0%	0.0%	1	0.0
61	0.0%	0.0%	0.0%	0	0.0
62	0.0%	0.0%	0.0%	0	0.0
63	0.0%	0.0%	0.0%	0	5.9
64	0.0%	0.0%	0.0%	0	3.9
65	0.0%	0.0%	0.0%	0	1.9
66	0.0%	0.0%	0.0%	0	5.9
67	0.0%	0.0%	0.0%	0	0.0
68	0.0%	0.0%	0.0%	0	0.0
69	0.0%	0.0%	0.0%	0	2.9
70	0.0%	0.0%	0.0%	0	0.0
71+	0.0%	0.0%	0.0%	0	0.0
				-----	-----
				4	20.7
AVERAGE AGES	56.2	0.0	0.0	56.2	65.0

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 2  
1990-1991

1990-1991 ACTIVE RETIREMENTS DISTRIBUTED BY AGE

COORDINATED

RULE OF 90 STATUS	<u>PERCENT RETIRING OF ALL ELIGIBLE</u>			<u>TOTAL RETIREMENTS</u>	
	<u>NOT ELIGIBLE</u>	<u>FIRST YEAR ELIGIBLE</u>	<u>BEYOND FIRST ELIGIBILITY</u>	<u>ACTUAL</u>	<u>EXPECTED</u>
<u>AGE</u>					
<55	4.0%	0.0%	0.0%	1	0.0
55	25.0%	0.0%	0.0%	2	0.0
56	0.0%	0.0%	0.0%	0	0.0
57	0.0%	0.0%	0.0%	0	0.0
58	0.0%	0.0%	0.0%	0	0.0
59	0.0%	0.0%	0.0%	0	0.0
60	0.0%	0.0%	0.0%	0	0.0
61	0.0%	0.0%	0.0%	0	0.0
62	0.0%	0.0%	0.0%	0	0.0
63	40.0%	0.0%	0.0%	2	4.9
64	0.0%	0.0%	0.0%	0	0.0
65	0.0%	0.0%	0.0%	0	3.9
66	0.0%	0.0%	0.0%	0	0.0
67	0.0%	0.0%	0.0%	0	0.0
68	0.0%	0.0%	0.0%	0	1.9
69	0.0%	0.0%	0.0%	0	0.0
70	0.0%	0.0%	0.0%	0	0.0
71+	0.0%	0.0%	0.0%	0	0.0
				-----	-----
				5	10.8
AVERAGE AGES	58.0	0.0	0.0	58.0	64.6

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 3  
ALL YEARS

RETIREMENT OPTIONS DISTRIBUTION

OPTION	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<u>1990-1994</u>						
STRAIGHT LIFE	133	134.9	99%	238	261.4	91%
50% BOUNCE BACK	34	33.7	101%	34	17.8	191%
75% BOUNCE BACK	42	0.0	N/A	9	0.0	N/A
100% BOUNCE BACK	<u>72</u>	112.4	64%	<u>16</u>	17.8	90%
TOTAL	281			297		
<u>1993-1994</u>						
STRAIGHT LIFE	20	26.9	74%	48	49.3	97%
50% BOUNCE BACK	8	6.7	119%	6	3.4	176%
75% BOUNCE BACK	10	0.0	N/A	0	0.0	0%
100% BOUNCE BACK	<u>18</u>	22.4	80%	<u>2</u>	3.4	59%
TOTAL	56			56		
<u>1992-1993</u>						
STRAIGHT LIFE	37	42.2	88%	78	91.5	85%
50% BOUNCE BACK	12	10.6	113%	13	6.2	210%
75% BOUNCE BACK	13	0.0	N/A	6	0.0	N/A
100% BOUNCE BACK	<u>26</u>	35.2	74%	<u>7</u>	6.2	113%
TOTAL	88			104		
<u>1991-1992</u>						
STRAIGHT LIFE	23	25.0	92%	50	52.8	95%
50% BOUNCE BACK	8	6.2	129%	6	3.6	167%
75% BOUNCE BACK	6	0.0	N/A	2	0.0	N/A
100% BOUNCE BACK	<u>15</u>	20.8	72%	<u>2</u>	3.6	56%
TOTAL	52			60		
<u>1990-1991</u>						
STRAIGHT LIFE	53	40.8	130%	62	67.8	91%
50% BOUNCE BACK	6	10.2	59%	9	4.6	196%
75% BOUNCE BACK	13	0.0	N/A	1	0.0	N/A
100% BOUNCE BACK	<u>13</u>	34.0	38%	<u>5</u>	4.6	109%
TOTAL	85			77		

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 4  
1990-1994

1990-1994 ACTIVE DISABILITY

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.4	0%
30-34	0	0.1	0%	0	1.0	0%
35-39	0	0.3	0%	0	1.4	0%
40-44	0	0.7	0%	1	3.9	26%
45-49	0	1.9	0%	4	7.0	57%
50-54	0	3.4	0%	0	8.4	0%
55-59	0	3.8	0%	1	9.8	10%
60-64	0	2.6	0%	1	7.8	13%
65+	0	0.0	N/A	0	0.0	N/A
ALL	0	13.2	0%	7	40.0	17%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	0	0.4	0%
30-34	0	1.1	0%
35-39	0	1.8	0%
40-44	1	4.7	21%
45-49	4	9.0	44%
50-54	0	11.9	0%
55-59	1	13.6	7%
60-64	1	10.4	10%
65+	0	0.0	N/A
ALL	7	53.3	13%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 4  
1993-1994

1993-1994 ACTIVE DISABILITY

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.1	0%
30-34	0	0.0	N/A	0	0.3	0%
35-39	0	0.1	0%	0	0.4	0%
40-44	0	0.2	0%	0	0.9	0%
45-49	0	0.4	0%	2	2.0	100%
50-54	0	0.9	0%	0	2.5	0%
55-59	0	0.6	0%	0	2.6	0%
60-64	0	0.4	0%	1	1.7	59%
65+	0	0.0	N/A	0	0.0	N/A
ALL	0	2.9	0%	3	10.9	28%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	0	0.1	0%
30-34	0	0.4	0%
35-39	0	0.5	0%
40-44	0	1.1	0%
45-49	2	2.5	80%
50-54	0	3.4	0%
55-59	0	3.3	0%
60-64	1	2.1	48%
65+	0	0.0	N/A
ALL	3	13.8	22%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 4  
1992-1993

1992-1993 ACTIVE DISABILITY

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.2	0%
35-39	0	0.0	N/A	0	0.3	0%
40-44	0	0.1	0%	0	0.9	0%
45-49	0	0.5	0%	2	1.9	105%
50-54	0	0.8	0%	0	2.1	0%
55-59	0	0.9	0%	0	2.4	0%
60-64	0	0.6	0%	0	2.0	0%
65+	0	0.0	N/A	0	0.0	N/A
ALL	0	3.2	0%	2	10.1	20%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	0	1.0	0%
45-49	2	2.4	83%
50-54	0	3.0	0%
55-59	0	3.3	0%
60-64	0	2.6	0%
65+	0	0.0	N/A
ALL	2	13.4	15%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 4  
1991-1992

1991-1992 ACTIVE DISABILITY

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.2	0%
35-39	0	0.0	N/A	0	0.3	0%
40-44	0	0.1	0%	1	1.0	100%
45-49	0	0.5	0%	0	1.6	0%
50-54	0	0.8	0%	0	1.9	0%
55-59	0	1.1	0%	1	2.5	40%
60-64	0	0.8	0%	0	2.0	0%
65+	0	0.0	N/A	0	0.0	N/A
ALL	0	3.6	0%	2	9.9	20%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	1	1.2	83%
45-49	0	2.1	0%
50-54	0	2.7	0%
55-59	1	3.6	28%
60-64	0	2.8	0%
65+	0	0.0	N/A
ALL	2	13.5	15%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 4  
1990-1991

1990-1991 ACTIVE DISABILITY

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.1	0%
30-34	0	0.0	N/A	0	0.1	0%
35-39	0	0.0	N/A	0	0.3	0%
40-44	0	0.2	0%	0	1.0	0%
45-49	0	0.5	0%	0	1.3	0%
50-54	0	0.7	0%	0	1.7	0%
55-59	0	1.0	0%	0	2.1	0%
60-64	0	0.7	0%	0	1.9	0%
65+	0	0.0	N/A	0	0.0	N/A
ALL	0	3.4	0%	0	9.0	0%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	0	0.1	0%
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	0	1.2	0%
45-49	0	1.8	0%
50-54	0	2.5	0%
55-59	0	3.2	0%
60-64	0	2.7	0%
65+	0	0.0	N/A
ALL	0	12.4	0%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 5  
1990-1994

1990-1994 ACTIVE TERMINATION

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.3	0%	3	4.2	71%
25-29	15	14.8	101%	37	72.0	51%
30-34	15	29.3	51%	42	105.7	40%
35-39	20	25.6	78%	50	65.0	77%
40-44	22	21.0	105%	48	61.3	78%
45-49	23	22.5	102%	63	53.4	118%
50-54	11	13.0	85%	23	21.2	108%
55-59	16	2.3	696%	21	4.4	477%
60-64	0	0.0	N/A	5	0.0	N/A
65+	0	0.0	N/A	1	0.0	N/A
ALL	122	129.1	95%	293	387.4	76%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	3	4.6	65%
25-29	52	86.9	60%
30-34	57	135.0	42%
35-39	70	90.6	77%
40-44	70	82.4	85%
45-49	86	75.9	113%
50-54	34	34.2	99%
55-59	37	6.7	552%
60-64	5	0.0	N/A
65+	1	0.0	N/A
ALL	415	516.6	80%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 5  
1993-1994

1993-1994 ACTIVE TERMINATION

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.1	0%	2	3.1	65%
25-29	6	4.8	125%	19	26.0	73%
30-34	6	9.8	61%	15	35.9	42%
35-39	9	7.3	123%	12	19.1	63%
40-44	8	5.4	148%	13	14.7	88%
45-49	5	5.4	93%	15	15.3	98%
50-54	2	3.5	57%	6	6.4	94%
55-59	4	0.4	1000%	8	1.2	667%
60-64	0	0.0	N/A	2	0.0	N/A
65+	0	0.0	N/A	0	0.0	N/A
ALL	40	37.2	108%	92	122.0	75%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	2	3.3	61%
25-29	25	30.8	81%
30-34	21	45.7	46%
35-39	21	26.5	79%
40-44	21	20.2	104%
45-49	20	20.8	96%
50-54	8	10.0	80%
55-59	12	1.6	750%
60-64	2	0.0	N/A
65+	0	0.0	N/A
ALL	132	159.3	83%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 5  
1992-1993

1992-1993 ACTIVE TERMINATION

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.7	0%
25-29	2	2.0	100%	3	14.3	21%
30-34	0	7.6	0%	2	25.5	8%
35-39	4	6.4	62%	3	15.0	20%
40-44	4	4.6	87%	6	14.4	42%
45-49	7	5.8	121%	13	14.7	88%
50-54	1	3.3	30%	2	5.4	37%
55-59	2	0.5	400%	4	1.1	364%
60-64	0	0.0	N/A	0	0.0	N/A
65+	0	0.0	N/A	0	0.0	N/A
ALL	20	30.5	66%	33	91.5	36%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.7	0%
25-29	5	16.4	30%
30-34	2	33.2	6%
35-39	7	21.4	33%
40-44	10	19.1	52%
45-49	20	20.6	97%
50-54	3	8.8	34%
55-59	6	1.6	375%
60-64	0	0.0	N/A
65+	0	0.0	N/A
ALL	53	122.1	43%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 5  
1991-1992

1991-1992 ACTIVE TERMINATION

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.2	0%	1	0.2	500%
25-29	2	3.1	65%	8	14.4	56%
30-34	4	6.7	60%	11	24.5	45%
35-39	6	6.1	98%	20	15.5	129%
40-44	7	5.1	137%	18	15.6	115%
45-49	4	5.7	70%	23	12.7	181%
50-54	6	3.1	194%	8	4.8	167%
55-59	7	0.6	1167%	8	1.1	727%
60-64	0	0.0	N/A	0	0.0	N/A
65+	0	0.0	N/A	1	0.0	N/A
ALL	36	30.8	117%	98	89.1	110%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	1	0.4	250%
25-29	10	17.5	57%
30-34	15	31.3	48%
35-39	26	21.6	120%
40-44	25	20.7	121%
45-49	27	18.4	147%
50-54	14	8.0	175%
55-59	15	1.8	833%
60-64	0	0.0	N/A
65+	1	0.0	N/A
ALL	134	120.0	112%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 5  
1990-1991

1990-1991 ACTIVE TERMINATION

AGE	MALES			FEMALES		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	5	4.8	104%	7	17.2	41%
30-34	5	4.9	102%	14	19.7	71%
35-39	1	5.7	18%	15	15.2	99%
40-44	3	5.8	52%	11	16.4	67%
45-49	7	5.4	130%	12	10.5	114%
50-54	2	2.9	69%	7	4.4	159%
55-59	3	0.6	500%	1	0.9	111%
60-64	0	0.0	N/A	3	0.0	N/A
65+	0	0.0	N/A	0	0.0	N/A
ALL	26	30.4	86%	70	84.6	83%

AGE	TOTAL		
	ACTUAL	EXPECTED	ACTUAL/ EXPECTED
<25	0	0.0	N/A
25-29	12	22.1	54%
30-34	19	24.7	77%
35-39	16	21.0	76%
40-44	14	22.3	63%
45-49	19	16.0	119%
50-54	9	7.3	123%
55-59	4	1.6	250%
60-64	3	0.0	N/A
65+	0	0.0	N/A
ALL	96	115.1	83%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 6  
1990-1994

1990-1994 ANNUITANT AND SURVIVOR MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	1	0.2	500%	0	0.2	0%
55-59	6	1.8	333%	3	1.7	176%
60-64	5	5.3	94%	6	7.2	83%
65-69	13	8.7	149%	8	12.9	62%
70-74	4	8.7	46%	10	19.8	51%
75-79	4	7.8	51%	22	35.0	63%
80-84	6	9.7	62%	38	52.0	73%
85-89	15	9.8	153%	84	74.4	113%
90-94	9	4.6	196%	66	53.6	123%
95+	4	2.5	160%	42	27.3	154%
ALL	67	59.6	112%	279	284.7	98%
65-84	27	35.0	77%	78	119.9	65%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	1	0.5	200%
55-59	9	3.5	257%
60-64	11	12.6	87%
65-69	21	21.6	97%
70-74	14	28.5	49%
75-79	26	42.9	61%
80-84	44	61.8	71%
85-89	99	84.2	118%
90-94	75	58.2	129%
95+	46	29.9	154%
ALL	346	344.3	100%
65-84	105	155.0	68%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 6  
1993-1994

