MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

ACTUARIAL VALUATION AND
EXPERIENCE STUDY AS OF
JUNE 30, 1979

May 2, 1980

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May 2, 1980

Board of Directors
Minnesota State Retirement System
529 Jackson at 10th Street
St. Paul, Minnesota 55101

Gentlemen:

Enclosed herewith is our report setting forth the results of our June 30, 1979 actuarial valuation and experience study for the State Employees Retirement Fund.

The valuation and experience study were performed on the basis of accepted actuarial methods and procedures, in accordance with the applicable provisions set forth in Minnesota Statutes (Chapter 356) and stipulated in the Contract between the State of Minnesota and The Wyatt Company.

We hereby certify that on the basis of our valuation, contributions required from employees and the State under Minnesota Statutes (Chapter 352) are adequate to provide benefits payable from the Fund. Furthermore, the entry age normal cost method was utilized in determining the accrued liability for all benefits payable under the Fund.

If, in connection with this valuation of the Fund, additional investigations are indicated, we will be happy to undertake any further computations that may be desired.

Respectfully submitted,

THE WYATT COMPANY

Allan J. Grosh
Fellow, Society of Actuaries

Alan J. Schutz
Associate, Society of Actuaries

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INTRODUCTION

Chapter 356 of the Minnesota Statutes, as in effect on June 30, 1979, requires that an actuarial valuation be performed annually. In addition, the Statutes require that the appropriateness of the actuarial assumptions utilized in the valuation be tested by performing an experience study every fourth year.

This report sets forth the results of the actuarial valuation and experience study performed as of June 30, 1979 in compliance with the requirements of the Statutes. The report is divided into two principal parts as follows:

A. PART I - ACTUARIAL VALUATION

This part sets forth the determination of the financial status of the plan as of June 30, 1979. As required by Statutes this determination was prepared using the entry age normal cost method, a prescribed assumed interest rate and salary scale assumption of 5% and 3½% respectively, as well as the actuarial assumptions summarized in later tables.

B. PART II - EXPERIENCE STUDY

This part consists of an analysis of experience under the Minnesota State Retirement System, State Employees Retirement Fund during the four year period ended June 30, 1979. The analysis centers primarily around a comparison of the actual experience under the plan and that experience projected by the actuarial assumptions used currently for valuation purposes. This enables the actuary to substantiate the appropriateness of the actuarial assumptions or to suggest modifications where necessary.

The last experience study was performed by the firm of Little, Church, & Chapin, Inc. Consulting Actuaries as of June 30, 1975, and although certain experience deviations were noted, no changes in assumptions were recommended or made. Thus, for the most part, the assumptions used in this year's valuation with the exception of any mandated changes have been in effect since 1971.

* * * * * * * * * *

Although several recommendations are made pertaining to possible changes in the assumptions as a result of the experience analysis, it should be noted that, aside from a change in the assumed retirement age of Correctional Employees from 55 to 58, none of these changes have been reflected in this valuation. It is anticipated that the full cost impact of these will be discussed and analyzed in detail in the following year preparatory to adoption in the 1980 valuation. This approach has been discussed in detail with the Executive Director.

Respectfully submitted,

THE WYATT COMPANY

Allan J. Grosh
Fellow, Society of Actuaries

Alan J. Schutz
Associate, Society of Actuaries

Minneapolis, Minnesota
May 2, 1980

PART I

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Actuarial Valuation as of June 30, 1979

PURPOSE AND SUMMARY

The purpose of this report is to set forth the financial status of the Minnesota State Retirement System (MSRS), State Employees Retirement Fund in accordance with the applicable provisions set forth in Chapter 356 and Chapter 11, Section 11.25 of the Minnesota Statutes.

Chapter 356 of the Minnesota Statutes sets forth the annual reporting requirements which govern the public employee retirement systems in Minnesota. The principal requirements (in addition to the experience study requirements discussed in Part II of the report) are that an actuarial valuation be performed each year and that the valuation specifically set forth the following items based on an assumed 5% interest rate and a 3½% salary scale assumption:

1. The assets of the plan and the present value of all benefits which will be payable from the plan.

2. The normal cost of the plan (as a level percentage of payroll) based on the entry age normal cost method.

3. The accrued liability of the plan, defined as the present value of all benefits less the present value of future entry age normal costs.

4. An actuarial balance sheet showing accrued assets, accrued liabilities, and the deficit from full funding of the accrued liability (unfunded accrued liability).

5. The annual contribution required to pay normal cost and amortize the June 30, 1979 unfunded accrued liability by June 30, 2009.

6. An analysis explaining the increase or decrease in the unfunded accrued liability since the last valuation.

Chapter 11, Section 11.25 of the Minnesota Statutes pertains to the operation of the Minnesota Adjustable Fixed Benefit Fund (MAFB) and includes requirements regarding the determination of present value of benefits payable from MAFB and the corresponding mortality gain or loss each year, the latter to facilitate an appropriate transfer between MSRS and the MAFB.

This reporting on the status of MSRS as of June 30, 1979, is intended to comply with all of the requirements regarding actuarial reporting that are set forth in Chapters 356 and 11. The Appendix at the end of the report cross references the information set forth herein with that specifically called for under Chapters 356 and 11 respectively.

In summary, our valuation reveals the following:

1. The prescribed contributions mandated by Chapter 352 of Minnesota Statutes represent 121.0% of those requirements set forth in Chapter 356.

2. This sufficiency, which exceeds that set forth last year due to methodology changes discussed later in the report, will result in full funding of accrued liabilities within 8 years compared to 14 years set forth last year, assuming assumptions utilized are realized.

3. The plan has virtually retained its funded status from last year at an extremely attractive level. Given the fact that the Metropolitan Transit Commission/Transit Operating Division (MTC/TOD) entered this year for the first time at a lower funding level than the General Plan, the funding progress during the year is more favorable than what appears to be the case.

The results of our valuation underlying the above are set forth in greater detail in the following sections of this report.

CHANGES FROM THE PRIOR YEAR'S REPORTING

This year's valuation reflects certain changes from the prior year's report. The revisions may be categorized as either legislated or methodology changes, and are summarized as follows:

1. Legislated Changes

   a. Effective July 1, 1978 the MTC/TOD group became part of the MSRS General Plan.

b. As of April 1, 1979, the early retirement reduction was revised to an actuarial equivalent, in lieu of a 6% reduction for each year that early retirement date preceded normal retirement date.

c. Effective June 1, 1979 the target date for amortizing the unfunded accrued liability was extended from June 30, 1997 to June 30, 2009.

d. Requirements for extending employment as a Correctional Employee past age 55 were liberalized in accordance with legislated changes in Section 43.051 of the Minnesota Statutes. To reflect this liberalization, the assumed retirement age for Correctional Employees has been increased from age 55 to age 58.

2. Methodology Changes

a. The 40 year limitation on benefit service (including the "Grandfather Provision" to April 1, 1978) has been reflected for the first time.

b. Actuarial determinations concerning the liability and cost regarding future disability benefits and the return of employee contributions have been revised to more closely reflect those provisions set forth in Chapter 352 of the Minnesota Statutes.

c. The method for splitting assets of the Fund for contribution determination purposes between Correctional and General Employee segments has been revised.

d. The manner in which the MAFB Annuity Stabilization Account is disclosed has been revised in accordance with our discussions with the Executive Director.