1993-1994 ANNUITANT AND SURVIVOR MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.0	0%	0	0.0	0%
55-59	2	0.6	333%	0	0.4	0%
60-64	2	1.6	125%	2	1.6	125%
65-69	5	3.0	167%	0	2.8	0%
70-74	1	2.9	34%	5	4.8	104%
75-79	2	2.5	80%	6	8.4	71%
80-84	1	2.5	40%	8	11.6	69%
85-89	4	2.3	174%	15	18.4	82%
90-94	1	0.6	167%	17	14.8	115%
95+	2	0.7	286%	7	6.7	104%
ALL	20	17.1	117%	60	69.9	86%
65-84	9	11.0	82%	19	27.7	69%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.1	0%
55-59	2	1.0	200%
60-64	4	3.2	125%
65-69	5	5.8	86%
70-74	6	7.7	78%
75-79	8	11.0	73%
80-84	9	14.1	64%
85-89	19	20.8	91%
90-94	18	15.5	116%
95+	9	7.4	122%
ALL	80	87.0	92%
65-84	28	38.7	72%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 6  
1992-1993

1992-1993 ANNUITANT AND SURVIVOR MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.0	0%	0	0.0	0%
55-59	3	0.4	750%	0	0.2	0%
60-64	2	1.6	125%	3	1.6	187%
65-69	5	2.7	185%	2	2.7	74%
70-74	1	2.7	37%	1	4.6	22%
75-79	0	2.1	0%	3	8.5	35%
80-84	1	2.2	45%	9	12.3	73%
85-89	5	2.4	208%	18	18.8	96%
90-94	4	0.7	571%	19	14.1	135%
95+	1	0.6	167%	11	6.7	164%
ALL	22	16.1	137%	66	70.0	94%
65-84	7	9.9	71%	15	28.3	53%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.1	0%
55-59	3	0.7	429%
60-64	5	3.2	156%
65-69	7	5.5	127%
70-74	2	7.4	27%
75-79	3	10.7	28%
80-84	10	14.6	68%
85-89	23	21.3	108%
90-94	23	14.8	155%
95+	12	7.4	162%
ALL	88	86.1	102%
65-84	22	38.3	57%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 6  
1991-1992

1991-1992 ANNUITANT AND SURVIVOR MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	1	0.1	1000%	0	0.0	0%
55-59	1	0.6	167%	2	0.2	1000%
60-64	1	1.6	62%	1	1.5	67%
65-69	3	2.2	136%	0	2.7	0%
70-74	2	2.1	95%	2	4.7	43%
75-79	1	1.8	56%	7	8.1	86%
80-84	3	2.2	136%	14	13.8	101%
85-89	3	1.9	158%	27	19.6	138%
90-94	2	0.9	222%	15	13.6	110%
95+	0	0.3	0%	11	7.1	155%
ALL	17	14.1	121%	79	71.8	110%
65-84	9	8.4	107%	23	29.5	78%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	1	0.1	1000%
55-59	3	0.9	333%
60-64	2	3.2	62%
65-69	3	5.0	60%
70-74	4	6.9	58%
75-79	8	10.0	80%
80-84	17	16.0	106%
85-89	30	21.6	139%
90-94	17	14.5	117%
95+	11	7.4	149%
ALL	96	86.0	112%
65-84	32	38.0	84%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 6  
1990-1991

1990-1991 ANNUITANT AND SURVIVOR MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.0	0%	0	0.0	0%
55-59	0	0.0	0%	1	0.7	143%
60-64	0	0.3	0%	0	2.4	0%
65-69	0	0.6	0%	6	4.5	133%
70-74	0	0.9	0%	2	5.5	36%
75-79	1	1.3	77%	6	9.9	61%
80-84	1	2.7	37%	7	14.3	49%
85-89	3	3.0	100%	24	17.3	139%
90-94	2	2.3	87%	15	11.0	136%
95+	1	0.8	125%	13	6.8	191%
ALL	8	12.2	66%	74	72.8	102%
65-84	2	5.5	36%	21	34.3	61%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<55	0	0.1	0%
55-59	1	0.8	125%
60-64	0	2.8	0%
65-69	6	5.1	118%
70-74	2	6.4	31%
75-79	7	11.2	62%
80-84	8	17.0	47%
85-89	27	20.3	133%
90-94	17	13.3	128%
95+	14	7.6	184%
ALL	82	85.0	96%
65-84	23	39.9	58%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 7  
1990-1994

1990-1994 DISABLED MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.0	N/A
35-39	0	0.0	N/A	0	0.0	N/A
40-44	0	0.0	N/A	0	0.0	N/A
45-49	0	0.0	N/A	0	0.0	N/A
50-54	0	0.0	N/A	0	0.0	N/A
55-59	1	0.0	N/A	0	0.0	N/A
60-64	0	0.0	N/A	0	0.0	N/A
65+	1	0.6	167%	1	2.4	42%
ALL	2	0.6	333%	1	2.5	40%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.0	N/A
35-39	0	0.0	N/A
40-44	0	0.0	N/A
45-49	0	0.0	N/A
50-54	0	0.0	N/A
55-59	1	0.0	N/A
60-64	0	0.1	0%
65+	2	3.0	67%
ALL	3	3.2	94%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 7  
1993-1994

1993-1994 DISABLED MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.0	N/A
35-39	0	0.0	N/A	0	0.0	N/A
40-44	0	0.0	N/A	0	0.0	N/A
45-49	0	0.0	N/A	0	0.0	N/A
50-54	0	0.0	N/A	0	0.0	N/A
55-59	1	0.0	N/A	0	0.0	N/A
60-64	0	0.0	N/A	0	0.0	N/A
65+	1	0.1	1000%	0	0.7	0%
ALL	2	0.1	2000%	0	0.7	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.0	N/A
35-39	0	0.0	N/A
40-44	0	0.0	N/A
45-49	0	0.0	N/A
50-54	0	0.0	N/A
55-59	1	0.0	N/A
60-64	0	0.0	N/A
65+	1	0.8	125%
ALL	2	0.9	222%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 7  
1992-1993

1992-1993 DISABLED MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.0	N/A
35-39	0	0.0	N/A	0	0.0	N/A
40-44	0	0.0	N/A	0	0.0	N/A
45-49	0	0.0	N/A	0	0.0	N/A
50-54	0	0.0	N/A	0	0.0	N/A
55-59	0	0.0	N/A	0	0.0	N/A
60-64	0	0.0	N/A	0	0.0	N/A
65+	0	0.1	0%	1	0.6	167%
ALL	0	0.1	0%	1	0.6	167%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.0	N/A
35-39	0	0.0	N/A
40-44	0	0.0	N/A
45-49	0	0.0	N/A
50-54	0	0.0	N/A
55-59	0	0.0	N/A
60-64	0	0.0	N/A
65+	1	0.8	125%
ALL	1	0.8	125%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 7  
1991-1992

1991-1992 DISABLED MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.0	N/A
35-39	0	0.0	N/A	0	0.0	N/A
40-44	0	0.0	N/A	0	0.0	N/A
45-49	0	0.0	N/A	0	0.0	N/A
50-54	0	0.0	N/A	0	0.0	N/A
55-59	0	0.0	N/A	0	0.0	N/A
60-64	0	0.0	N/A	0	0.0	N/A
65+	0	0.1	0%	0	0.5	0%
ALL	0	0.1	0%	0	0.6	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.0	N/A
35-39	0	0.0	N/A
40-44	0	0.0	N/A
45-49	0	0.0	N/A
50-54	0	0.0	N/A
55-59	0	0.0	N/A
60-64	0	0.0	N/A
65+	0	0.7	0%
ALL	0	0.7	0%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 7  
1990-1991

1990-1991 DISABLED MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.0	N/A
35-39	0	0.0	N/A	0	0.0	N/A
40-44	0	0.0	N/A	0	0.0	N/A
45-49	0	0.0	N/A	0	0.0	N/A
50-54	0	0.0	N/A	0	0.0	N/A
55-59	0	0.0	N/A	0	0.0	N/A
60-64	0	0.0	N/A	0	0.0	N/A
65+	0	0.1	0%	0	0.4	0%
ALL	0	0.1	0%	0	0.5	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.0	N/A
35-39	0	0.0	N/A
40-44	0	0.0	N/A
45-49	0	0.0	N/A
50-54	0	0.0	N/A
55-59	0	0.0	N/A
60-64	0	0.0	N/A
65+	0	0.6	0%
ALL	0	0.6	0%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 8  
1990-1994

1990-1994 ACTIVE MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.3	0%
30-34	0	0.2	0%	0	0.9	0%
35-39	0	0.4	0%	0	1.3	0%
40-44	0	1.1	0%	0	3.4	0%
45-49	0	2.4	0%	0	5.7	0%
50-54	0	3.9	0%	0	6.4	0%
55-59	0	3.6	0%	0	6.7	0%
60-64	0	2.4	0%	0	5.0	0%
65+	0	0.9	0%	0	1.6	0%
ALL	0	15.3	0%	0	31.7	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.4	0%
30-34	0	1.1	0%
35-39	0	1.7	0%
40-44	0	4.5	0%
45-49	0	8.2	0%
50-54	0	10.3	0%
55-59	0	10.3	0%
60-64	0	7.5	0%
65+	0	2.5	0%
ALL	11	47.0	23%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 8  
1993-1994

1993-1994 ACTIVE MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.1	0%
30-34	0	0.0	N/A	0	0.3	0%
35-39	0	0.1	0%	0	0.3	0%
40-44	0	0.2	0%	0	0.8	0%
45-49	0	0.5	0%	0	1.6	0%
50-54	0	1.1	0%	0	1.9	0%
55-59	0	0.6	0%	0	1.8	0%
60-64	0	0.4	0%	0	1.2	0%
65+	0	0.1	0%	0	0.3	0%
ALL	0	3.5	0%	0	8.7	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.1	0%
30-34	0	0.4	0%
35-39	0	0.5	0%
40-44	0	1.1	0%
45-49	0	2.2	0%
50-54	0	3.0	0%
55-59	0	2.4	0%
60-64	0	1.6	0%
65+	0	0.5	0%
ALL	1	12.2	8%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 8  
1992-1993

1992-1993 ACTIVE MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.2	0%
35-39	0	0.1	0%	0	0.2	0%
40-44	0	0.2	0%	0	0.8	0%
45-49	0	0.6	0%	0	1.5	0%
50-54	0	1.0	0%	0	1.6	0%
55-59	0	0.8	0%	0	1.6	0%
60-64	0	0.5	0%	0	1.2	0%
65+	0	0.2	0%	0	0.4	0%
ALL	0	3.6	0%	0	7.9	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	0	1.0	0%
45-49	0	2.2	0%
50-54	0	2.6	0%
55-59	0	2.5	0%
60-64	0	1.8	0%
65+	0	0.6	0%
ALL	4	11.6	34%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 8  
1991-1992

1991-1992 ACTIVE MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.2	0%
35-39	0	0.1	0%	0	0.3	0%
40-44	0	0.2	0%	0	0.8	0%
45-49	0	0.6	0%	0	1.3	0%
50-54	0	0.9	0%	0	1.4	0%
55-59	0	1.1	0%	0	1.7	0%
60-64	0	0.7	0%	0	1.3	0%
65+	0	0.3	0%	0	0.4	0%
ALL	0	4.1	0%	0	7.8	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.0	N/A
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	0	1.1	0%
45-49	0	1.9	0%
50-54	0	2.4	0%
55-59	0	2.8	0%
60-64	0	2.0	0%
65+	0	0.7	0%
ALL	0	11.9	0%

MINNEAPOLIS TEACHERS RETIREMENT FUND

TABLE 8  
1990-1991

1990-1991 ACTIVE MORTALITY

AGE	MALES			FEMALES		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A	0	0.0	N/A
25-29	0	0.0	N/A	0	0.0	N/A
30-34	0	0.0	N/A	0	0.1	0%
35-39	0	0.1	0%	0	0.3	0%
40-44	0	0.3	0%	0	0.9	0%
45-49	0	0.6	0%	0	1.1	0%
50-54	0	0.8	0%	0	1.3	0%
55-59	0	1.0	0%	0	1.4	0%
60-64	0	0.7	0%	0	1.2	0%
65+	0	0.2	0%	0	0.4	0%
ALL	0	3.9	0%	0	7.1	0%

AGE	TOTAL		
	ACTUAL DEATHS	EXPECTED DEATHS	ACTUAL/EXPECTED
<25	0	0.0	N/A
25-29	0	0.1	0%
30-34	0	0.2	0%
35-39	0	0.4	0%
40-44	0	1.2	0%
45-49	0	1.7	0%
50-54	0	2.2	0%
55-59	0	2.4	0%
60-64	0	1.9	0%
65+	0	0.6	0%
ALL	6	11.1	54%

# MINNEAPOLIS TEACHERS' RETIREMENT FUND

## Compilation of Recommended Changes

<i>Salary Increase Assumption:</i>	From flat 6.5% to age-related table grading from 7.5% at youngest ages to 5.0% at oldest ages (see Appendix A).
<i>Payroll Growth Assumption:</i>	From 6.5% to 5.0%.
<i>Retirement Assumption:</i>	
<u>Basic (non 30-year):</u>	From 100% at 61 or older to age-related from 3% to 75%.
<u>Coordinated (non Rule-of-90):</u>	From 100% at 63 or older to age-related from 2% to 75% (see page 3 of narrative).
<i>Annuitant and Survivor Mortality:</i>	From GA 71 Males with 8-year setback to: Males - 1983 GAM (Males -4) Females - 1983 GAM (Females -2)
<i>Disability Mortality:</i>	From same as annuitant to 1977 Railroad Retirement Board Mortality for Disabled Annuitants.
<i>Active Mortality:</i>	From same as old annuitant mortality to new annuitant mortality setback two more years.

MINNEAPOLIS TEACHERS' RETIREMENT FUND

Appendix A

Salary Increase Assumptions

Age	Current Assumption	Proposed Assumption
< 22	6.5%	7.50%
23	6.5	7.40
24	6.5	7.30
25	6.5	7.20
26	6.5	7.10
27	6.5	7.00
28	6.5	6.90
29	6.5	6.80
30	6.5	6.70
31	6.5	6.60
32	6.5	6.50
33	6.5	6.40
34	6.5	6.30
35	6.5	6.20
36	6.5	6.10
37	6.5	6.00
38	6.5	5.90
39	6.5	5.80
40	6.5	5.70
41	6.5	5.60
42	6.5	5.50
43	6.5	5.45
44	6.5	5.40
45	6.5	5.35
46	6.5	5.30
47	6.5	5.25
48	6.5	5.20
49	6.5	5.15
50	6.5	5.10
51	6.5	5.05
52	6.5	5.00
53	6.5	5.00
54	6.5	5.00
55+	6.5	5.00

**APPENDIX D**  
**SAMPLE COST ESTIMATE REPORT**



# MILLIMAN & ROBERTSON, INC.

Actuaries and Consultants

Suite 400  
15700 Bluemound Road  
Brookfield, Wisconsin 53005-6069  
Telephone: 414/784-2250  
Fax: 414/784-6388

Wendell Milliman, F.S.A. (1976)  
Stuart A. Robertson, F.S.A.  
Chairman Emeritus

Steven R. Baker, M.D.  
T. Scott Bentley, A.S.A.  
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Mark J. Cain, F.C.A.S.  
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Timothy D. Courtney, A.S.A.  
Thomas K. Custis, F.S.A.  
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Kevin B. Robbins, F.C.A.S.  
Robert L. Sanders, F.C.A.S.  
Steven J. Sherman, F.S.A.  
John B. Snyder, F.S.A.  
Lee H. Straate, F.S.A.  
Peter G. Wick, A.C.A.S.  
Roger A. Yard, A.C.A.S.

## PERSONAL & CONFIDENTIAL

March 7, 1995

Mr. Lawrence A. Martin  
Executive Director  
Minnesota Legislative Commission  
on Pensions and Retirement  
55 State Office Building  
St. Paul, Minnesota 55155-1201

**RE: Increased Benefit Multiplier for  
State Patrol and Correctional Plans**

Dear Larry:

As you requested, we have prepared cost estimates of a proposed increase in the benefit multiplier for the MSRS - State Patrol and MSRS - Correctional plans.

The first attachment outlines the results under the State Patrol plan and reflects the proposed changes in member and employer statutory contribution rates.

The second attachment outlines the results under the Correctional plan. This exhibit does not reflect any change in the statutory contribution rates since none were specifically proposed. We show these results assuming the eligibility criteria are unchanged and assuming the eligibility criteria is expanded (long list basis) as proposed in HF 947.

All calculations are prepared using July 1, 1994 data and the July 1, 1994 valuation assumptions.

Albany • Atlanta • Boston • Chicago • Cincinnati • Dallas • Denver • Hartford • Houston  
Indianapolis • Irvine • Los Angeles • Milwaukee • Minneapolis • New York • Omaha • Philadelphia • Phoenix  
Portland • St. Louis • Salt Lake City • San Diego • San Francisco • Seattle • Tokyo • Washington, D.C.

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PERSONAL & CONFIDENTIAL

Mr. Lawrence A. Martin

March 7, 1995

Page 2

Please call if you have any questions. Let me know if and when you will want me to attend the Commission meeting.

Best regards,



Thomas K. Custis, F.S.A.  
Consulting Actuary

TKC/bh

Enclosure

# Legislative Proposal to Increase Benefit Multiplier Under MSRS-State Patrol Plan

(\$000 omitted)

	July 1, 1994 Current Status	Revised	Change
	-----	-----	-----
Payroll	41,462	41,462	0
Present Value Future Benefits			
Active	237,733	250,897	13,164
Inactive	125,240	125,240	0
Total	362,973	376,137	13,164
Current Benefit Obligation			
Active	139,067	146,739	7,672
Total	264,307	271,979	7,672
Present Value Future Normal Costs	87,596	92,153	4,557
Actuarial Accrued Liability			
Active	150,137	158,744	8,607
Total	275,377	283,984	8,607
Assets	262,570	262,570	0
Unfunded Actuarial Accrued Liability	12,807	21,414	8,607
Amortization			
Period	26	28	3
Ending Date	07/01/2020	07/01/2023	

# Legislative Proposal to Increase Benefit Multiplier Under MSRS-State Patrol Plan

(\$000 omitted)

	July 1, 1994 Current Status	Revised	Change
	-----	-----	-----
<b>Required Contributions</b>			
Normal Cost	8,326	8,758	432
Supplemental Contribution	643	1,045	402
Expenses	66	66	0
Total	9,035	9,869	834
Normal Cost	20.08%	21.12%	1.04%
Supplemental Contribution	1.55%	2.52%	0.97%
Expenses	0.16%	0.16%	0.00%
Total	21.79%	23.80%	2.01%
<b>Statutory Contributions</b>			
Employee	3,524	3,586	62
Employer	6,169	6,344	175
Total	9,693	9,930	237
Employee Rate	8.50%	8.65%	0.15%
Employer Rate	14.88%	15.30%	0.42%
Total	23.38%	23.95%	0.57%
<b>Sufficiency/(Deficiency)</b>			
Actuarial Cost	9,035	9,869	834
Statutory Contributions	9,693	9,930	237
Sufficiency/(Deficiency)	658	61	(597)
Actuarial Cost	21.79%	23.80%	2.01%
Statutory Contributions	23.38%	23.95%	0.57%
Sufficiency/(Deficiency)	1.59%	0.15%	-1.44%
Current Benefit Obligation	264,307	271,979	7,672
Actuarial Accrued Liability	275,377	283,984	8,607
Present Value Future Benefits	362,973	376,137	13,164
Current Assets	262,570	262,570	0
Current and Future Assets	376,089	377,419	1,330
<b>Funding Ratios</b>			
Accrued Benefit	99.34%	96.54%	-2.80%
Accrued Liability	95.35%	92.46%	-2.89%
Projected Benefit	103.61%	100.34%	-3.27%

## Legislative Proposal to Increase Benefit Multiplier Under MSRS-Correctional Plan

(\$000 omitted)

	July 1, 1994 Current Status	Revised	Add Long List
	-----	-----	-----
Payroll	70,562	70,562	90,549
Present Value Future Benefits			
Active	161,513	170,017	227,172
Inactive	53,109	53,109	53,109
Total	214,622	223,126	280,281
Current Benefit Obligation			
Active	78,357	82,603	115,601
Total	131,466	135,712	168,710
Present Value Future Normal Costs	61,920	64,567	81,774
Actuarial Accrued Liability			
Active	99,593	105,450	145,398
Total	152,702	158,559	198,507
Assets	148,163	148,163	166,844
Unfunded Actuarial Accrued Liability	4,539	10,396	31,663
Amortization			
Period	26	28	28
Ending Date	07/01/2020	07/01/2023	07/01/2023

# Legislative Proposal to Increase Benefit Multiplier Under MSRS-Correctional Plan

(\$000 omitted)

	July 1, 1994 Current Status	Revised	Add Long List
<b>Required Contributions</b>			
Normal Cost	7,632	7,964	10,538
Supplemental Contribution	226	494	1,503
Expenses	120	120	154
Total	7,978	8,578	12,195
Normal Cost	10.81%	11.29%	11.64%
Supplemental Contribution	0.32%	0.70%	1.66%
Expenses	0.17%	0.17%	0.17%
Total	11.30%	12.16%	13.47%
<b>Statutory Contributions</b>			
Employee	3,458	3,458	4,437
Employer	4,424	4,424	5,677
Total	7,882	7,882	10,114
Employee Rate	4.90%	4.90%	4.90%
Employer Rate	6.27%	6.27%	6.27%
Total	11.17%	11.17%	11.17%
<b>Sufficiency/(Deficiency)</b>			
Actuarial Cost	7,978	8,578	12,195
Statutory Contributions	7,882	7,882	10,114
Sufficiency/(Deficiency)	(96)	(696)	(2,081)
Actuarial Cost	11.30%	12.16%	13.47%
Statutory Contributions	11.17%	11.17%	11.17%
Sufficiency/(Deficiency)	-0.13%	-0.99%	-2.30%
Current Benefit Obligation	131,466	135,712	168,710
Actuarial Accrued Liability	152,702	158,559	198,507
Present Value Future Benefits	214,622	223,126	280,281
Current Assets	148,163	148,163	166,844
Current and Future Assets	212,753	212,730	248,618
<b>Funding Ratios</b>			
Accrued Benefit	112.70%	109.17%	98.89%
Accrued Liability	97.03%	93.44%	84.05%
Projected Benefit	99.13%	95.34%	88.70%

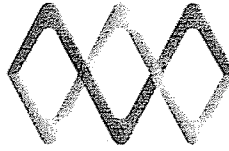
**APPENDIX E**  
**SAMPLE REPORT PRELIMINARY TO CONSOLIDATION**

**VIRGINIA POLICE  
BENEFIT ASSOCIATION**

**ACTUARIAL CALCULATIONS PRELIMINARY  
TO CONSOLIDATION**

March 20, 1996

**MILLIMAN & ROBERTSON, INC.**



**MILLIMAN & ROBERTSON, INC.**

Actuaries & Consultants

*Internationally WOODROW MILLIMAN*

Suite 400, 15800 Bluemound Road, Brookfield, Wisconsin 53005-6069  
Telephone: 414/784-2250  
Fax: 414/784-4116

March 20, 1996

Legislative Commission on  
Pensions and Retirement  
55 State Office Building  
St. Paul, Minnesota 55155

**RE: Virginia Police Department Benefit Association**

Commission Members:

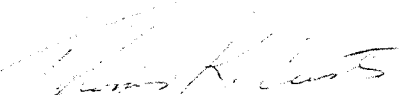
Pursuant to your request, we have performed revised actuarial calculations preliminary to consolidation for the Benefit Association as of January 1, 1995.

The results of our calculations are set forth in the following report as are the actuarial assumptions upon which our calculations have been made. We have relied on the basic employee data and asset figures as submitted by the Public Employees Retirement Association.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with the requirements of Section 356.215, Minnesota Statutes, and the requirements of the Standards for Actuarial Work, adopted by the Commission on September 20, 1989.

Respectfully submitted,

MILLIMAN & ROBERTSON, INC.

  
Thomas K. Custis, F.S.A., M.A.A.A.  
Consulting Actuary

TKC/bh

## REPORT PRELIMINARY TO CONSOLIDATION

The purpose of this report is to determine the *initial* additional municipal contribution required by consolidating the Benefit Association with PERA Police and Fire (P&F) as specified in Minnesota Statutes, Chapter 353A.

The consolidation process provides the Benefit Association members and their beneficiaries an opportunity to change their retirement benefit plan coverage by electing between Benefit Association and P&F benefits. In order to evaluate the financial aspects of consolidation, the costs in Table 1 have been determined under three possible outcomes - all individuals elect Benefit Association benefits (column 2), all individuals elect P&F benefits (column 3) and each individual elects the benefit plan which has the greater total benefit plan actuarial value (column 4).

Table 1 also compares the consolidation calculations to those found in the actuarial valuation of the Benefit Association as of December 31, 1994, prepared by Gabriel, Roeder, Smith & Company. Table 2 shows a summary of the data and lists the major assumptions.

Whenever a retired member or the retired member's surviving spouse elects P&F benefits, the reserve for that benefit must be transferred to the Minnesota Post-retirement Investment Fund (MPRIF). The amount to be transferred if all benefit recipients who are eligible for MPRIF elect P&F benefits is \$3,127,835, which is less than the market value of assets on December 31, 1994.

Current benefit recipients who are not eligible for MPRIF will be paid directly by PERA. Their benefits will be escalated by the same percentage that applies to MPRIF annuitants; however, no funds are required to be transferred to MPRIF.

Although the costs shown in Table 1 represent an appropriate range of estimates available today, the costs are subject to change in future years following the consolidation. The true cost of any pension plan is not completely determined until the last benefit payment has been made to the last benefit recipient. Prior to that date, annual budgets are determined by making assumptions regarding future experience.

Each year in the future following consolidation, municipal costs will be redetermined based on the elections made by members and beneficiaries and will consist of the following components:

**Regular Contributions (line 8):** A variable cost which will depend on the compensation of members still active.

**Additional Contributions (line 7):** A fixed cost which is an annual amount required to amortize the initial unfunded consolidation actuarial liability shown in column 4 of Table 1 by December 31 of the year 2010. In this particular case, the additional contributions are equal to \$0.

**Experience Contributions (undeterminable at this time):** A variable cost which will depend on actual experience. Any actuarial gains will reduce future contributions and actuarial loss will increase future contributions.

**Virginia Policemen's Benefit Association  
ACTUARIAL CALCULATIONS**

	Prior Valuation Relief Association (1)	Election of Benefits Under the Consolidation		
		All Elect Relief Association (2)	All Elect PERA P&F (3)	All Elect Greater Value (4)
Date of Calculations	12/31/94	12/31/94	12/31/94	12/31/94
Actuarial Present Value of Projected Benefits	\$7,124,101	\$6,031,602	\$5,505,100	\$6,108,047
Actuarial Accrued Liability	6,093,523	5,464,478	4,924,208	5,520,859
Normal Cost	86,306	53,881	55,331	55,980
<b><u>Determination of Municipality Contributions</u></b> <i>(before adjustment for state aid)</i>				
1. Actuarial Present Value of Projected Benefits	\$7,124,101	\$6,031,602	\$5,505,100	\$6,108,047
2. Present Value of Future Member Contributions	NA	273,656	264,273	270,748
3. Present Value of Future Regular Municipal Contributions	NA	410,484	396,409	406,122
4. Market Value of Assets	6,396,519	6,396,519 *	6,396,519 *	6,396,519 *
5. Minimum Contribution Required to Fund MPRIF Benefits	NA	NA	0	NA
6. Unfunded Amount to be Amortized (1-2-3-4)	(38,374) **	0	0	0
7. Additional Municipal Contribution (6 amortized by 2010)	0	0	0	0
8. Regular Municipal Contribution	60,212 ***	39,331	38,016	38,016
9. Total Municipal Contribution (7+8)	60,212	39,331	38,016	38,016
10. Supplemental Contribution Required (5-9 not less than \$0)	NA	NA	0	NA

\* Equal to market value reported by Virginia Policemen's and assuming no changes by the State Board of Investments.

\*\* Based on the Actuarial Accrued Liability less the Actuarial Value of Assets of \$6,131,897.

\*\*\* Equals the Employer Normal Cost.