The revisions are discussed in detail throughout the text of the report.

PRINCIPAL VALUATION RESULTS

The principal results of our valuation may be summarized and compared with those of the June 30, 1978 valuation as follows:

SUMMARY OF PRINCIPAL VALUATION RESULTS

		1978	1979
1.	Normal Cost		
	a. General Plan	39,145,806 (7.06)*	40,642,250 (6.53)
	b. Correctional Plan	1,634,068 (11.02)	1,556,455 (10.24)
2.	Accrued Liability	585,941,142	667,101,131
3.	Valuation Assets	399,169,644	482,465,961
4.	Accrued Liability Funding Ratio	68.12%	72.32%
5.	Unfunded Accrued Liability	186,771,498	184,635,170
6.	Chapter 356 Requirement	57,031,306	55,102,118
7.	Prescribed Chapter 352 Requirement	58,412,959	66,698,565
8.	Plan Continuation Liability	465,817,822	564,131,420
9.	Number of Years that Prescribed Contributions Fully Fund Accrued Liability	14	8
10.	Continuation Liability Funding Ratio	85.69%	85.52%

* Parentheses indicate item as a percentage of covered payroll.

The normal cost for General Employees has decreased from 7.06% of covered payroll reported in the June 30, 1978 valuation to 6.53% of covered payroll as of June 30, 1979. Chapter 352 of the Minnesota Statutes requires that General Plan Employees and the State each contribute 4% of covered payroll towards normal cost and that the State contribute an "additional contribution" for funding the unfunded accrued liability (as discussed later, MTC/TOD temporarily pays 3.8% of pay in addition to these requirements). Consequently, after adjusting by 0.14% of covered payroll for operating expenses, 1.33% (8.00% - 6.53% - 0.14%), in addition to the legislated 2% "additional contribution" is available for amortizing the unfunded accrued liability. As discussed later in the report, the decrease in the normal cost requirement for General Employees is due primarily to refinements in the methodology employed in prior valuations.

The normal cost for Correctional Employees has decreased from 11.02% to 10.24% of covered payroll. Chapter 352 requires that Correctional Employees pay 6% of pay towards normal cost and the State contribute 9% of covered payroll towards normal cost as well as a 5% legislated "additional contribution" by the State for amortizing the unfunded accrued liability. Consequently, after again adjusting by .14% of covered payroll for operating expenses, 4.62% (15.00% - 10.24% - 0.14%) in addition to the legislated 5% "additional contribution" is available for amortizing the unfunded accrued liability.

Although the accrued liability has increased from $585,941,142 to $667,101,131 during the past year, the valuation assets of the plan have increased from $399,169,644 to $482,465,961 over the same period. Consequently, the unfunded accrued liability has decreased from $186,771,498 on June 30, 1978 to $184,635,170 as of June 30, 1979 and the portion of accrued liability funded has increased from 68.12% to 72.32%. A detailed reconciliation of the change in the unfunded accrued liability from the prior year's valuation is set forth later in the report.

The Chapter 356 contribution requirements have decreased slightly from $57,031,306 (extracted from the June 30, 1978 report by applying the normal cost percentage to covered payroll, amortizing the June 30, 1978 unfunded accrued liability over the 19 year period ending June 30, 1997 and adding the .14% assumed expense provision) to $55,102,118. The change in the Chapter 356 contribution requirement represents the net effect of (i) adding the MTC/TOD division to the General Plan, (ii) extending the time for amortizing the unfunded accrued liability from June 30, 1997 to June 30, 2009, (iii) other methodology changes that are explained later in the report and resulted in a decrease in contribution requirements, and (iv) net actuarial losses during the year.

Based on the unfunded accrued liability as of June 30, 1979, and the amount by which prescribed Chapter 352 contributions exceed the Chapter 356 normal cost and assumed operating expenses, we estimate that the unfunded accrued liability will be amortized within 8 years for the General Plan and 5 years for the Correctional Plan. This represents a significant reduction from that set forth in the prior actuarial valuation (14 years for the General Plan and 6 years for the Correctional Plan). This is due primarily to the reduction in normal cost requirements on account of methodology changes and the resulting increase in the portion of prescribed contributions available for the amortization of the unfunded accrued liability.

Although the present value of accrued benefits, determined on a plan continuation basis (applying all ongoing actuarial assumptions including assumed salary increases and turnover) increased from $465,817,822 to $564,131,420 during the year, there was a corresponding increase in plan valuation assets from $399,169,644 to $482,465,961. As a result, the depth of funding ratio, defined as the valuation assets divided by the present value of accrued benefits, has remained fairly constant (85.52% as of June 30, 1979 as opposed to the prior year's 85.69%). This stability is evidenced after reflecting the inclusion of MTC/TOD with its prior lower funding ratio.

Table 1(a) summarizes the results of the valuation in detail, including the breakdown between the General and Correctional Plans while Table 1(b) sets forth a more detailed comparison between the June 30, 1978 and June 30, 1979 principal actuarial valuation results.

ADDITION OF THE METROPOLITAN TRANSIT COMMISSION/TRANSIT OPERATING DIVISION

Effective July 1, 1978, the MTC/TOD Retirement Fund was transferred to MSRS. A February 16, 1979 letter from the Executive Director to the Commissioner of the Metropolitan Transit Commission documents the provisions of the transfer concerning future funding of benefits as follows:

1. Based on the June 30, 1978 actuarial valuation of the MSRS State Employees Retirement Fund it was determined that the MSRS Funding Ratio, defined as the assets on hand divided by the accrued liability of the plan, was 68.6% (this differs from the 68.12% mentioned previously due to our different treatment of the Annuity Stabilization Account discussed later in the report).

2. The June 30, 1978 accrued liability of the MTC/TOD Retirement Plan, as reported by the MSRS prior actuary, was $41,372,108, while assets on hand totaled $21,120,749. Consequently, it was determined that an additional $7,260,518 subsequently would be required to bring the funding level for this group up to the MSRS level of 68.6% as of June 30, 1978.

3. It was agreed that in order to accomplish the above, the MTC/TOD would make "additional contributions" of 3.8% of covered payroll (i.e., in addition to the already mandated 8% "normal cost" and 2% "additional contribution" required by Chapter 352) each year until the additional deficiency of $7,307,545 is amortized, based on a 6% interest rate.

Based on the MTC/TOD contributions made for this purpose during the year (reported by the Executive Director to be $1,362,617) we have determined that the remaining additional deficiency is $6,342,502 as of June 30, 1979. Based on assumed salary increases of 3½% per year and the 6% interest rate required for amortization, this deficiency will be completely amortized within six years.

VALUATION ASSETS

The Executive Director furnished us with a Financial Report setting forth the assets and liabilities of the Fund as of June 30, 1979. The accounting balance sheet furnished by the Executive Director is set forth in Table 2(a), as adjusted by us to reflect a $364,151 transfer of assets from the MSRS State Employees Retirement Fund to the MAFB Fund as a result of this year's post-retirement mortality loss regarding MAFB benefits (treatment of MAFB is discussed later in the text).