TABLE 2

**Virginia Policemen's Benefit Association  
ACTUARIAL CALCULATIONS**

	<u>Relief Association</u> (1)	<u>Consolidated Calculation</u>	
		<u>All Elect Relief Association</u> (2)	<u>All Elect PERA P&amp;F</u> (3)
<b>NUMBER IN PLAN</b>			
Active Members	8	8	8
Deferred Former Members	0	0	0
Retired Members and Beneficiaries	18	18	18
<b>MEMBER CONTRIBUTION</b>			
Percentage	8.0%	7.6%	7.6%
Compensation Base	326,177	345,013	333,473
Contribution	26,094	26,221	25,344
<b>MUNICIPAL CONTRIBUTION</b>			
Percentage	18.5%	11.4%	11.4%
Compensation Base	326,177	345,013	333,473
Contribution	60,212	39,331	38,016
<b>INTEREST</b>			
- Before Retirement	5.0%	8.5%	8.5%
- After Retirement	5.0%	8.5%	5.0%
<b>SALARY INCREASE</b>	3.5%	graded rates	graded rates
<b>POST-RETIREMENT BENEFIT INCREASE</b>	3.5%	5.0%	N/A
<b>RETIREMENT AGE/SERVICE</b>	58/20	58/20	60/3
<b>OTHER ASSUMPTIONS</b>	Per Virginia Policemen's Benefit Association	Per PERA P&F Recommended New Assumptions	Per PERA P&F Recommended New Assumptions
<b>BENEFITS</b>	Per Virginia Policemen's Benefit Association	Per Virginia Policemen's Benefit Association	Per PERA P&F Report

**APPENDIX F**

**SAMPLE ACTUARIAL VALUATION REPORT FOR**

**RELIEF ASSOCIATION CONSOLIDATION ACCOUNTS**

**ALBERT LEA FIRE CONSOLIDATION ACCOUNT**  
**ACTIVE MEMBERS AS OF JUNE 30, 1996**

Age	Years of Service								
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
<25	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	1	0	0	0	1
45-49	0	0	0	0	1	0	0	0	1
50-54	0	0	0	0	1	1	1	1	4
55-59	0	0	0	0	0	1	1	3	5
60-64	0	0	0	0	0	0	0	2	2
65+	0	0	0	0	0	0	0	0	0
ALL	0	0	0	0	3	2	2	6	13

**AVERAGE ANNUAL EARNINGS**

Age	Years of Service								
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
<25	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	0	0	0	0	0	0	0
40-44	0	0	0	0	40,880	0	0	0	40,880
45-49	0	0	0	0	35,871	0	0	0	35,871
50-54	0	0	0	0	36,119	37,767	36,986	43,627	38,625
55-59	0	0	0	0	0	35,809	37,502	41,611	39,629
60-64	0	0	0	0	0	0	0	48,688	48,688
65+	0	0	0	0	0	0	0	0	0
ALL	0	0	0	0	37,623	36,788	37,244	44,306	40,520

**PRIOR FISCAL YEAR EARNINGS (IN DOLLARS) BY YEARS OF SERVICE**

Age	<1	1-4	5-9	10-14	15-19	20-24	25-29	30+	ALL
All	0	0	0	0	112,869	73,576	74,488	265,836	526,760

## ALBERT LEA FIRE CONSOLIDATION ACCOUNT

SERVICE RETIREMENTS AS OF JUNE 30, 1996

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	1	0	0	0	0	0	1
55-59	0	3	0	0	0	0	0	3
60-64	0	0	0	0	0	0	0	0
65-69	0	0	0	2	2	0	0	4
70-74	0	0	0	3	0	1	0	4
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	4	0	5	2	1	0	12

AVERAGE ANNUAL BENEFIT

Age	YEARS RETIRED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	26,711	0	0	0	0	0	26,711
55-59	0	23,482	0	0	0	0	0	23,482
60-64	0	0	0	0	0	0	0	0
65-69	0	0	0	24,455	22,373	0	0	23,414
70-74	0	0	0	30,318	0	19,321	0	27,569
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	24,289	0	27,973	22,373	19,321	0	25,091

TOTAL ANNUAL BENEFIT (ACTUAL DOLLARS) BY YEARS RETIRED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	0	97,156	0	139,865	44,746	19,321	0	301,092

## ALBERT LEA FIRE CONSOLIDATION ACCOUNT

SURVIVORS AS OF JUNE 30, 1996

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0
60-64	0	0	0	0	1	0	0	1
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	1	1	0	2
75-79	0	0	0	0	0	0	1	1
80-84	0	0	0	0	0	0	1	1
85+	0	0	0	0	0	0	1	1
ALL	0	0	0	0	2	1	3	6

AVERAGE ANNUAL BENEFIT

Age	YEARS SINCE DEATH							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0
60-64	0	0	0	0	11,930	0	0	11,930
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	12,772	11,798	0	12,285
75-79	0	0	0	0	0	0	12,434	12,434
80-84	0	0	0	0	0	0	10,515	10,515
85+	0	0	0	0	0	0	11,856	11,856
ALL	0	0	0	0	12,351	11,798	11,602	11,884

TOTAL ANNUAL BENEFIT (ACTUAL DOLLARS) BY YEARS SINCE DEATH

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	0	0	0	0	24,702	11,798	34,806	71,304

## ALBERT LEA FIRE CONSOLIDATION ACCOUNT

DISABILITY RETIREMENTS AS OF JUNE 30, 1996

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	0	0	0	0	0	0	0

AVERAGE ANNUAL BENEFIT

Age	YEARS DISABLED							ALL
	<1	1-4	5-9	10-14	15-19	20-24	25+	
<50	0	0	0	0	0	0	0	0
50-54	0	0	0	0	0	0	0	0
55-59	0	0	0	0	0	0	0	0
60-64	0	0	0	0	0	0	0	0
65-69	0	0	0	0	0	0	0	0
70-74	0	0	0	0	0	0	0	0
75-79	0	0	0	0	0	0	0	0
80-84	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0
ALL	0	0	0	0	0	0	0	0

TOTAL ANNUAL BENEFIT (ACTUAL DOLLARS) BY YEARS DISABLED

Age	<1	1-4	5-9	10-14	15-19	20-24	25+	ALL
All	0	0	0	0	0	0	0	0

*Reconciliation Of Members*

	Actives	Terminated	
		Deferred Retirement	Other Non-Vested
A. ON JUNE 30, 1995	13	0	0
B. ADDITIONS	0	0	0
C. DELETIONS			
1. Service Retirement	0	0	0
2. Disability	0	0	0
3. Death-Survivor	0	0	0
4. Death-Other	0	0	0
5. Terminated - Deferred	0	0	0
6. Terminated - Refund	0	0	0
7. Terminated - Other Non-Vested	0	0	0
8. Returned as Active	0	0	0
D. DATA ADJUSTMENTS	0	0	0
Vested	13		
Non-Vested	0		
E. TOTAL ON JUNE 30, 1996	13	0	0

	Recipients		
	Retirement Annuitants	Disabled	Survivors
A. ON JUNE 30, 1995	13	0	5
B. ADDITIONS	0	0	1
C. DELETIONS			
1. Service Retirement	0	0	0
2. Death	(1)	0	0
3. Annuity Expired	0	0	0
4. Returned as Active	0	0	0
D. DATA ADJUSTMENTS	0	0	0
E. TOTAL ON JUNE 30, 1996	12	0	6

**Actuarial Balance Sheet**  
(actual dollars)

JULY 1, 1996

A. CURRENT ASSETS (1.71% of Table 1, F6)	\$12,882,931
B. EXPECTED FUTURE ASSETS	
1. Present Value of Employee Contributions	\$169,206
2. Present Value of Regular Municipal Contributions	253,808
3. Present Value of Additional Municipal Contributions	(3,658,063)
4. Total Expected Future Assets	<u>(\$3,235,049)</u>
C. TOTAL CURRENT AND EXPECTED FUTURE ASSETS	\$9,647,882
D. CURRENT PENSION BENEFIT OBLIGATIONS	
1. Retirees and Beneficiaries Currently Receiving Benefits and Terminated Employees Not Yet Receiving Benefits	\$4,226,194
2. Current Employees	
a. Accumulated Employee Contributions Including Allocated Investment Income*	\$575,222
b. Employer-Financed Vested	3,670,469
c. Employer-Financed Nonvested	491,041
d. Total	<u>\$4,736,732</u>
3. Total Pension Benefit Obligation	\$8,962,926
E. EXPECTED FUTURE PENSION BENEFIT OBLIGATION	\$684,956
F. TOTAL CURRENT AND EXPECTED FUTURE PENSION BENEFIT OBLIGATION	\$9,647,882
G. CURRENT UNFUNDED ACTUARIAL LIABILITY (D3-A)	(\$3,920,005)
H. CURRENT AND FUTURE UNFUNDED ACTUARIAL LIABILITY (F-C)	\$0

\*Estimated

**Entry Age Normal Cost Calculations**  
(actual dollars)

JULY 1, 1996

	Number of Participants	Present Value of Projected Benefits	Actuarial Accrued Liabilities
<b>A. DETERMINATION OF ACTUARIAL ACCRUED LIABILITY (AAL)</b>			
1. Active Members			
a. Elected PERA Police and Fire	6	\$2,060,290	\$1,784,807
b. No Election (Greater Value)	7	3,361,398	3,138,578
c. Total	<u>13</u>	<u>\$5,421,688</u>	<u>\$4,923,385</u>
2. Former Members			
a. Elected PERA Police and Fire	0	0	\$0
b. No Election (Greater Value)	0	0	0
c. Total	<u>0</u>	<u>\$0</u>	<u>\$0</u>
3. Benefit Recipients			
a. Elected PERA Police and Fire*	18	\$4,226,194	\$4,226,194
b. Elected Relief Association	0	0	0
c. Total	<u>18</u>	<u>\$4,226,194</u>	<u>\$4,226,194</u>
4. Total			
a. Elected PERA Police and Fire*	24	\$6,286,484	\$6,011,001
b. Elected Relief Association	0	0	0
c. No Election (Greater Value)	7	3,361,398	3,138,578
d. Total	<u>31</u>	<u>\$9,647,882</u>	<u>\$9,149,579</u>
<b>B. DETERMINATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY (UAAL)</b>			
1. AAL (A4)			\$9,149,579
2. Current Assets (1.71% of Table 1,F6)			<u>12,882,931</u>
3. UAAL (B1-B2)			<u>(\$3,733,352)</u>
<b>C. NORMAL COST</b>			
			\$128,043

\* Includes MPRIF Reserves of \$4,069,787

Albert Lea Fire Consolidation Account

TABLE 10-165

**Net Actuarial Loss (Gain)**  
(actual dollars)

JULY 1, 1996

A.	ACTUARIAL PRESENT VALUE OF PROJECTED BENEFITS (Table 9-165)	
	1. Elected PERA Police and Fire	\$6,286,484
	2. Elected Relief Association	0
	3. No Election (Greater Value)	3,361,398
	4. Total	<u>\$9,647,882</u>
B.	PRESENT VALUE OF FUTURE EMPLOYEE CONTRIBUTIONS	
	1. Elected PERA Police and Fire	\$112,301
	2. No Election (Greater Value)	\$56,905
	3. Total	<u>\$169,206</u>
C.	PRESENT VALUE OF FUTURE REGULAR MUNICIPAL CONTRIBUTIONS	
	1. Elected PERA Police and Fire	\$168,451
	2. No Election (Greater Value)	\$85,357
	3. Total	<u>\$253,808</u>
D.	CURRENT VALUE OF TOTAL ASSETS (1.71% of Table 1, F6)	\$12,882,931
E.	PRESENT VALUE OF FUTURE ADDITIONAL MUNICIPAL CONTRIBUTIONS	
	1. Initial contribution - Amortized Through December 31, 2010	\$193,508
	2. 15 year amortization of prior years' loss (gain) (Table 11, B.2.b + B.2.c + B.2.d + B.2.e+B.2.f + B.2.g + B.2.h)	<u>(2,741,660)</u>
	3. Total	<u>(\$2,548,152)</u>
F.	LOSS (GAIN) [A-B-C-D-E]	<u>(\$1,109,911)</u>
G.	ANALYSIS OF LOSS (GAIN)	
	1. MPRIF Mortality	(\$51,273)
	2. PERA Benefit Election	0
	3. Additional Contributions Made	(313,815)
	4. Other	(744,823)
	5. Total	<u>(\$1,109,911)</u>
H.	15 YEAR AMORTIZATION OF LOSS (GAIN)	(128,314)



**APPENDIX G**  
**PLAN SPECIFIC ACTUARIAL VALUATION ASSUMPTIONS**

## State Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	Pre-Retirement: 8.5% per annum Post-Retirement: 5.0% per annum
<i>Salary Increases:</i>	Reported salary at valuation date increased according to the rate table below to current fiscal year and annually for each future year. Prior fiscal year salary is annualized for new Members.
<i>Mortality:</i>	<p><b>Pre-Retirement:</b>  Male - 1983 Group Annuity Mortality Table for males setback four years.  Female - 1983 Group Annuity Mortality Table for females set back two years.</p> <p><b>Post-Retirement:</b>  Male - 1983 Group Annuity Mortality Table for males.  Female - 1983 Group Annuity Mortality Table for females.</p> <p><b>Post-Disability:</b>  Male - Combined Annuity Mortality Table  Female - Combined Annuity Mortality Table</p>
<i>Retirement Age:</i>	Graded rates beginning at age 58 as shown in rate table. Members who have attained the highest assumed retirement age will retire in one year. In addition, 25% of Members are assumed to retire each year that they are eligible for the Rule of 90.
<i>Separation:</i>	Graded rates based on actual experience developed by the June 30, 1971 experience analysis. Rates are shown in rate table.
<i>Disability:</i>	Rates adopted by MSRS as shown in rate table.
<i>Expenses:</i>	Prior year administration expenses expressed as a percentage of prior year payroll.

<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	85% of Members are assumed to be married. Female is three years younger than male.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Special Consideration:</i>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males -           25% elect 50% J&S option 45% elect 100% J&S option  Females -         5% elect 50% J&S option 5% elect 100% J&S option
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 5% per annum.

TABLE 12  
(Continued)

State Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	Pre-retirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
20	3	2	2,400	3,700	0	0	0	0	7.75%
21	3	2	2,250	3,550	0	0	0	0	7.1454
22	4	2	2,080	3,390	0	0	0	0	7.1094
23	4	2	1,920	3,230	0	0	0	0	7.0725
24	4	2	1,760	3,070	0	0	0	0	7.0363
25	4	2	1,600	2,910	0	0	0	0	7
26	4	2	1,470	2,750	0	0	0	0	7
27	4	3	1,340	2,600	0	0	0	0	7
28	4	3	1,230	2,430	0	0	0	0	7
29	5	3	1,130	2,270	0	0	0	0	7
30	5	3	1,040	2,120	2	0	0	0	7
31	5	3	950	1,970	2	0	0	0	7
32	5	3	890	1,820	2	0	0	0	7
33	6	4	830	1,680	2	0	0	0	7
34	6	4	770	1,540	2	0	0	0	7
35	6	4	720	1,410	2	1	0	0	7
36	7	4	680	1,300	2	1	0	0	6.9019
37	7	5	640	1,190	2	1	0	0	6.8074
38	8	5	600	1,090	2	1	0	0	6.7125
39	9	5	560	1,000	2	2	0	0	6.6054
40	9	6	530	920	2	2	0	0	6.5
41	10	6	500	850	2	2	0	0	6.354
42	10	7	480	780	2	4	0	0	6.2087
43	11	7	460	720	3	4	0	0	6.0622
44	12	8	430	680	3	4	0	0	5.9048
45	14	8	410	630	3	5	0	0	5.75
46	15	9	390	590	5	6	0	0	5.6940
47	17	10	370	560	7	7	0	0	5.6375
48	19	11	350	530	9	7	0	0	5.5822
49	22	12	340	500	11	10	0	0	5.5405

State Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	Pre-retirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
50	25	14	320	470	14	10	0	0	5.5%
51	28	15	300	440	16	12	0	0	5.4384
52	31	16	280	410	20	14	0	0	5.3776
53	35	18	260	390	24	16	0	0	5.3167
54	39	19	240	360	28	20	0	0	5.2826
55	43	21	210	330	34	24	0	0	5.25
56	48	23	170	290	40	30	0	0	5.25
57	52	25	140	230	46	36	0	0	5.25
58	57	28	90	170	56	44	50	50	5.25
59	61	31	40	90	66	52	50	50	5.25
60	66	34	0	0	76	62	150	150	5.25
61	71	38	0	0	90	74	150	150	5.25
62	77	42	0	0	110	88	500	500	5.25
63	84	47	0	0	136	104	350	350	5.25
64	92	52	0	0	174	122	1,100	1,100	5.25
65	101	58	0	0	0	0	10,000	10,000	5.25
66	111	64	0	0	0	0	0	0	5.25
67	124	71	0	0	0	0	0	0	5.25
68	139	78	0	0	0	0	0	0	5.25
69	156	87	0	0	0	0	0	0	5.25
70	176	97	0	0	0	0	0	0	5.25

## State Patrol Retirement Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	<b>Pre-Retirement:</b> 8.5% per annum
	<b>Post-Retirement:</b> 5.0% per annum
<i>Salary Increases:</i>	Reported salary at Valuation Date increased 6.5% to current fiscal year and 6.5% annually for each future year.
<i>Mortality:</i>	<b>Pre-Retirement:</b> Male - 1971 Group Annuity Mortality Table Female - 1971 Group Annuity Mortality Table male rates set back eight years
	<b>Post-Retirement:</b> Male - Same as above Female - Same as above
	<b>Post-Disability:</b> Male - Same as above Female - Same as above
<i>Retirement Age:</i>	Age 58 for State Troopers and for State Police Officers hired after June 30, 1961 or age 63 for State Police Officers hired before July 1, 1961. If over assumed retirement age, one year from the valuation date.
<i>Separation:</i>	Graded rates starting at .03 at age 20 and decreasing to .005 at age 45-49 and .02 for ages 50-54. Adopted 1984.
<i>Disability:</i>	Rates adopted by MSRS as shown in rate table.
<i>Administrative and Investment Expenses:</i>	Prior year expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.

<i>Family Composition:</i>	100% of Members are married. Female is three years younger than male. Each Member is assumed to have two children whose ages are dependent upon the Member's age. Assumed first child is born at Member's age 28 and second child is born at Member's age 31.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Special Consideration:</i>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males - 25% elect 50% J&S option 25% elect 100% J&S option  Females - 5% elect 50% J&S option 5% elect 100% J&S option
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method based on earnings and the date the employee entered the plan is applied to all plan benefits. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

State Patrol Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	5	4	300	300	4	4	0	0
21	5	4	290	290	4	4	0	0
22	5	4	280	280	5	5	0	0
23	6	4	270	270	5	5	0	0
24	6	4	260	260	6	6	0	0
25	6	5	250	250	6	6	0	0
26	7	5	240	240	6	6	0	0
27	7	5	230	230	7	7	0	0
28	7	5	220	220	7	7	0	0
29	8	5	210	210	8	8	0	0
30	8	5	200	200	8	8	0	0
31	9	6	190	190	9	9	0	0
32	9	6	180	180	9	9	0	0
33	10	6	170	170	10	10	0	0
34	10	7	160	160	10	10	0	0
35	11	7	150	150	11	11	0	0
36	12	7	140	140	12	12	0	0
37	13	8	130	130	13	13	0	0
38	14	8	120	120	15	15	0	0
39	15	9	110	110	16	16	0	0
40	16	9	100	100	18	18	0	0
41	18	10	90	90	20	20	0	0
42	20	10	80	80	22	22	0	0
43	23	11	70	70	24	24	0	0
44	26	12	60	60	26	26	0	0
45	29	13	50	50	29	29	0	0
46	33	14	50	50	32	32	0	0
47	38	15	50	50	36	36	0	0
48	42	16	50	50	41	41	0	0
49	47	18	50	50	46	46	0	0

State Patrol Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	53	20	200	200	50	50	0	0
51	59	23	200	200	57	57	0	0
52	65	26	200	200	64	64	0	0
53	71	29	200	200	72	72	0	0
54	78	33	200	200	80	80	0	0
55	85	38	0	0	88	88	0	0
56	93	42	0	0	98	98	0	0
57	100	47	0	0	108	108	0	0
58	109	53	0	0	118	118	10,000	10,000
59	119	59	0	0	129	129	0	0
60	131	65	0	0	141	141	0	0
61	144	71	0	0	154	154	0	0
62	159	78	0	0	167	167	0	0
63	174	85	0	0	0	0	0	0
64	192	93	0	0	0	0	0	0
65	213	100	0	0	0	0	0	0
66	236	109	0	0	0	0	0	0
67	263	119	0	0	0	0	0	0
68	292	131	0	0	0	0	0	0
69	324	144	0	0	0	0	0	0
70	361	159	0	0	0	0	0	0

## Correctional Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	<p>Pre-Retirement: 8.5% per annum          Post-Retirement: 5.0% per annum</p>
<i>Salary Increases:</i>	Reported salary at valuation date increased 6.5% to current fiscal year and 6.5% annually for each future year. Prior fiscal year salary is annualized for new Members.
<i>Mortality:</i>	<p><b>Pre-Retirement:</b>          Male - 1971 Group Annuity Mortality Table          Female - 1971 Group Annuity Mortality Table male rates set back 8 years</p> <p><b>Post-Retirement:</b>          Male - Same as above          Female - Same as above</p> <p><b>Post-Disability:</b>          Male - Combined Annuity Mortality Table          Female - Combined Annuity Mortality Table</p>
<i>Retirement Age:</i>	Age 58 or if over age 58, one year from valuation date.
<i>Separation:</i>	Graded rates based on actual experience developed by the June 30, 1971 experience analysis. Rates are shown in rate table.
<i>Disability:</i>	Rates adopted by MSRS as shown in rate table.
<i>Administrative and Investment Expenses:</i>	Prior year administration expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.

*Family Composition:* 85% of Members are assumed to be married. Female is three years younger than male.

*Social Security:* Based on the present law and 6.5% salary scale. Only earnings history while in state service is used. Future Social Security benefits replace the same proportion of salary as at present.

*Benefit Increases After Retirement:* Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.

*Special Consideration:* Married Members assumed to elect subsidized joint and survivor form of annuity as follows:

Males - 25% elect 50% J&S option  
25% elect 100% J&S option

Females - 5% elect 50% J&S option  
5% elect 100% J&S option

*Actuarial Cost Method:* Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.

*Asset Valuation Method:* Cost Value plus one-third Unrealized Gains or Losses.

*Payment on the Unfunded Actuarial Accrued Liability:* A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

TABLE 12  
(Continued)

Correctional Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	Death		Withdrawal		Disability		Retirement	
	Male	Female	Male	Female	Male	Female	Male	Female
20	5	4	2,400	3,700	0	0	0	0
21	5	4	2,250	3,550	0	0	0	0
22	5	4	2,080	3,390	0	0	0	0
23	6	4	1,920	3,230	0	0	0	0
24	6	4	1,760	3,070	0	0	0	0
25	6	5	1,600	2,910	0	0	0	0
26	7	5	1,470	2,750	0	0	0	0
27	7	5	1,340	2,600	0	0	0	0
28	7	5	1,230	2,430	0	0	0	0
29	8	5	1,130	2,270	0	0	0	0
30	8	5	1,040	2,120	2	0	0	0
31	9	6	950	1,970	2	0	0	0
32	9	6	890	1,820	2	0	0	0
33	10	6	830	1,680	2	0	0	0
34	10	7	770	1,540	2	0	0	0
35	11	7	720	1,410	2	1	0	0
36	12	7	680	1,300	2	1	0	0
37	13	8	640	1,190	2	1	0	0
38	14	8	600	1,090	2	1	0	0
39	15	9	560	1,000	2	2	0	0
40	16	9	530	920	2	2	0	0
41	18	10	500	850	2	2	0	0
42	20	10	480	780	2	4	0	0
43	23	11	460	720	3	4	0	0
44	26	12	430	680	3	4	0	0
45	29	13	410	630	3	5	0	0
46	33	14	390	590	5	6	0	0
47	38	15	370	560	7	7	0	0
48	42	16	350	530	9	7	0	0
49	47	18	340	500	11	10	0	0

TABLE 12  
(Continued)

Correctional Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	53	20	320	470	14	10	0	0
51	59	23	300	440	16	12	0	0
52	65	26	280	410	20	14	0	0
53	71	29	260	390	24	16	0	0
54	78	33	240	360	28	20	0	0
55	85	38	210	330	34	24	0	0
56	93	42	170	290	40	30	0	0
57	100	47	140	230	46	36	0	0
58	109	53	90	170	56	44	10,000	10,000
59	119	59	40	90	66	52	0	0
60	131	65	0	0	76	62	0	0
61	144	71	0	0	90	74	0	0
62	159	78	0	0	110	88	0	0
63	174	85	0	0	136	104	0	0
64	192	93	0	0	174	122	0	0
65	213	100	0	0	0	0	0	0
66	236	109	0	0	0	0	0	0
67	263	119	0	0	0	0	0	0
68	292	131	0	0	0	0	0	0
69	324	144	0	0	0	0	0	0
70	361	159	0	0	0	0	0	0

## Legislators Retirement Fund

*Summary of Actuarial Assumptions and Methods*

## GENERAL

<i>Interest:</i>	Pre-Retirement: 8.5% per annum Post-Retirement: 5.0% per annum
<i>Salary Increases:</i>	The statutory salary rate as prescribed in Chapter 345, Article I, Sec. 28, through January 1, 1996 and 6.5% per year thereafter. Per diem payments were assumed to remain constant each year in the future.
<i>Mortality:</i>	<p><b>Pre-Retirement:</b>  Male - 1971 Group Annuity Mortality Table  Female - 1971 Group Annuity Mortality Table male rates set back eight years</p> <p><b>Post-Retirement:</b>  Male - Same as above  Female - Same as above</p> <p><b>Post-Disability:</b>  Male - N/A  Female - N/A</p>
<i>Retirement Age:</i>	Age 62 or if over age 62, one year from valuation date.
<i>Separation:</i>	Rates based on years of service.

<u>Year</u>	<u>House</u>	<u>Senate</u>
1	0%	0%
2	30	0
3	0	0
4	20	25
5	0	0
6	10	0
7	0	0
8	5	10

<i>Disability:</i>	None
<i>Expenses:</i>	Prior year administration expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	85% of Members are assumed to be married. Female is three years younger than male. Each Member may have up to two dependent children depending on Member's age. Assumed first child born at Member's age 28 and second child born at member's age 31.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Special Consideration:</i>	Per diem payments for regular and special sessions were included in salary. The annual amount of per diem that is recognized in this valuation is \$4,800 per Member. This is based on \$48 per day times an average session of 100 days.
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method based on earnings and the date the employee entered the plan is applied to all plan benefits. Under this method, actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

## Elective State Officers Retirement Fund

*Summary of Actuarial Assumptions and Methods*

*Interest:* Pre-Retirement: 8.5% per annum  
 Post-Retirement: 5.0% per annum

*Salary Increases:* The statutory salary rate as prescribed in Chapter 345, Article I, Sec. 28, through January 1, 1996 and 6.5% per year thereafter.

*Mortality:* Pre-Retirement:  
 Male - 1971 Group Annuity Mortality Table  
 Female - 1971 Group Annuity Mortality Table male rates set back 8 years

Post-Retirement:  
 Male - Same as above  
 Female - Same as above

Post-Disability:  
 Male - N/A  
 Female - N/A

*Retirement Age:* Age 62 or if over age 62, one year from valuation date.

*Separation:* Rates based on years of service:

<u>Year</u>	<u>Rate</u>
1	0%
2	0
3	0
4	50
5	0
6	0
7	0
8	50

*Disability:* None

<i>Expenses:</i>	Prior year administration expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after eight years of service were assumed to leave their contributions on deposit and receive a deferred annuitant benefit.
<i>Family Composition:</i>	85% of Members are assumed to be married. Female is three years younger than male. Each Member may have up to two dependent children depending on the Member's age. Assume first child born at Member's age 28 and second child born at Member's age 31.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method based on earnings and the date the employee entered the plan is applied to all plan benefits. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

## Judges Retirement Fund

**SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS**

<b>Interest:</b>	<p>Pre-Retirement: 8.5% per annum  Post-Retirement: 5.0% per annum</p>
<b>Salary Increases:</b>	Statutory salary rate as prescribed in Chapter 345, Article I, Sec. 28, through January 1, 1996 and 6.5% per year thereafter.
<b>Mortality:</b>	<p><b>Pre-Retirement:</b>  Male - 1971 Group Annuity Mortality Table  Female - 1971 Group Annuity Mortality Table male rates set back eight years</p> <p><b>Post-Retirement:</b>  Male - Same as above  Female - Same as above</p> <p><b>Post-Disability:</b>  Male - Same as above  Female - Same as above</p>
<b>Retirement Age:</b>	<p><i>Judges:</i> Age 68 or, if over age 68, one year from the valuation date.  <i>Supreme Court Justices in Pre-1974 Plan:</i> Latest of age 70, 12 years of service, or one year from valuation date.</p>
<b>Separation:</b>	None
<b>Disability:</b>	Rates adopted by MSRS based on actual experience, most recently adjusted in 1979, as shown in rate table.
<b>Expenses:</b>	Prior year administration expenses expressed as percentage of prior year payroll.
<b>Return of Contributions:</b>	N/A
<b>Family Composition:</b>	Marital status as indicated by data. Female is three years younger than male.