In order to determine the Chapter 356 contribution requirements, as well as the unfunded accrued liability and depth of funding ratio, separately for Correctional and General Employees, the State Contribution Reserve (see item

B.4 under the reserves set forth in Table 2(a)) must be allocated between the General and Correctional Employees' portion of the fund. That is, of the $482,465,921 of assets in item B.5 (Total Reserves) only the State Contribution Reserve is not already split into the respective portions for Correctional and General Employee groups.

In prior years this was done in direct proportion to the Employee Contribution Reserves in each plan. However, in discussions with the Executive Director it was pointed out that based on the required contribution schedule which is summarized in the table below, State contributions for Correctional Employees should represent a higher proportion of the fund, relative to employee contributions because these are proportionally higher for the Correctional segment and a straight proportional splitting is not equitable:

CHAPTER 352 CONTRIBUTION SCHEDULE

	General	Correctional
Employee	4% Normal Cost	6% Normal Cost
Employer	4% Normal Cost	9% Normal Cost
	2% Additional*	5% Additional
	6% Total	14% Total
Employer/Employee Multiple	1.50	2.33

* MTC/TOD pays an extra 3.8% as discussed earlier.

Therefore, a new method of allocating the State contribution fund to General and Correctional Employees is being employed. Starting with last year's allocation as an initial base, the current allocation may be briefly outlined as follows:

1. Start with last year's base.
2. Add estimated State contributions to each plan, determined by allocating the actual State contribution for the year in proportion to the respective amounts derived by applying the

above State contribution rates to average General and Correctional payrolls during the year.

3. Deduct any refund of contributions and transfers of assets to MAFB (estimated, based on new retirees reported at the end of the year) during the year. Note that this step is performed only in regard to those items which we can definitely allocate on the valuation date. Determine new 1979 base before allocation of investment earnings.

4. Allocate investment earnings, net of operating expenses in proportion to the new base.

The June 30, 1979 allocation on this revised basis is set forth in Table 2(b) and results in valuation assets as follows:

General Plan	$463,869,751
Correctional Plan	18,596,210
Total	482,465,961

ACTUARIAL BALANCE SHEETS

Table 2(c) sets forth an actuarial balance sheet summarizing the actuarial valuation. Whereas the previously mentioned accounting balance sheet balances the current assets to date with current accumulated reserves for benefits payable, the actuarial balance sheet compares total assets, including the present value of all future contributions payable to the plan, with the present value of all benefits payable from the plan.

Table 3(a) sets forth a balance sheet comparing the assets and unfunded accrued liability (the total of the two equaling the accrued liability) to the current liabilities and reserves required under the plan. This table is in the format specifically required by Chapter 356 and is supported by attachments in the form of Tables 3(b) and 3(c) which set forth the determination of the June 30, 1979 unfunded accrued liability and the June 30, 1979 MAFB Fund Participation respectively.

MINNESOTA ADJUSTABLE FIXED BENEFIT (MAFB) FUND PARTICIPATION

As shown in Table 3(c) the unadjusted MAFB participation reported in the Financial Statements submitted by the Executive Director was $169,860,797. We determined that the liability for benefits payable under the MAFB has increased from $151,273,385 as of June 30, 1978 to $179,101,216 as of June 30, 1979. Taking into account the MTC/TOD retirees transferred to the MSRS General Plan and active participant retirements during the year, this reflects a mortality loss of $364,151 since June 30, 1978. Consequently, item 2 of the table indicates a transfer of the $364,151 mortality loss back from the MSRS State Employees Retirement Fund to the MAFB Fund resulting in a June 30, 1979 MAFB Fund participation of $170,224,948.

The MAFB Fund is basically a vehicle for providing variable annuity payments to pensioners, where the changes in benefit levels from year to year depend on investment performance of the fund. When an active participant retires, assets equal to the present value of future benefits payable to that participant (and beneficiary, if applicable) are transferred from the State and Employee Contribution Reserves to the MAFB Fund. Thereafter, benefits paid to the retiree are made from the MAFB Fund.

Each year, as required by Section 11.25 of the Statutes, as part of a determination whether benefits are to be adjusted, the present value of all future benefits payable from the MAFB are compared to assets on hand in the MAFB Fund after adjustment for mortality gains or losses. The magnitude of the Annuity Stabilization Account (or ASA, which is defined as the adjusted assets on hand in the MAFB Fund less the present value of benefits for retirees in MAFB) determines whether benefits are to be adjusted. If the ASA is positive, then based on a formula set forth in the Statutes, part of this surplus may be used to increase benefits for eligible retirees. If the ASA is negative, then again according to formula, benefits to eligible retirees could decrease, although according to Statute, benefits may not be decreased below their original level upon retirement (or the level on July 1, 1976, whichever is greater).

As a result of favorable investment experience, the negative account balance of $9,585,666 as of June 30, 1978, has been reduced to a negative balance of $8,876,268 as of June 30, 1979. This year's ASA has been reflected in all of the tables and balance sheets as follows:

ACCOUNTING TREATMENT OF MAFB AND ASA

ASSETS:	
• Actual Participation	$170,224,958
LIABILITIES:	
• Present Value of Benefits Payable from MAFB as of June 30, 1979	179,101,216
• Annuity Stabilization Account	(8,876,268)
• Total Liability Equals Reserves Required by MSRS	$170,224,948

In fact, the approach taken is to reflect assets and liabilities as offsetting items with no resulting surplus or deficit to MSRS, the intent of the Statutes in our opinion. This approach suggests that if the ASA is positive, any surplus simply represents a liability to MAFB for future increases. On the other hand, if it is negative, this deficit represents a fund deficiency in the MAFB which in the absence of legislated ad hoc adjustments, must be covered in full before future increases are granted.

The above represents a slight change from procedures in the prior year's report which we have discussed in detail with the Executive Director and would outline as follows:

1. In prior years, when the ASA was negative, the accrued liability (or total required reserves) reflected it by including for retirees the actual present value of benefits payable, even though actual underlying assets were deficient by the dollar amount of the ASA. This implied that the ASA in negative form was a liability of MSRS. However, in disclosing the unfunded accrued liability, this amount was deducted.

2. In determining the depth of funding on a plan continuation basis in prior years, a negative ASA was treated as a positive asset (to balance, since it was not deducted from the present value of benefits payable to retirees on the liability side), thus resulting in a slightly higher funding ratio.

3. In the prior year's analysis of income and disbursements, a balancing item equal to the change in the ASA during the year was required to reconcile the change in the unfunded accrued liability during the year. Since we do not involve the ASA in our determinations for MSRS, this balancing item is no longer necessary.

It is our opinion that our method reflects a more consistent treatment throughout the report and presents items for disclosure purposes in a uniform manner.

RECONCILIATION OF THE UNFUNDED ACCRUED LIABILITY

Tables 4 and 5 reconcile the change in the unfunded accrued liability during the year. Table 4 sets forth an accounting balance sheet illustrating that the increase in the unfunded accrued liability is equal to the excess of income over deductions during the year, where any increase in required actuarial reserves is indicated as a deduction item.

Table 5 sets forth our analysis of the change in the unfunded accrued liability. As is shown in detail in the table, the unfunded accrued liability decreased from $186,771,498 on June 30, 1978 to $184,635,170. This reduction has resulted primarily on account of:

1. A reduction due to contributions (employee plus employer) in excess of normal cost, operating expenses and interest on the unfunded accrued liability, in the amount of $11,082,368.

2. An increase of $17,111,149 due to the transfer of the MTC/TOD to MSRS.

3. A decrease of $1,017,444 due to a change in the Minnesota Statutes requiring actuarial equivalent early retirement reduction factors in lieu of the prior reduction of 6% for each year of early retirement.

4. A reduction of $1,601,760 due to the revision in the assumed Correctional Employee retirement age from 55 to 58.

5. A reduction of $7,933,681 due to changes in methodology from those used in the prior year's valuation.

6. An increase due to a net actuarial loss of $2,387,776.

The principal loss was due to salary increases which offset the gains due to investment performance and employee turnover during the year. A more detailed description of the methodology changes is set forth in the section describing the actuarial assumptions and methods.

EMPLOYEE DATA

The Executive Director furnished us with employee information pertaining to all active members, inactive members and retired members of the System. Tables 6(a) through 6(d) summarize the changes in active, inactive and retired membership during the year in accordance with the requirements set forth in Section 356.215 of the Minnesota Statutes, Subdivisions 4 and 5. All of the information was extracted from an exhibit prepared by the Executive Director.

The data reported as of June 30, 1979 reflects covered payrolls of $592,411,825 and $14,452,567 for General and Correctional Employees respectively. Chapter 356, Section 356.215, Subdivision 4 of the Statutes requires that the actuarial valuation reflect salaries that will be in force during the ensuing fiscal year for which the valuation is being performed. In order to satisfy this requirement, salaries as reported have been adjusted for valuation purposes as follows:

1. Based on salary information submitted by the Executive Director, it was determined that the average July 1, 1979 salary increase (when, we understand that most increases are implemented) for Correctional and General Employees, excluding MTC/TOD Employees, was 5.17%. Accordingly, we increased the reported salaries by 5.17%.

2. We were informed that over the ensuing fiscal year, MTC/TOD Employees will receive an average salary increase of 7%. Since our actuarial valuation automatically assumes an increase of 3½% per year, we have reflected an additional 3.38% (which when compounded with the assumed 3½% salary assumption results in an additional 7% annual increase).

Application of the above salary increases has resulted in covered payrolls of $622,392,796 and $15,199,761 as of June 30, 1979 for General Employees and Correctional Employees respectively.

PLAN VALUED

The provisions of the Minnesota State Retirement System, State Employees Retirement Fund are governed principally by Chapter 352 of the Minnesota Statutes. Table 7 sets forth a summary of the principal plan provisions as of June 30, 1979. The summary reflects a slight revision in the plan that became effective April 30, 1979, wherein early retirement benefits are actuarially reduced in lieu of a reduction of 6% for each year that early retirement precedes age 65.

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Methods

Chapter 356 of the Minnesota Statutes calls for the determination of normal cost and accrued liability in accordance with the entry age normal cost method, one of several available projected cost methods. Several versions of this method are being used today which represent modifications of the "textbook" approach. One such modification has been used in the past by the prior actuary, and we have continued this practice. The impact of this (e.g., for this group, a higher normal cost and a lower resulting unfunded accrued liability) has been discussed in detail with the Executive Director preparatory to completion of this report.

Under the method, the entry age normal cost percentage is determined as (a) divided by (b) where:

(a) equals the sum of the present value of benefits payable for all active members, determined at each member's entry age; and

(b) equals the sum of the present value of compensation for all active members, determined at each member's entry age.

The normal cost for the year is then determined by applying the normal cost percentage to covered payroll. The accrued liability is, by definition, equal to the present value of all benefits payable under the plan less the present value of all future normal costs. The unfunded accrued liability is the net of the accrued liability and current valuation assets on hand.

Our valuation results reflect certain revisions to the methodology used in prior years. The extent of our modifications can be summarized by the table on the following page which reconciles the prior year's Chapter 356 requirements for General Employees with this year's requirements.

The methodology changes had the same relative effect on the Correctional Plan valuation results.

Actuarial Assumptions

The actuarial assumptions used for this valuation were the same as those used in prior years except that, as explained earlier, an assumed retirement age of 58 was used for Correctional Employees.

Tables 8(a) through 8(e) set forth an outline of the actuarial assumptions used in the valuation.

CONTRIBUTION ELEMENTS AS % OF COVERED PAYROLL*

	Normal Cost	Amortization	Total
1. June 30, 1978 Valuation Results	7.06	2.66**	9.72
2. Methodology Differences			
a. Reflecting 40 year limitation including 1978 "Grandfather Provision"	(.03)	(.12)	(.15)
b. Reflect 3½% interest on employee contribution in lieu of 5%	(.26)	.04	(.22)
c. Reflect actual disability provision rather than 50% of pay for all	(.16)	(.13)	(.29)
3. Chapter 356 Revisions - amortization by 2009 rather than 1997	N/A	(.62)	(.62)
4. Demographic changes	(.08)	.03	(.05)
5. June 30, 1979 Valuation Results	6.53	1.86	8.39

* Absent .14% assumed operating expenses.
**Extracted from TPF&C report by amortizing the General Plan unfunded accrued liability over 19 years.

PART II

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Experience Study as of June 30, 1979

PURPOSE

An actuarial valuation is basically a procedure under which the financial condition of a retirement program is determined. In addition, the valuation provides a determination of funding requirements which set forth the pattern of expected costs in a uniform, predictable and consistent manner. In order to determine the liabilities and applicable annual contribution amounts several assumptions affecting the level of projected benefits which will become payable under the plan are made. The extent to which any valuation method can accurately measure the financial liabilities of a retirement program depends heavily on whether or not the actuarial assumptions, in the aggregate, closely reflect actual experience under the plan.

The purpose of this experience study as called for under Chapter 356 of Minnesota Statutes is to compare "expected experience" predicted by the actuarial assumptions, with "actual experience" over the past four years (July 1, 1975 through June 30, 1979) with a view toward revising those assumptions which prove inconsistent with actual experience and in the aggregate would produce material cost deviations. This study consists of such a comparison and analysis with regard to the following assumptions which are used along with the 5% assumed interest rate and 3½% assumed salary increases mandated by Chapter 356 of the Minnesota Statutes:

1. Separation from service on account of:
    a. Withdrawal prior to vesting;
    b. Death;

c. Disability;

d. Retirement.

2. Mortality experience of retired and disabled annuitants.

3. Operating expense levels.

EXPERIENCE DATA

We have examined the emerging experience of the plan during the four year period ending June 30, 1979. The data, submitted by the Executive Director of the Minnesota State Retirement System, included those items necessary for the June 30, 1979 valuation along with copies of the data submitted to the System's prior actuaries for performance of the June 30, 1976, June 30, 1977 and June 30, 1978 actuarial valuations. The basic data includes all active and retired members reported on the prior four valuation dates as follows:

SUMMARY OF EXPERIENCE DATA FOR THE
FOUR YEAR PERIOD ENDING JUNE 30, 1979

Year Ending	Active Participants	Retired Participants	Disabled Participants
June 30, 1976	39,867	5,212	289
June 30, 1977	41,112	6,464	350
June 30, 1978	41,394	7,033	404
June 30, 1979	43,708	7,409	439

In the following sections we summarize the results of the experience study and analyze the appropriateness of the actuarial assumptions with respect to the anticipated impact on the overall cost of the plan. Specific recommendations for any changes are set forth in the last sub-part of this analysis (Summary and Recommendations).