TABLE 12  
(Continued)

<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method based on earnings and the date the employee entered the plan is applied to all plan benefits. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

TABLE 12  
(Continued)

Judges Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	Male	Female	Male	Female	Male	Female	Male	Female
20	5	4	0	0	0	0	0	0
21	5	4	0	0	0	0	0	0
22	5	4	0	0	0	0	0	0
23	6	4	0	0	0	0	0	0
24	6	4	0	0	0	0	0	0
25	6	5	0	0	0	0	0	0
26	7	5	0	0	0	0	0	0
27	7	5	0	0	0	0	0	0
28	7	5	0	0	0	0	0	0
29	8	5	0	0	0	0	0	0
30	8	5	0	0	2	0	0	0
31	9	6	0	0	2	0	0	0
32	9	6	0	0	2	0	0	0
33	10	6	0	0	2	0	0	0
34	10	7	0	0	2	0	0	0
35	11	7	0	0	2	1	0	0
36	12	7	0	0	2	1	0	0
37	13	8	0	0	2	1	0	0
38	14	8	0	0	2	1	0	0
39	15	9	0	0	2	2	0	0
40	16	9	0	0	2	2	0	0
41	18	10	0	0	2	2	0	0
42	20	10	0	0	2	4	0	0
43	23	11	0	0	3	4	0	0
44	26	12	0	0	3	4	0	0
45	29	13	0	0	3	5	0	0
46	33	14	0	0	5	6	0	0
47	38	15	0	0	7	7	0	0
48	42	16	0	0	9	7	0	0
49	47	18	0	0	11	10	0	0

TABLE 12  
(Continued)

Judges Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	53	20	0	0	14	10	0	0
51	59	23	0	0	16	12	0	0
52	65	26	0	0	20	14	0	0
53	71	29	0	0	24	16	0	0
54	78	33	0	0	28	20	0	0
55	85	38	0	0	34	24	0	0
56	93	42	0	0	40	30	0	0
57	100	47	0	0	46	36	0	0
58	109	53	0	0	56	44	0	0
59	119	59	0	0	66	52	0	0
60	131	65	0	0	76	62	0	0
61	144	71	0	0	90	74	0	0
62	159	78	0	0	110	88	0	0
63	174	85	0	0	136	104	0	0
64	192	93	0	0	174	122	0	0
65	213	100	0	0	0	0	0	0
66	236	109	0	0	0	0	0	0
67	263	119	0	0	0	0	0	0
68	292	131	0	0	0	0	10,000	10,000
69	324	144	0	0	0	0	0	0
70	361	159	0	0	0	0	0	0

## Public Employees Retirement Fund

**Summary of Actuarial Assumptions and Methods**

<b>Interest:</b>	<b>Pre-Retirement:</b> 8.5% per annum
	<b>Post-Retirement:</b> 5.0% per annum
<b>Salary Increases:</b>	Reported salary for prior fiscal year, with new hires annualized, increased to current fiscal year and annually for each future year according to the rate table below.
<b>Mortality:</b>	<b>Pre-Retirement:</b> Male - 1983 Group Annuity Mortality Table for males setback five years. Female - 1983 Group Annuity Mortality Table for females setback five years.
	<b>Post-Retirement:</b> Male - 1983 Group Annuity Mortality Table for males set forward one year. Female - 1983 Group Annuity Mortality Table for females set forward one year.
	<b>Post-Disability:</b> Male - 1965 RRB rates Female - 1965 RRB rates
<b>Retirement Age:</b>	Age 64 or if over age 64, one year from valuation date. In addition, 50% of employees are assumed to retire under the Rule of 90 when first eligible.
<b>Separation:</b>	Graded rates based on experience as of June 30, 1990. Rates are shown in rate table.
<b>Disability:</b>	Rates as shown in rate table.
<b>Administrative and Investment Expenses:</b>	Prior year expenses expressed as percentage of prior year payroll.
<b>Return of Contributions:</b>	All employees withdrawing after becoming eligible for a deferred benefit take the larger of their contributions accumulated with interest or the value of their deferred benefit.

TABLE 12  
(Continued)

<b>Family Composition:</b>	85% of male Members and 65% of female Members are assumed to be married. Female is four years younger than male. Assume Members have no children.
<b>Social Security:</b>	N/A
<b>Benefit Increases After Retirement:</b>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<b>Special Consideration:</b>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males - 30% elect 50% J&S option 45% elect 100% J&S option  Females - 15% elect 50% J&S option 15% elect 100% J&S option
<b>Actuarial Cost Method:</b>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<b>Asset Valuation Method:</b>	Cost Value plus one-third Unrealized Gains or Losses.
<b>Payment on the Unfunded Actuarial Accrued Liability:</b>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6% per annum.

TABLE 12  
(Continued)

Public Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	Pre-Retirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
20	3	1	2,542	2,913	9	9	0	0	7.7%
21	3	1	2,277	2,666	9	9	0	0	7.7
22	3	2	2,050	2,450	9	9	0	0	7.7
23	4	2	1,854	2,259	10	10	0	0	7.7
24	4	2	1,684	2,091	10	10	0	0	7.7
25	4	2	1,536	1,942	10	10	0	0	7.6
26	4	2	1,406	1,808	10	10	0	0	7.51
27	4	2	1,291	1,688	10	10	0	0	7.39
28	4	2	1,189	1,580	11	11	0	0	7.30
29	4	2	1,099	1,482	11	11	0	0	7.2
30	5	3	1,018	1,394	11	11	0	0	7.2
31	5	3	945	1,313	11	11	0	0	7.1
32	5	3	880	1,239	11	11	0	0	7.1
33	5	3	821	1,172	12	12	0	0	7.0
34	6	3	767	1,110	12	12	0	0	7.0
35	6	3	719	1,053	12	12	0	0	6.9
36	7	4	675	1,000	12	12	0	0	6.8
37	7	4	634	952	13	13	0	0	6.7
38	8	4	597	907	13	13	0	0	6.6
39	9	4	563	865	14	14	0	0	6.5
40	9	5	532	826	15	15	0	0	6.4
41	10	5	503	790	16	16	0	0	6.3
42	10	5	476	756	17	17	0	0	6.3
43	11	6	452	724	18	18	0	0	6.3
44	12	6	429	695	20	20	0	0	6.2
45	14	7	408	667	22	22	0	0	6.2
46	15	7	388	641	23	23	0	0	6.09
47	17	8	370	616	25	25	0	0	6.0
48	19	8	352	593	27	27	0	0	5.9
49	22	9	336	571	30	30	0	0	5.8

Public Employees Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	Pre-Retirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
50	22	10	321	550	33	33	0	0	5.7%
51	25	11	316	531	36	36	0	0	5.7
52	28	12	310	513	40	40	0	0	5.7
53	31	14	270	495	45	45	0	0	5.7
54	35	15	230	487	51	51	0	0	5.7
55	39	16	195	478	58	58	0	0	5.7
56	43	18	150	410	66	66	0	0	5.7
57	48	19	100	362	76	76	0	0	5.7
58	52	21	50	210	88	88	0	0	5.7
59	57	23	20	50	102	102	0	0	5.0
60	61	25	0	0	118	118	0	0	5.0
61	66	28	0	0	136	136	0	0	5.0
62	71	31	0	0	157	157	0	0	5.0
63	77	34	0	0	181	181	0	0	5.0
64	83	38	0	0	208	208	10,000	10,000	5.0
65	91	42	0	0	0	0	0	0	5.0
66	101	47	0	0	0	0	0	0	5.0
67	111	52	0	0	0	0	0	0	5.0
68	124	58	0	0	0	0	0	0	5.0
69	139	64	0	0	0	0	0	0	5.0
70	156	71	0	0	0	0	0	0	5.0

## Public Employees Police and Fire Fund

*Summary of Actuarial Assumptions and Methods*

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

<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumption.
<i>Special Consideration:</i>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males - 40% elect 50% J&S option 45% elect 100% J&S option Females - 15% elect 50% J&S option 15% elect 100% J&S option
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

TABLE 12  
(Continued)

Public Employees Police and Fire Fund

*Summary of Actuarial Assumptions and Methods*

Separations Expressed as the Number of Occurrences per 10,000:

Age	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	5	2	859	859	11	11	0	0
21	5	2	750	750	11	11	0	0
22	5	2	660	660	12	12	0	0
23	5	3	583	583	12	12	0	0
24	5	3	519	519	13	13	0	0
25	6	3	463	463	13	13	0	0
26	6	3	416	416	14	14	0	0
27	6	3	374	374	14	14	0	0
28	7	3	339	339	14	14	0	0
29	7	4	307	307	15	15	0	0
30	7	4	280	280	16	16	0	0
31	8	4	256	256	16	16	0	0
32	8	4	234	234	17	17	0	0
33	9	5	215	215	17	17	0	0
34	10	5	198	198	18	18	0	0
35	10	5	183	183	19	19	0	0
36	11	6	169	169	20	20	0	0
37	12	6	157	157	22	22	0	0
38	13	7	146	146	23	23	0	0
39	14	7	135	135	24	24	0	0
40	15	8	126	126	26	26	0	0
41	16	9	118	118	28	28	0	0
42	18	9	110	110	29	29	0	0
43	21	10	103	103	31	31	0	0
44	24	11	97	97	34	34	0	0
45	27	12	91	91	36	36	0	0
46	30	13	86	86	41	41	0	0
47	34	14	81	81	46	46	0	0
48	39	15	69	69	52	52	0	0
49	44	17	59	59	60	60	0	0

TABLE 12  
(Continued)

Public Employees Police and Fire Fund

*Summary of Actuarial Assumptions and Methods*

Separations Expressed as the Number of Occurrences per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	49	18	50	50	69	69	0	0
51	54	20	39	39	80	80	0	0
52	60	21	29	29	91	91	0	0
53	65	23	22	22	104	104	0	0
54	72	25	15	15	119	119	0	0
55	78	27	11	11	135	135	0	0
56	85	30	7	7	152	152	0	0
57	92	33	5	5	171	171	0	0
58	100	37	3	3	192	192	0	0
59	110	41	1	1	215	215	0	0
60	121	46	0	0	0	0	10,000	10,000
61	133	52	0	0	0	0	0	0
62	146	58	0	0	0	0	0	0
63	160	65	0	0	0	0	0	0
64	176	73	0	0	0	0	0	0
65	195	81	0	0	0	0	0	0
66	219	90	0	0	0	0	0	0
67	243	99	0	0	0	0	0	0
68	270	109	0	0	0	0	0	0
69	300	123	0	0	0	0	0	0
70	334	140	0	0	0	0	0	0

## Police and Fire Consolidation Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	<b>Pre-Retirement:</b>	8.5% per annum
	<b>Post-Retirement:</b>	
	PERA Police and Fire	5.0% per annum
	Relief Association	8.5% per annum
<i>Salary Increases:</i>	Reported salary for prior fiscal year, increased 6.5% to current fiscal year and 6.5% annually for each future year.	
<i>Mortality:</i>	<b>Pre-Retirement:</b>	
	Male -	1971 Group Annuity Mortality Table male rates projected to 1984 by Scale D.
	Female -	1971 Group Annuity Mortality Table female rates projected to 1984 by Scale D.
	<b>Post-Retirement:</b>	
	Male -	Same as above.
	Female -	Same as above.
	<b>Post-Disability:</b>	
	Male -	1965 RRB rates
	Female -	1965 RRB rates
<i>Retirement Age:</i>		
<i>PERA Police and Fire</i>	Age 60, or if over age 60, one year from the valuation date.	
<i>Albert Lea Fire</i>	Age 56 and 20 years of service, or if over 58, one year from the valuation date.	
<i>Albert Lea Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.	
<i>Anoka Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.	
<i>Austin Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.	

TABLE 12  
(Continued)

<i>Bloomington Police</i>	Age 53 and 20 years of service, or if over 58, one year from the valuation date.
<i>Buhl Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Chisholm Fire</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Chisholm Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Columbia Heights Fire</i>	Age 55 and 20 years of service, or if over 58, one year from the valuation date.
<i>Columbia Heights Police</i>	Age 52 and 20 years of service, or if over 58, one year from the valuation date.
<i>Crookston Fire</i>	Age 60 and 20 years of service, or if over 60, one year from the valuation date.
<i>Crystal Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Duluth Fire</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Duluth Police</i>	Age 58 and five years of service, or if over 58, one year from the valuation date.
<i>Faribault Fire</i>	Age 54 and 20 years of service, or if over 50, one year from the valuation date.
<i>Fridley Police</i>	Age 58 and 20 years of service, or if over 50, one year from the valuation date.
<i>Hibbing Fire</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Hibbing Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Mankato Fire</i>	Age 57 and 20 years of service, or if over 50, one year from the valuation date.

TABLE 12  
(Continued)

<i>New Ulm Police</i>	Age 56 and 20 years of service, or if over 50, one year from the valuation date.
<i>Red Wing Fire</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Red Wing Police</i>	Age 53 and 20 years of service, or if over 53, one year from the valuation date.
<i>Richfield Police</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Rochester Fire</i>	Age 60 and 20 years of service, or if over 56, one year from the valuation date.
<i>Rochester Police</i>	Age 60 and 20 years of service, or if over 60, one year from the valuation date.
<i>St. Cloud Fire</i>	Age 60 and 20 years of service, or if over 60, one year from the valuation date.
<i>St. Louis Park Fire</i>	Age 62 and 20 years of service, or if over 62, one year from the valuation date.
<i>St. Louis Park Police</i>	Age 58 and 10 years of service, or if over 50, one year from the valuation date.
<i>St. Paul Fire</i>	Age 60 and 20 years of service, or if over 60, one year from the valuation date.
<i>St. Paul Police</i>	Age 58 and 20 years of service, or if over 60, one year from the valuation date.
<i>South St. Paul Fire</i>	Age 58 and 20 years of service, or if over 60, one year from the valuation date.
<i>West St. Paul Fire</i>	Age 58 and 20 years of service, or if over 60, one year from the valuation date.
<i>West St. Paul Police</i>	Age 58 and 20 years of service, or if over 60, one year from the valuation date.

<i>Winona Fire</i>	Age 58 and 20 years of service, or if over 58, one year from the valuation date.
<i>Winona Police</i>	Age 58 and 20 years of service, or if over 50, one year from the valuation date.
<i>Separation:</i>	Graded rates based on PERA Police and Fire Fund experience as of June 30, 1990. Rates are shown in rate table.
<i>Disability:</i>	Rates as shown in rate table.
<i>Return of Contributions:</i>	
<i>PERA Police and Fire:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefits.
<i>Relief Association:</i>	If a relief association allows for the return of contributions, the contributions are returned to the Member if the Member is not eligible for any other benefit.
<i>Family Composition:</i>	85% of male Members and 65% of female Members are assumed to be married. Female is four years younger than male. Assume Members have no children.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	
<i>PERA Police and Fire:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement interest.
<i>Relief Association:</i>	6.5% per annum. The following are exceptions:  <b>Buhl Police - 3.5% per annum</b>  <b>Chisholm Police - 3% per annum</b>  <b>Chisholm Fire - 3% per annum</b>

**Red Wing Police** - 6.5% per annum; increased in accordance with CPI increase if on active duty as of January 1, 1974 or later.

**Rochester Police** - If hired before July 1, 1969, 6.5% per annum. If hired after June 30, 1969, 3.25% per annum.

**Rochester Fire** - If hired before July 1, 1969, 6.5% per annum. If hired after June 30, 1969, 3.25% per annum.

**West St. Paul Police** - 3.5% per annum

***Special Consideration:***

***PERA Police and Fire:***

Married Members assumed to elect subsidized joint and survivor form of annuity as follows:

Males -           40% elect 50% J&S option  
                      45% elect 100% J&S option

Females -         15% elect 50% J&S option  
                      15% elect 100% J&S option

***Relief Association:***

N/A

***Actuarial Cost Method:***

Calculations of the Actuarial Accrued Liability and Normal Cost under the Entry Age Normal Actuarial Cost Method are disclosed in the report.