SUMMARY OF RESULTS - RATES OF SEPARATION FROM ACTIVE SERVICE

As follows, we have summarized the expected experience versus actual experience pertaining to rates of separation from active service. It should be noted that expected experience was based on each year's valuation data and on the rates set forth in the active service table (Tables 8(b) through 8(e)) later in this report.

1. Non-Vested Withdrawal

The actuarial valuation of the MSRS State Employees Retirement Fund includes assumptions as to the rate of non-vested turnover. That is, based on a member's age, rates of withdrawal prior to achieving eligibility status for any benefits (other than a return of contribution with interest) are assumed. The following table sets forth a comparison of actual non-vested termination experience over the past four years with that projected by the rates set forth in the present active service table.

NON-VESTED WITHDRAWAL

	Expected Non-Vested Withdrawals	Actual Non-Vested Withdrawals	Experience Ratio
Male	6,155	8,975	145.8%
Female	16,389	16,269	99.3%
Total	22,544	25,244	112.0%

The assumed withdrawal rates for females have resulted in an expected number of assumed non-vested quits which very closely parallel actual experience. However, the above table indicates that actual male non-vested quits have exceeded those expected by about 45.8%. An examination of the age distribution of those quitting indicates that the disparity between expected and actual male non-vested quits occurs primarily because of termination at the very low ages. Since employees at these very low ages have very little effect on the liabilities of the plan, we feel that no modification of this assumption is required at this time.

If the current trend of higher male turnover continues, this should yield actuarial gains in the future, although as indicated, the impact would most likely be minimal.

2. Mortality

The following schedule compares actual deaths among active members with the number projected by the assumed mortality rates which are set forth in the active service table:

MORTALITY PRIOR TO RETIREMENT

	Expected Deaths	Actual Deaths	Experience Ratio
Male	342	251	73.4%
Female	134	114	85.1%
Total	476	365	76.7%

The above indicates that deaths have occurred about 23% less frequently than expected over the past four years, with the larger disparity occurring in the male segment of the population. As discussed in more detail in the Summary and Recommendations section, we would recommend that the mortality assumption be revised to reflect the lower actual mortality. It might be noted that the trend towards decreasing mortality has been very common, and that several actuarial mortality tables reflecting this improved mortality experience have been developed in recent years. This change, depending on the ultimate table adopted should result in slight increases in Chapter 356 requirements.

3. Disability

The valuation utilizes rates of assumed disability retirement based on age. The following table sets forth a comparison of the expected and actual disablements over the past four years:

DISABILITY

	Expected Disabilities	Actual Disabilities	Experience Ratio
Male	68	233	342.6%
Female	44	100	227.3%
Total	112	333	297.3%

Disabilities over the past four years have significantly exceeded those projected by the actuarial assumptions over the past four years. Examination of the experience data indicates that this disparity occurs primarily at the older ages. We recommend that the assumed rates of disablement be revised to reflect this disparity. This will be elaborated on in more detail in the Summary and Recommendations section.

4. Age Retirement

The valuation includes different retirement age assumptions for General and Correctional Employees. Therefore, considerations concerning the appropriateness of the retirement age assumptions are being set forth separately for these two groups.

a. General Employees

The valuation for General Employees utilizes rates of retirement which assume retirements to take place as early as age 58. The following table sets forth a comparison between the actual number of retirements over the past four years and those expected by application of the valuation rates, taking into account each member's age and associated probability of retirement.

RETIREMENT - GENERAL EMPLOYEES

	Expected Retirements	Actual Retirements	Experience Ratio
Male	1,158	1,322	114.2%
Female	1,059	1,168	110.3%
Total	2,217	2,490	112.3%

Actual retirement experience has somewhat exceeded that expected over the study period. This translates into employees tending to retire somewhat earlier than predicted by direct application of the retirement assumptions. This trend is also borne out by noting that the average retirement age of those retiring in recent years has been decreasing as follows:

EARLY RETIREMENT TREND IN RECENT YEARS

Retirement in the Year Ending	Average Retirement Age*
June 30, 1975	65.2
June 30, 1976	64.9
June 30, 1977	64.1
June 30, 1978	64.0
June 30, 1979	63.9

*As reported by the Executive Director and documented in prior actuarial valuation reports.

Although the trend has been toward earlier retirement, we feel that the recently legislated Age Discrimination in Employment Act (ADEA) coupled with the impact of continuing inflation will serve to possibly reverse this noted trend. Consequently, we would suggest that the current assumptions concerning the retirement age of General Employees be retained subject to further analysis in future valuations wherein the full impact of ADEA can be observed.

b. Correctional Employees

Section 43.051 of the Minnesota Statutes, as in effect on June 30, 1978, called for mandatory retirement for Correctional Employees at age 55. This requirement was subject to extension to age 62 (only up to July 1, 1980 if earlier) contingent upon medical approval and the written approval of the Commissioner of Corrections.

During the June 30, 1979 fiscal year, Section 43.051 was amended in response to ADEA. Although the mandatory retirement age of 55 has been retained, this requirement is now subject to extension to age 65 and the July 1, 1980 cutoff date no longer applies. Furthermore, an extension is no longer subject to the written approval of the Commissioner of Corrections, although a medical examination must be passed.

During discussions with the Executive Director, it was agreed that an assumed retirement age of 58 would best anticipate future Correctional Employee experience.

As summarized in Table 6 of this report, additional benefits, over and above General Plan benefits, are payable to Correctional Employees for up to seven years or until the attainment of age 65 (whichever occurs first), at which time benefits are reduced to essentially General Plan levels. This was a primary consideration in choosing age 58 in that it is the last age at which a Correctional Employee can retire and receive the maximum "additional benefit" (e.g., payable for seven years from age 58 to age 65).

SUMMARY OF RESULTS - POST RETIREMENT MORTALITY

1. Mortality After Age Retirement

The valuation utilizes a mortality assumption based on the male and female 1951 Group Annuity Mortality Tables with ages set back one year for males and two years for females. The following table sets forth a comparison of actual mortality during the four year period ending June 30, 1979 and that which is expected based on the valuation assumptions:

POST-RETIREMENT MORTALITY

	Expected Deaths	Actual Deaths	Experience Ratio
Male	796	785	98.6%
Female	449	388	86.4%
Total	1,245	1,173	94.2%

The table shows that the trend toward lower mortality, noted in the 1975 experience study performed by Little, Church, & Chapin, Inc. Consulting Actuaries, has continued. Based on this, we recommend that the post-retirement mortality assumption be revised to a more modern table which reflects the recent trend towards improved mortality. This recommendation is consistent with that being made for pre-retirement mortality and its impact operates in the same direction resulting in modest potential increases in actuarial requirements.

2. Mortality After Disability Retirement

The valuation currently employs the Combined Annuity Mortality Table to predict mortality experience after disablement. The following table compares the actual number of deaths and those expected over the past four years:

MORTALITY AFTER DISABILITY RETIREMENT	Expected Deaths	Actual Deaths	Experience Ratio
Male	39	94	241.0%
Female	25	34	136.0%
Total	64	128	200.0%

Although the number of disabled participants is not large enough to lend 100% credibility to the actual experience, the above table seems to indicate that the actual mortality after disablement exceeds that assumed by rather substantial margins. Noting that this is the same result as that set forth in the 1975 experience study, we feel that this mortality assumption should be increased to more realistically reflect disabled mortality, as the trend would appear to be continuing over a rather extended period of time (297.3% experience ratio in 1975).

SUMMARY OF RESULTS - EXPENSE PROVISIONS

The present valuation takes into account a provision of .14% of covered payroll for operating and administrative expenses of MSRS. Experience over the past four years has indicated an average actual expense provision of .17% as follows:

EXPENSE PROVISIONS

Year Ending	Actual Expenses	Covered Payroll	Percentage Provision
June 30, 1979	1,041,312	569,301,385	0.18%
June 30, 1978	910,926	483,203,504	0.19%
June 30, 1977	721,493	460,999,409	0.16%
June 30, 1976	676,331	414,852,162	0.16%
Total	3,350,062	1,928,356,460	0.17%

We recommend, therefore, that based on the above, the expense provision be increased from the present .14% to .18% of covered payroll, taking into account the trend observed during the past two years.

SUMMARY AND RECOMMENDATIONS

The results of the experience study may be conveniently summarized by the following table, which denotes the ratio of actual experience to that expected by the actuarial assumptions, and denotes whether or not the disparity between actual and expected experience is (i) on the conservative side (e.g., a change in the indicated direction would reduce requirements), (ii) close enough to be within most statistical tolerance limits, or (iii) not conservative (e.g., an indicated change would increase requirements).

SUMMARY OF EXPERIENCE STUDY

Assumption	Percentage of Actual Experience to that Expected: Males Percentage	Males Conservative	Females Percentage	Females Conservative
Non-Vested Withdrawal	145.8	yes	99.3	close
Mortality Prior to Retirement	73.4	no	85.1	no
Disability	342.6	no	227.3	no
Retirement	114.2	close	110.3	close
Mortality After Retirement	98.6	close	86.4	close
Mortality After Disablement	241.0	yes	136.0	yes
Expense Provision	121.4	no	121.4	no

Except for the conservative nature of the male turnover rates at the very young ages, the relative differences between the actual experience and that expected, based on the direct application of the actuarial assumptions suggest the same trends reported in the 1975 experience study. Based on these results, we recommend the following:

1. The assumptions concerning non-vested withdrawal should be retained since in fact most of the excess appears to be concentrated at very young ages with little resulting cost impact.

2. The pre and post-retirement mortality assumptions should be revised to reflect the recent trend toward improved mortality. For this purpose, we would recommend the 1971 Group Annuity Mortality Table (or modification thereof). This table was prepared by the Society of Actuaries in order to reflect those improvements in mortality which have occurred subsequent to the publication of the 1951 Group Annuity Table. In accordance with standard usage of this table, we recommend that female rates be based on the male table, with ages set back six years. As an alternative to this table, one could be constructed based on graduated actual experience observed.

   It should be noted that a change in the mortality basis will increase the reported present value of benefits to be payable from MAFB and serve to reduce or diminish future MAFB mortality losses. Based on a discussion with the actuary for the Legislative Commission on Pensions, we concur that the simplest and most equitable manner in which to reflect this would be to transfer funds from MSRS to the MAFB in the amount of the increase in reserve requirement produced by the revised mortality basis. In this way MSRS would essentially be making a one time payment to eliminate future anticipated mortality losses which will occur if use of the 1951 Group Annuity Table is retained for retirees. The latter result was experienced in three of the last four years.

3. The current assumed rates of disability be retained but that the rates after age 40 be gradually increased so that they are 100% higher at ages 50 and thereafter.

4. The assumptions concerning the rates of retirement for General Employees be retained. The assumed retirement age for Correctional Employees has been increased to 58.

5. The expense provision be increased from .14% to .18% of covered payroll.

We suggest in accordance with the above, that the cost impact on Chapter 356 requirements of the Minnesota Statutes be analyzed completely in the ensuing fiscal year such that changes, if deemed material and necessary, be implemented in the 1980 valuation.

Table 1(a)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Summary of Actuarial Valuation as of June 30, 1979

	General Plan	Correctional Plan	Total
A. BASIC DATA			
1. Active Members			
a. Number	44,602	964	45,566
b. Covered payroll	622,392,796	15,199,761	637,592,557
c. Average prospective annual benefit 1/	11,529	17,459	14,028
2. Retired Members/Beneficiaries			
a. Number	8,959	232	9,191
b. Average annual benefit payable	2,182	4,683	2,245
3. Deferred Annuitants			
a. Number	699	7	706
b. Average annual vested benefit	2,497	6,226	2,534
4. Former Members Without Vested Rights			
a. Number	3,277	50	3,327
b. Average employee contributions	239	360	241
B. BASIC FINANCIAL RESULTS			
1. Normal Cost	40,642,250	1,556,455	42,198,705
2. Accrued Liability	641,823,853	25,277,278	667,101,131
3. Valuation Assets	463,869,751	18,596,210	482,465,961
4. Portion of Accrued Liability Funded	72.27%	73.57%	72.32%
5. Unfunded Accrued Liability [2 - 3]	177,954,102	6,681,068	184,635,170
C. DETERMINATION OF ANNUAL REQUIREMENT IN ACCORDANCE WITH CHAPTER 356 2/			
1. Normal Cost	40,642,250 (6.53)	1,556,455 (10.24)	42,198,705 (6.62)
2. Assumed Operating Expenses	871,350 (0.14)	21,280 (0.14)	892,630 (0.14)
3. Amortization of the Unfunded Accrued Liability by June 30, 2009	11,576,170 (1.86)	434,613 (2.86)	12,010,783 (1.88)
4. Total Chapter 356 Requirement [1 + 2 + 3]	53,089,770 (8.53)	2,012,348 (13.24)	55,102,118 (8.64)