The Additional Municipal Contribution is derived by subtracting the following items from the Actuarial Present Value of Projected Benefits:

- Present Value of Future Employee Contributions
- Present Value of Future Regular Municipal Contributions
- Current Value of Assets
- Present Value of Additional Municipal Contributions (amount determined in the prior year)

Any excess (deficit) is a loss (gain) to be funded over 15 years and is added to the prior year Additional Municipal Contributions.

*Asset Valuation Method:*

Cost Value plus one-third Unrealized Gains or Losses.

TABLE 12  
(Continued)

Police and Fire Consolidation Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

Age	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	Male	Female	Male	Female	Male	Female	Male	Female
20	5	2	859	859	11	11	0	0
21	5	2	750	750	11	11	0	0
22	5	2	660	660	12	12	0	0
23	5	3	583	583	12	12	0	0
24	5	3	519	519	13	13	0	0
25	6	3	463	463	13	13	0	0
26	6	3	416	416	14	14	0	0
27	6	3	374	374	14	14	0	0
28	7	3	339	339	14	14	0	0
29	7	4	307	307	15	15	0	0
30	7	4	280	280	16	16	0	0
31	8	4	256	256	16	16	0	0
32	8	4	234	234	17	17	0	0
33	9	5	215	215	17	17	0	0
34	10	5	198	198	18	18	0	0
35	10	5	183	183	19	19	0	0
36	11	6	169	169	20	20	0	0
37	12	6	157	157	22	22	0	0
38	13	7	146	146	23	23	0	0
39	14	7	135	135	24	24	0	0
40	15	8	126	126	26	26	0	0
41	16	9	118	118	28	28	0	0
42	18	9	110	110	29	29	0	0
43	21	10	103	103	31	31	0	0
44	24	11	97	97	34	34	0	0
45	27	12	91	91	36	36	0	0
46	30	13	86	86	41	41	0	0
47	34	14	81	81	46	46	0	0
48	39	15	69	69	52	52	0	0
49	44	17	59	59	60	60	0	0

TABLE 12  
(Continued)

Police and Fire Consolidation Fund

*Summary of Actuarial Assumptions and Methods*

Separations Expressed as the Number of Occurrences per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	49	18	50	50	69	69	0	0
51	54	20	39	39	80	80	0	0
52	60	21	29	29	91	91	0	0
53	65	23	22	22	104	104	0	0
54	72	25	15	15	119	119	0	0
55	78	27	11	11	135	135	0	0
56	85	30	7	7	152	152	0	0
57	92	33	5	5	171	171	0	0
58	100	37	3	3	192	192	0	0
59	110	41	1	1	215	215	0	0
60	121	46	0	0	0	0	10,000	10,000
61	133	52	0	0	0	0	0	0
62	146	58	0	0	0	0	0	0
63	160	65	0	0	0	0	0	0
64	176	73	0	0	0	0	0	0
65	195	81	0	0	0	0	0	0
66	219	90	0	0	0	0	0	0
67	243	99	0	0	0	0	0	0
68	270	109	0	0	0	0	0	0
69	300	123	0	0	0	0	0	0
70	334	140	0	0	0	0	0	0

## Teachers Retirement Association Fund

*Summary of Actuarial Assumptions and Methods*

<i>Interest:</i>	<p>Pre-Retirement: 8.5% per annum          Post-Retirement: 5.0% per annum</p>																
<i>Salary Increases:</i>	Reported salary for prior fiscal year, with new hires annualized, increased according to the table below to current fiscal year and annually for each future year.																
<i>Mortality:</i>	<p><b>Pre-Retirement:</b>          Male - 1983 Group Annuity Mortality Table for males set back eight years.          Female - 1983 Group Annuity Mortality Table for females set back four years.</p> <p><b>Post-Retirement:</b>          Male - Same as above except set back four years.          Female - Same as above except set back two years.</p> <p><b>Post-Disability:</b>          Male - 1977 Railroad Retirement Board Mortality for Disabled Annuitants.          Female - 1977 Railroad Retirement Board Mortality for Disabled Annuitants.</p>																
<i>Retirement Age:</i>	Age 62 or if over age 62, one year from valuation date. In addition, 45% of Basic Members and 30% of Coordinated Members are assumed to retire each year that they are eligible for the Rule of 90.																
<i>Separation:</i>	Select and ultimate rates were based on plan experience as of June 30, 1989. Ultimate rates after the third year are shown in rate table. Select rates are as follows:																
	<table> <thead> <tr> <th></th> <th><u>First Year</u></th> <th><u>Second Year</u></th> <th><u>Third Year</u></th> </tr> </thead> <tbody> <tr> <td>Less than 35</td> <td>.3</td> <td>.15</td> <td>.1</td> </tr> <tr> <td>35-44</td> <td>.25</td> <td>.125</td> <td>.08</td> </tr> <tr> <td>45-60</td> <td>.3</td> <td>.15</td> <td>.1</td> </tr> </tbody> </table>		<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>	Less than 35	.3	.15	.1	35-44	.25	.125	.08	45-60	.3	.15	.1
	<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>														
Less than 35	.3	.15	.1														
35-44	.25	.125	.08														
45-60	.3	.15	.1														
<i>Disability:</i>	Rates as shown in table.																

<i>Expenses:</i>	Prior year expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	85% of male Members and 65% of female Members are assumed to be married. Female is three years younger than male. Assume Members have no children.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of earnings on retired reserves in excess of 5% accounted for by 5% post-retirement assumptions.
<i>Special Consideration:</i>	Married Members assumed to elect subsidized joint and survivor form of annuity as follows:  Males -           15% elect 50% J&S option 50% elect 100% J&S option  Females -        10% elect 50% J&S option 10% elect 100% J&S option
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 5% per annum.

TABLE 12  
(Continued)

Teachers Retirement Association Fund

**SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS**

Separations Expressed as the Number of Occurrences Per 10,000:

Age	Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
20	3	1	600	600	4	4	0	0	7.25%
21	3	2	600	600	4	4	0	0	7.25
22	3	2	600	600	4	4	0	0	7.25
23	3	2	600	600	5	5	0	0	7.20
24	3	2	600	600	5	5	0	0	7.15
25	3	2	600	600	5	5	0	0	7.10
26	4	2	600	600	5	5	0	0	7.05
27	4	2	600	600	5	5	0	0	7.00
28	4	2	600	600	5	5	0	0	7.00
29	4	3	580	580	5	5	0	0	7.00
30	4	3	565	565	6	6	0	0	7.00
31	4	3	540	540	6	6	0	0	7.00
32	4	3	520	520	6	6	0	0	7.00
33	5	3	500	500	6	6	0	0	7.00
34	5	3	480	480	6	6	0	0	7.00
35	5	4	440	440	6	6	0	0	7.00
36	5	4	370	370	7	7	0	0	7.00
37	6	4	330	330	7	7	0	0	7.00
38	6	4	280	280	8	8	0	0	6.90
39	6	5	240	240	8	8	0	0	6.80
40	7	5	210	210	8	8	0	0	6.70
41	7	5	195	195	9	9	0	0	6.60
42	8	6	185	185	9	9	0	0	6.50
43	9	6	175	175	10	10	0	0	6.35
44	9	7	160	160	10	10	0	0	6.20
45	10	7	145	145	11	11	0	0	6.05
46	10	8	130	130	12	12	0	0	5.90
47	11	8	115	115	13	13	0	0	5.75
48	12	9	100	100	14	14	0	0	5.70
49	14	10	85	85	16	16	0	0	5.65

TABLE 12  
(Continued)

Teachers Retirement Association Fund

**SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS**

Separations Expressed as the Number of Occurrences Per 10,000:

Age	Preretirement Death		Withdrawal		Disability		Retirement		Salary Increases
	Male	Female	Male	Female	Male	Female	Male	Female	
50	15	11	70	70	17	17	0	0	5.60%
51	17	12	55	55	19	19	0	0	5.55
52	19	14	40	40	22	22	0	0	5.50
53	22	15	25	25	26	26	0	0	5.45
54	25	16	10	10	30	30	0	0	5.40
55	28	18	0	0	36	36	0	0	5.35
56	31	19	0	0	41	41	0	0	5.30
57	35	21	0	0	47	47	0	0	5.25
58	39	23	0	0	52	52	0	0	5.25
59	43	25	0	0	58	58	0	0	5.25
60	48	28	0	0	63	63	0	0	5.25
61	52	31	0	0	69	69	0	0	5.25
62	57	34	0	0	0	0	10,000	10,000	5.25
63	61	38	0	0	0	0	0	0	5.25
64	66	42	0	0	0	0	0	0	5.25
65	71	47	0	0	0	0	0	0	5.25
66	77	52	0	0	0	0	0	0	5.25
67	84	58	0	0	0	0	0	0	5.25
68	92	64	0	0	0	0	0	0	5.25
69	101	71	0	0	0	0	0	0	5.25

## Duluth Teachers' Retirement Fund

**Summary of Actuarial Assumptions and Methods**

<i>Interest:</i>	<p>Pre-Retirement: 8.5% per annum  Post-Retirement: 8.5% per annum</p>
<i>Salary Increases:</i>	Reported salary increased 6.5% to current fiscal year and 6.5% annually for each future year.
<i>Mortality:</i>	<p><b>Pre-Retirement:</b>  Male - 1971 Group Annuity Mortality Table  male rates set back 8 years  Female - 1971 Group Annuity Mortality Table male  rates set back 8 years</p> <p><b>Post-Retirement:</b>  Male - Same as above  Female - Same as above</p> <p><b>Post-Disability:</b>  Male - Same as above  Female - Same as above</p>
<i>Retirement Age:</i>	Age 61 for the Old Plan and age 63 for the New Plan. In addition, 30% of the Members are assumed to retire each year that they are eligible for Rule of 90.
<i>Separation:</i>	Graded rates shown in rate table.
<i>Disability:</i>	Rates as shown in rate table.
<i>Expenses:</i>	Prior year administrative expenses expressed as percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	80% of Members are assumed to be married. Female is three years younger than male.
<i>Social Security:</i>	N/A

***Benefit Increases  
After Retirement:***

N/A

***Special Consideration:***

Annual 2% increase for annuitants is accounted for by using a 6.5% post-retirement interest rate. Members in the Old Plan are assumed to receive their retirement benefits from the New Plan. Members who terminated under the Old Plan are assumed to take refund under the New Plan.

Married Members assumed to elect subsidized joint and survivor form of annuity as follows:

**Males** - 40% elect 50% J&S option  
40% elect 100% J&S option

**Females** - 10% elect 50% J&S option  
10% elect 100% J&S option

***Actuarial Cost Method:***

Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method, Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.

***Asset Valuation Method:***

Cost Value plus one-third Unrealized Gains or Losses.

***Payment on the  
Unfunded Actuarial  
Accrued Liability:***

A level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.5% per annum.

TABLE 12  
(Continued)

Duluth Teachers' Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	4	4	2,000	2,000	28	28	0	0
21	4	4	1,931	1,931	28	28	0	0
22	4	4	1,731	1,731	28	28	0	0
23	4	4	1,532	1,532	28	28	0	0
24	4	4	1,332	1,332	28	28	0	0
25	5	5	1,132	1,132	28	28	0	0
26	5	5	932	932	28	28	0	0
27	5	5	732	732	28	28	0	0
28	5	5	703	703	28	28	0	0
29	5	5	673	673	28	28	0	0
30	5	5	643	643	28	28	0	0
31	6	6	612	612	28	28	0	0
32	6	6	582	582	28	28	0	0
33	6	6	552	552	28	28	0	0
34	7	7	522	522	28	28	0	0
35	7	7	491	491	29	29	0	0
36	7	7	461	461	29	29	0	0
37	8	8	430	430	30	30	0	0
38	8	8	409	409	31	31	0	0
39	9	9	389	389	31	31	0	0
40	9	9	368	368	32	32	0	0
41	10	10	347	347	33	33	0	0
42	10	10	325	325	35	35	0	0
43	11	11	304	304	37	37	0	0
44	12	12	282	282	38	38	0	0
45	13	13	260	260	41	41	0	0
46	14	14	237	237	43	43	0	0
47	15	15	214	214	46	46	0	0
48	16	16	191	191	49	49	0	0
49	18	18	167	167	53	53	0	0

Duluth Teachers' Retirement Fund

*Summary of Actuarial Assumptions and Methods*

Separation Expressed as Number of Occurrences Per 10,000:

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
50	20	20	143	143	57	57	0	0
51	23	23	118	118	62	62	0	0
52	26	26	92	92	68	68	0	0
53	29	29	67	67	74	74	0	0
54	33	33	40	40	80	80	0	0
55	38	38	13	13	87	87	0	0
56	42	42	0	0	95	95	0	0
57	47	47	0	0	104	104	0	0
58	53	53	0	0	114	114	0	0
59	59	59	0	0	125	125	0	0
60	65	65	0	0	136	136	0	0
61	71	71	0	0	149	149	0	0
62	78	78	0	0	163	163	0	0
63	85	85	0	0	0	0	10,000	10,000
64	93	93	0	0	0	0	0	0
65	100	100	0	0	0	0	0	0
66	109	109	0	0	0	0	0	0
67	119	119	0	0	0	0	0	0
68	131	131	0	0	0	0	0	0
69	144	144	0	0	0	0	0	0
70	159	159	0	0	0	0	0	0

**Minneapolis Teachers' Retirement Fund**  
**Summary of Actuarial Assumptions and Methods**

<i>Interest:</i>	Pre-Retirement:      8.50% per annum Post-Retirement:      8.50% per annum
<i>Salary Increases:</i>	Total reported pay for prior fiscal year increased 6.50% to current fiscal year and 6.50% annually for each future year.
<i>Mortality:</i>	Pre-Retirement: Male -            1971 Group Annuity Mortality Table male rates set back 8 years. Female -         1971 Group Annuity Mortality Table male rates set back 8 years. Post-Retirement: Male -            same as above. Female -         same as above. Post-Disability: Male -            same as above. Female -         same as above.
<i>Retirement Age:</i>	Basic Members are assumed to retire at age 60. Coordinated Members are assumed to retire at age 63. If over the assumed retirement age, one year from valuation date. In addition, 30% of Coordinated Members are assumed to retire each year that they are eligible for the Rule of 90.
<i>Separation:</i>	Graded rates shown in the rate table.
<i>Disability:</i>	Graded rates shown in the rate table.
<i>Administrative Expenses:</i>	Prior year administrative expenses (excluding investment expenses) expressed as a percentage of prior year payroll.
<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	80% of male Members and 60% of female Members are assumed to be married. Female is assumed to be three years younger than male.
<i>Social Security:</i>	N/A

*Benefit Increases  
After Retirement:*

2.0% per annum

*Special Consideration:*

Additional post retirement benefit increase is accounted for by increasing the reserve value for all service retirements, disability retirements and survivors eligible for the increase by an amount that equals the excess of the five year time weighted total rate of return over the assumed interest rate of 8.50% multiplied by the quantity of one minus the rate of contribution deficiency.