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	General Plan	Correctional Plan	Total
D. DETERMINATION OF CONTRIBUTION SUFFICIENCY 3/			
1. Actual Prescribed Contributions (Chapter 352)			
a. Employee contributions	24,895,712 (4.00)	911,986 (6.00)	25,807,698
b. Employer "matching" contribution	24,895,712 (4.00)	1,367,978 (9.00)	26,263,690
c. Employer "additional" contribution 4/	13,867,189 (2.00)	759,988 (5.00)	14,627,177
d. Total of (a) through (c)	63,658,613 (10.00)	3,039,952 (20.00)	66,698,565
2. Chapter 356 Requirements [Per item C.4.]	53,089,770	2,012,348	55,102,118
3. Sufficiency [1.(d) ÷ 2]	1.199	1.511	1.210
4. Number of Years "Additional" Contributions Will Amortize Unfunded Accrued Liability Not Being Funded by Prescribed "Matching" Contributions, taking into account future assumed salary increases	8	5	8
5. Portion of Prescribed Contributions Other Than "Additional" Contributions Available for Funding of Unfunded Accrued Liability	8,277,824 (1.33)	550,231 (3.62)	8,828,055 (1.38)
E. DEPTH OF FUNDING - PLAN CONTINUATION BASIS			
1. Present Value of Accrued Benefits			
a. Active members	368,405,831	15,390,731	383,796,562
b. Deferred annuitants	8,976,812	74,925	9,051,737
c. Former members without vested rights	825,602	18,798	844,400
d. Survivors	213,773	Nil	213,773
e. Benefits payable from MAFB Fund	170,087,696	9,013,520	179,101,216
f. Annuity Stabilization Account	(8,429,557)	(446,711)	(8,876,268)
g. Total present value of accrued benefits	540,080,157	24,051,263	564,131,420
2. Valuation Assets	463,869,751	18,596,210	482,465,961
3. Portion of Accrued Benefits Funded [2 ÷ 1(g)]	85.89%	77.32%	85.52%

1/ Reflects assumed increases in salary as set forth in Table 8(a). Prospective benefit average shown for Correctional Employees reflects payments to be made prior to age 65 (or prior to receipt of 84 payments, whichever comes first).

2/ Chapter 356 requirements reflect revisions in the law effective for valuations performed subsequent to June 1, 1979. Parentheses indicate Chapter 356 contribution levels as a percentage of salary.

3/ Estimated July 1, 1979.- June 30, 1980 contributions on an accrual basis. Parentheses indicate statutory annual contribution levels as a percentage of salary, as set forth in Chapter 352 of the Minnesota Statutes.

4/ Dollar requirements include the additional 3.8% requirement for MTC employees.

Table 1(b)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Comparison of 1978 and 1979 Actuarial Valuation Results

			1978	1979
1.	Active Members			
	a.	Number	43,708	45,566
	b.	Covered payroll	569,301,385	637,592,557
	c.	Average prospective annual benefit 1/	N/A	14,028
2.	Retired Members/Beneficiaries			
	a.	Number	8,139	9,191
	b.	Average annual benefit payable	2,128	2,245
3.	Deferred Annuitants			
	a.	Number	583	706
	b.	Average annual vested benefit	2,191	2,534
4.	Former Members Without Vested Rights			
	a.	Number	2,886	3,327
	b.	Average employee contributions	213	241
5.	Normal Cost 2/			
	a.	General plan	39,145,806 (7.06)	40,642,250 (6.53)
	b.	Correctional plan	1,634,068 (11.02)	1,556,455 (10.24)
6.	Accrued Liability 3/		585,941,142	667,101,131
7.	Valuation Assets		399,169,644	482,465,961
8.	Unfunded Accrued Liability		186,771,498	184,635,170
9.	Revised Chapter 356 Requirement (Normal Cost Plus Amortization by 2009) 3/ 4/		53,726,569 (9.44)	55,102,118 (8.64)
10.	Prior Chapter 356 Requirement (Normal Cost Plus Amortization by 1997) 3/ 4/		57,031,306 (10.02)	58,886,176 (9.24)
11.	Present Value of Accrued Benefits - Plan Continuation Basis		465,817,822	564,131,420
12.	Depth of Funding [7 ÷ 11]		85.69%	85.52%

1/ Per salary scale assumption set forth in Table 8(a). Amount for 1978 not readily available from prior report.
2/ Parentheses indicate contribution levels as a percentage of salary.
3/ Not including the Annuity Stabilization Account.
4/ Including assumed operating expenses of .14% of covered payroll. See text for a description of the recent revisions to Chapter 356 of the Minnesota Statutes. Parentheses indicate contribution levels as a percentage of salary.

Table 2(a)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Accounting Balance Sheet as of June 30, 1979

A.	ASSETS		
1.	Cash in State Treasury		24,229.06
2.	Cash in Bank (Imprest Cash)		200.00
3.	Short Term Investments (at Cost)		24,296,275.28
4.	Accounts Receivable:		
	a. Accrued employee contributions	620,430.63	
	b. Accrued employer contributions	991,202.22	
	c. Employee buy-backs	201,216.74	
	d. Due from other plans	55,549.87	
	e. Other	1,760.07	1,870,159.53
5.	Accrued Interest on Investments		3,011,297.59
6.	Dividends Declared and Payable, but Not Yet Received		676,931.82
7.	Investment in Debt Securities at Amortized Cost		123,425,160.50
8.	Investment in G.N.M.A.'s at Amortized Cost		19,116,110.32
9.	Investment in Equities at Cost 1/		136,479,812.59
10.	Equipment at Depreciated Cost		26,591.81
11.	Deferred Yield Adjustment Account		3,949,077.96
12.	Participation in the MAFB Fund		170,224,948.03
13.	TOTAL ASSETS		483,100,794.49
B.	LIABILITIES AND RESERVES		
	Liabilities		
1.	Accounts Payable		
	a. Security purchases	0.00	
	b. Annuities	846.47	
	c. Annuitant deposits	5,809.92	
	d. Accrued expenses	64,372.36	
	e. Overpaid dividends	1,785.00	
	f. Transfer to unclassified retirement	190,075.35	
	g. Due MAFB Fund, including transfer for Mortality Loss	364,326.56	627,215.66
2.	Suspense Item: Unredeemed 6 Year Old Warrants		7,617.91
3.	Total Liabilities		634,833.57
	Reserves		
1.	Minnesota Adjustable Fixed Benefit Fund		
	a. Actuarial reserve requirement	179,101,216.00	
	b. Annuity stabilization reserve	(8,876,267.97)	170,224,948.03
2.	Survivor Benefit Reserve		213,773.00
3.	Employee Contribution Reserve		121,815,770.69
4.	State Contribution Reserve		190,211,469.20
5.	Total Reserves (Valuation Assets) 2/		482,465,960.92
6.	TOTAL LIABILITIES AND RESERVES		483,100,794.49

1/ Market value as of June 30, 1979 is $142,911,068.

2/ Portion of assets to be applied as valuation assets towards providing benefits.