Married Members are assumed to elect subsidized joint and survivor forms of annuity as follows:

Males -	15% elect 50% J&S option 50% elect 100% J&S option
Females -	10% elect 50% J&S option 10% elect 100% J&S option

*Actuarial Cost Method:*

Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.

*Asset Valuation Method:*

Cost Value plus one-third of Unrealized Gains or Losses.

*Payment on the  
Unfunded Actuarial  
Accrued Liability:*

The Unfunded Actuarial Accrued Liability is amortized as level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.50% per annum.

TABLE 12  
(cont)

Minneapolis Teachers' Retirement Fund  
*Summary of Actuarial Assumptions and Methods*

*Separations Expressed as the Number of Occurrences per 10,000:*

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	4	4	1,200	1,200	3	4	0	0
21	4	4	1,150	1,150	3	4	0	0
22	4	4	1,100	1,100	3	4	0	0
23	4	4	1,050	1,050	3	5	0	0
24	4	4	1,000	1,000	3	5	0	0
25	5	5	950	950	3	5	0	0
26	5	5	900	900	4	5	0	0
27	5	5	850	850	4	5	0	0
28	5	5	800	800	4	6	0	0
29	5	5	750	750	4	6	0	0
30	5	5	700	700	4	6	0	0
31	6	6	650	650	4	6	0	0
32	6	6	600	600	4	7	0	0
33	6	6	550	550	5	7	0	0
34	7	7	500	500	5	8	0	0
35	7	7	450	450	5	8	0	0
36	7	7	400	400	6	8	0	0
37	8	8	350	350	6	9	0	0
38	8	8	300	300	6	9	0	0
39	9	9	250	250	6	10	0	0
40	9	9	200	200	7	10	0	0
41	10	10	190	190	7	11	0	0
42	10	10	180	180	8	12	0	0
43	11	11	170	170	8	13	0	0
44	12	12	160	160	9	14	0	0
45	13	13	150	150	10	15	0	0
46	14	14	140	140	11	16	0	0
47	15	15	130	130	12	18	0	0
48	16	16	120	120	14	20	0	0
49	18	18	110	110	16	23	0	0
50	20	20	100	100	18	26	0	0
51	23	23	90	90	20	29	0	0
52	26	26	80	80	23	33	0	0
53	29	29	70	70	26	37	0	0
54	33	33	60	60	30	42	0	0

TABLE 12  
(cont)

Minneapolis Teachers' Retirement Fund  
*Summary of Actuarial Assumptions and Methods*

*Separations Expressed as the Number of Occurrences per 10,000:*

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
55	38	38	50	50	36	49	0	0
56	42	42	40	40	42	58	0	0
57	47	47	30	30	50	68	0	0
58	53	53	20	20	59	80	0	0
59	59	59	10	10	69	94	0	0
60	65	65	0	0	90	121	0	0
61	71	71	0	0	116	154	0	0
62	78	78	0	0	146	193	0	0
63	85	85	0	0	0	0	10,000	10,000
64	93	93	0	0	0	0	0	0
65	100	100	0	0	0	0	0	0
66	109	109	0	0	0	0	0	0
67	119	119	0	0	0	0	0	0
68	131	131	0	0	0	0	0	0
69	144	144	0	0	0	0	0	0
70	159	159	0	0	0	0	0	0

**St. Paul Teachers' Retirement Fund**  
**Summary of Actuarial Assumptions and Methods**

<b>Interest:</b>	Pre-Retirement: 8.50% per annum Post-Retirement: 8.50% per annum
<b>Salary Increases:</b>	Total reported pay for prior fiscal year increased 6.50% to current fiscal year and 6.50% annually for each future year.
<b>Mortality:</b>	Pre-Retirement: Male - 1971 Group Annuity Mortality Table male rates set back 8 years. Female - 1971 Group Annuity Mortality Table male rates set back 8 years. Post-Retirement: Male - same as above. Female - same as above. Post Disability: Male - same as above. Female - same as above.
<b>Retirement Age:</b>	Basic Members are assumed to retire at the greater of age 61 or age 60 and 25 years of service but not later than age 65. Coordinated Members are assumed to retire at age 62 and 30 years of service but not later than age 65. If over the assumed retirement age, members are assumed to retire one year from the valuation date. In addition, 45% of Basic Members and 30% of Coordinated Members are assumed to retire each year that they are eligible for the Rule of 90.
<b>Withdrawal:</b>	Graded rates shown in the rate table.
<b>Disability:</b>	Graded rates shown in the rate table.
<b>State Contribution:</b>	\$500,000 for the 1995-96 Fiscal Year increased at 3.00% per annum.
<b>Administrative Expenses:</b>	Prior year administrative expenses (excluding investment expenses) expressed as a percentage of prior year payroll.  Members are assumed to make an additional contribution equal to the difference between prior year expenses as a percentage of payroll for the Teachers' Retirement Association ("TRA") and prior year administrative expenses as a percentage of payroll for this Fund.  TRA expenses are assumed to be 0.15% of payroll for the 1995-96 fiscal year.

<i>Return of Contributions:</i>	All employees withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.								
<i>Family Composition:</i>	85% of male Members and 60% of female Members are assumed to be married. Females are assumed to be four years younger than males. Married members are assumed to have two children.								
<i>Social Security:</i>	N/A								
<i>Benefit Increases After Retirement:</i>	N/A								
<i>Special Consideration:</i>	<p>Annual bonus payments totaling 1.00% of the year end assets are accounted for by using a 7.50% pre and post-retirement interest rate.</p> <p>Married Coordinated Members are assumed to elect subsidized joint and survivor forms of annuity as follows:</p> <table><tr><td>Males -</td><td>15% elect 50% J&amp;S option</td></tr><tr><td></td><td>50% elect 100% J&amp;S option</td></tr><tr><td>Females -</td><td>10% elect 50% J&amp;S option</td></tr><tr><td></td><td>10% elect 100% J&amp;S option</td></tr></table>	Males -	15% elect 50% J&S option		50% elect 100% J&S option	Females -	10% elect 50% J&S option		10% elect 100% J&S option
Males -	15% elect 50% J&S option								
	50% elect 100% J&S option								
Females -	10% elect 50% J&S option								
	10% elect 100% J&S option								
<i>Actuarial Cost Method:</i>	The Entry Age Normal Actuarial Cost Method is used with normal costs expressed as a level percentage of earnings. Under this method Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.								
<i>Asset Valuation Method:</i>	Current Assets are equal to Cost Value plus one-third of Unrealized Gains or Losses.								
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	The Unfunded Actuarial Accrued Liability is amortized as a level percentage of payroll each year to the statutory amortization date assuming payroll increases of 6.50% per annum.								

TABLE 12  
(cont)

St. Paul Teachers' Retirement Fund  
**Summary of Actuarial Assumptions and Methods**

*Separations Expressed as the Number of Occurrences per 10,000:*

Age	Death		Withdrawal		Disability		Retirement	
	Male	Female	Male	Female	Male	Female	Male	Female
20	4	4	600	1,000	7	7	0	0
21	4	4	600	1,000	7	7	0	0
22	4	4	600	1,000	7	7	0	0
23	4	4	600	1,000	7	7	0	0
24	4	4	600	1,000	7	7	0	0
25	5	5	600	1,000	8	8	0	0
26	5	5	600	1,000	8	8	0	0
27	5	5	600	1,000	8	8	0	0
28	5	5	600	1,000	8	8	0	0
29	5	5	600	1,000	8	8	0	0
30	5	5	600	1,000	8	8	0	0
31	6	6	570	1,000	9	9	0	0
32	6	6	540	1,000	9	9	0	0
33	6	6	510	1,000	9	9	0	0
34	7	7	480	1,000	9	9	0	0
35	7	7	450	1,000	10	10	0	0
36	7	7	430	960	10	10	0	0
37	8	8	410	920	10	10	0	0
38	8	8	390	880	11	11	0	0
39	9	9	370	840	11	11	0	0
40	9	9	350	800	12	12	0	0
41	10	10	340	720	12	12	0	0
42	10	10	330	640	13	13	0	0
43	11	11	320	560	14	14	0	0
44	12	12	310	530	15	15	0	0
45	13	13	300	500	16	16	0	0
46	14	14	280	460	18	18	0	0
47	15	15	260	420	19	19	0	0
48	16	16	240	380	21	21	0	0
49	18	18	220	340	22	22	0	0
50	20	20	200	300	24	24	0	0
51	23	23	180	260	26	26	0	0
52	26	26	160	220	29	29	0	0
53	29	29	140	180	32	32	0	0
54	33	33	120	140	36	36	0	0

TABLE 12  
(cont)

St. Paul Teachers' Retirement Fund  
*Summary of Actuarial Assumptions and Methods*

*Separations Expressed as the Number of Occurrences per 10,000:*

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
55	38	38	100	100	40	40	0	0
56	42	42	80	80	46	46	0	0
57	47	47	60	60	53	53	0	0
58	53	53	40	40	61	61	0	0
59	59	59	20	20	72	72	0	0
60	65	65	0	0	84	84	0	0
61	71	71	0	0	98	98	0	0
62	78	78	0	0	113	113	10,000	10,000
63	85	85	0	0	131	131	0	0
64	93	93	0	0	149	149	0	0
65	100	100	0	0	0	0	0	0
66	109	109	0	0	0	0	0	0
67	119	119	0	0	0	0	0	0
68	131	131	0	0	0	0	0	0
69	144	144	0	0	0	0	0	0
70	159	159	0	0	0	0	0	0

**Minneapolis Employees Retirement Fund**  
**Summary of Actuarial Assumptions and Methods**  
**As of July 1, 1994**

<b>Interest:</b>	Pre-Retirement: 6.00% per annum Post-Retirement: 5.00% per annum
<b>Salary Increases:</b>	Total reported pay for prior calendar year increased 1.0198% to prior fiscal year and 4.00% annually for each future year.
<b>Mortality:</b>	Pre-Retirement: Male - Average of male and female rates of 1986 Projected Experience Table with a 1-year age setback. Female - same as male.  Post-Retirement: Male - same as above. Female - same as above.  Post Disability: Male - same as above. Female - same as above.
<b>Retirement Age:</b>	Age 61 or 1 year from the valuation date.
<b>Separation:</b>	Graded rates shown in the rate table.
<b>Disability:</b>	Graded rates shown in the rate table.
<b>Administrative Expenses:</b>	Prior year administrative expenses (excluding investment expenses) increased by 4.00% expressed as a percentage of projected annual payroll.
<b>Investment Expenses:</b>	Investment expenses for the fiscal year ending July 31, 1992 are being amortized as follows:

<u>Beginning Balance</u>	<u>Outstanding Amount</u>	<u>Annual Payment</u>	<u>Years Remaining</u>
\$2,849,000	\$2,734,000	\$207,000	25

TABLE 12  
(cont)

<i>Return of Contributions:</i>	All members withdrawing after becoming eligible for a deferred benefit were assumed to take the larger of their contributions accumulated with interest or the value of their deferred benefit.
<i>Family Composition:</i>	67% of members are assumed to be married. Females are assumed to be three years younger than males.
<i>Social Security:</i>	N/A
<i>Benefit Increases After Retirement:</i>	Payment of increases based on the excess of Minnesota Postretirement Investment Fund earnings over 5.00% is accounted for by using a 5.00% postretirement interest assumption.
<i>Special Consideration:</i>	N/A
<i>Actuarial Cost Method:</i>	Entry Age Normal Actuarial Cost Method with normal costs expressed as a level percentage of earnings. Under this method Actuarial Gains (Losses) reduce (increase) the Unfunded Actuarial Accrued Liability.
<i>Asset Valuation Method:</i>	Cost Value plus one-third of Unrealized Gains or Losses.
<i>Payment on the Unfunded Actuarial Accrued Liability:</i>	A level dollar amount each year to the statutory amortization date.

TABLE 12  
(cont)

Minneapolis Employees Retirement Fund  
*Summary of Actuarial Assumptions and Methods*

*Separations Expressed as the Number of Occurrences per 10,000:*

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	10	10	2,100	2,100	21	21	0	0
21	10	10	1,900	1,900	21	21	0	0
22	9	9	1,700	1,700	21	21	0	0
23	9	9	1,500	1,500	21	21	0	0
24	8	8	1,300	1,300	21	21	0	0
25	8	8	1,100	1,100	21	21	0	0
26	8	8	900	900	21	21	0	0
27	8	8	800	800	21	21	0	0
28	9	9	700	700	21	21	0	0
29	9	9	600	600	22	22	0	0
30	9	9	500	500	23	23	0	0
31	9	9	400	400	24	24	0	0
32	10	10	300	300	25	25	0	0
33	10	10	250	250	27	27	0	0
34	10	10	200	200	28	28	0	0
35	11	11	150	150	30	30	0	0
36	11	11	100	100	32	32	0	0
37	12	12	100	100	33	33	0	0
38	12	12	100	100	35	35	0	0
39	13	13	100	100	38	38	0	0
40	14	14	100	100	41	41	0	0
41	14	14	100	100	44	44	0	0
42	15	15	100	100	48	48	0	0
43	16	16	100	100	52	52	0	0
44	17	17	100	100	56	56	0	0
45	19	19	100	100	61	61	0	0
46	21	21	100	100	67	67	0	0
47	23	23	100	100	73	73	0	0
48	25	25	100	100	79	79	0	0
49	27	27	100	100	86	86	0	0
50	30	30	100	100	93	93	0	0
51	33	33	100	100	103	103	0	0
52	35	35	100	100	114	114	0	0
53	39	39	100	100	128	128	0	0
54	42	42	100	100	143	143	0	0

TABLE 12  
(cont)

Minneapolis Employees Retirement Fund  
*Summary of Actuarial Assumptions and Methods*

*Separations Expressed as the Number of Occurrences per 10,000:*

<u>Age</u>	<u>Death</u>		<u>Withdrawal</u>		<u>Disability</u>		<u>Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
55	47	47	100	100	160	160	0	0
56	52	52	100	100	179	179	0	0
57	57	57	100	100	200	200	0	0
58	64	64	100	100	224	224	0	0
59	71	71	100	100	252	252	0	0
60	79	79	100	100	0	0	0	0
61	89	89	0	0	0	0	10,000	10,000
62	100	100	0	0	0	0	0	0
63	111	111	0	0	0	0	0	0
64	125	125	0	0	0	0	0	0
65	140	140	0	0	0	0	0	0
66	157	157	0	0	0	0	0	0
67	176	176	0	0	0	0	0	0
68	196	196	0	0	0	0	0	0
69	217	217	0	0	0	0	0	0
70	241	241	0	0	0	0	0	0