Table 2(b)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Allocation of June 30, 1979 Valuation Assets
Between General and Correctional Employees

		General Plan	Correctional Plan	Total
1.	Original Base, Equal to the Employee and State Contribution Fund, as Allocated on June 30, 1978	249,045,687	8,191,032	257,236,719
2.	Transfer to General Plan From MTC/TOD	21,242,839	---	21,242,839
3.	Allocated Contributions During the Year	59,230,005	2,867,071	62,097,076
4.	Transfers of Assets to MAFB During the Year, Including Original 14,369,015 for MTC/TOD	38,973,307	1,396,625	40,369,932
5.	Refunds Allocable During the Year	5,185,636	207,019	5,392,655
6.	Estimated Base as of June 30, 1979, Before Allocation of Investment Earnings and Expenses [1 + 2 + 3 - 4 - 5]	285,359,588	9,454,459	294,814,047
7.	Employee Contribution Reserve as of June 30, 1979	118,139,674	3,676,097	121,815,771
8.	Estimated State Contribution Reserve as of June 30, 1979 [6 - 7]	167,219,914	5,778,362	172,998,276
9.	Actual State Contribution Reserve, Including Investment Earnings During the Year and Expenses Allocated According to Item 8.	183,858,165	6,353,304	190,211,469
10.	Total Valuation Assets Including MAFB Participation, Survivor Benefit Reserve and Employee and State Contribution Reserves	463,869,751	18,596,210	482,465,961

Table 2(c)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Actuarial Balance Sheet as of June 30, 1979

A.	ASSETS		
1.	Assets on Hand from Accounting Balance Sheet:		
	a. Participation in MAFB Fund	170,224,948	
	b. All other assets	312,875,846	483,100,794
2.	Present Value of Employee's Future Contributions		227,296,454
3.	Present Value of State Future Contributions Applicable to:		
	a. Entry age normal cost	144,354,533	
	b. Unfunded accrued liability (Balance of "matching" contribution less .14% for operating expense)	79,053,616	
	c. Unfunded accrued liability (Portion to be funded by "additional" contribution)	105,581,554	328,989,703
4.	TOTAL ASSETS		1,039,386,951
B.	LIABILITIES		
1.	Current Liabilities from Accounting Balance Sheet		634,833
2.	Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
	a. Retirement benefits	682,265,279	
	b. Disability benefits	27,821,080	
	c. Refundments due to death or withdrawal	124,201,821	
	d. Surviving spouse benefits	24,129,080	858,417,260
3.	Present Value of Benefits for Deferred Annuitants:		
	a. Retirement benefits	8,893,403	
	b. Refundments due to death	158,334	9,051,737
4.	Present Value of Refundments to Former Members Without Vested Rights		844,400
5.	Present Value of Survivor Benefits		213,773
6.	Present Value of Benefits Payable from MAFB Fund		179,101,216
7.	MAFB Fund Annuity Stabilization Account		(8,876,268)
8.	TOTAL LIABILITIES		1,039,386,951

Table 3(a)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Chapter 356 Balance Sheet as of June 30, 1979

ASSETS AND UNFUNDED ACCRUED LIABILITY

A.	ASSETS		
1.	Cash in State Treasury		24,229.06
2.	Cash in Bank (Imprest Cash)		200.00
3.	Short Term Investments (as Cost)		24,296,275.28
4.	Accounts Receivable:		
	a. Accrued employee contributions	620,430.63	
	b. Accrued employer contributions	991,202.22	
	c. Employee buy-backs	201,216.74	
	d. Due from other plans	55,549.87	
	e. Other	1,760.07	1,870,159.53
5.	Accrued Interest on Invesments		3,011,297.59
6.	Dividends Declared and Payable, but Not Yet Recieved		676,931.82
7.	Investment in Debt Securities at Amortized Cost		123,425,160.50
8.	Investment in G.N.M.A.'s at Amortized Cost		19,116,110.32
9.	Investment in Equities at Cost		136,479,812.59
10.	Equipment at Depreciated Cost		26,591.81
11.	Deferred Yield Adjustment Account		3,949,077.96
12.	Participation in the MAFB Fund		170,224,948.03
13.	Total Assets		483,100,794.49
B.	UNFUNDED ACCRUED LIABILITY		
1.	Unfunded Accrued Liability to be Funded by Portion of Employee Contributions and State "Matching" Contribution in Excess of Entry Age Normal Cost Contribution and Operating Expenses		79,053,616.00
2.	Unfunded Accrued Liability to be Funded by State's "Additional" Contribution		105,581,554.08
3.	Total Unfunded Accrued Liability		184,635,170.08
4.	TOTAL ASSETS AND UNFUNDED ACCRUED LIABILITY		667,735,964.57

CURRENT LIABILITIES AND RESERVES REQUIRED

C.	LIABILITIES		
1.	Accounts Payable:		
	a. Security purchases	0.00	
	b. Annuities	846.47	
	c. Annuitant deposits	5,809.92	
	d. Accrued expenses	64,372.36	
	e. Overpaid dividends	1,785.00	
	f. Transfer to unclassified retirement	190,075.35	
	g. Due MAFB Fund, including transfer for Mortality Loss	364,326.56	627,215.66
2.	Suspense Item: Unredeemed 6 Year Old Warrants		7,617.91
3.	Total Liabilities		634,833.57
D.	RESERVES REQUIRED		
1.	Total Reserves Required per Attached Table 3(b)		667,101,131.00
2.	TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED		667,735,964.57

NOTE: Accumulated contributions, without interest, of members not yet retired amounted to $121,815,770.69 as of June 30, 1979 (includes accrued but unpaid contributions).

Table 3(b)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Determination of Accrued Liability and
Unfunded Accrued Liability as of June 30, 1979

	(1) Present Value of Benefits	(2) Present Value of Applicable Portion of Normal Cost Contribution	(3) Accrued Liability Equals Reserves Required (1)-(2)
A. DETERMINATION OF ACCRUED LIABILITY			
1. Active Members			
a. Retirement benefits	682,265,279	253,186,666	429,078,613
b. Disability benefits	27,821,080	13,293,344	14,527,736
c. Refundments due to death or withdrawal	124,201,821	96,397,066	27,804,755
d. Surviving spouse benefits	24,129,080	8,773,911	15,355,169
2. Deferred Annuitants	9,051,737	---	9,051,737
3. Former Members Without Vested Rights	844,400	---	844,400
4. Survivors	213,773	---	213,773
5. Benefits Payable From MAFB Fund	179,101,216	---	179,101,216
6. MAFB Fund Annuity Stabilization Account	(8,876,268)	---	(8,876,268)
7. Total	1,038,752,118	371,650,987	667,101,131
B. DETERMINATION OF UNFUNDED ACCRUED LIABILITY			
1. Accrued Liability	---	---	667,101,131
2. Valuation Assets	---	---	482,465,961
3. Unfunded Accrued Liability [1 - 2]	---	---	184,635,170

Table 3(c)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Determination of MAFB Fund Participation
and MAFB Fund Annuity Stabilization Account
as of June 30, 1979

1.	Unadjusted MAFB Fund Participation as of June 30, 1979	169,860,797
2.	Transfer to MAFB Fund from MSRS Fund for 1979 Mortality Loss	364,151
3.	MAFB Fund Participation after Transfer [1 + 2]	170,224,948
4.	Present Value of Benefits Payable from MAFB Fund 1/	179,101,216
5.	MAFB Fund Annuity Stabilization Account [3 - 4]	(8,876,268)

1/ Allocated to members eligible or not eligible to participate in any January 1, 1980 increases as follows:

a.	Liability for members eligible to participate in increase	158,007,022
b.	Liability for members not eligible to participate in increase	21,094,194

Table 4

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Analysis of Income and Deductions From Income
And Effect on the Unfunded Accrued Liability

A.	INCOME		
1.	From Employees		
	a. Employee contributions	23,337,772.38	
	b. Employee accrued contributions receivable	620,430.63	
	c. Employee contributions, accounts receivable	55,739.49	24,013,942.50
2.	From Employers		
	a. Employer contributions	23,770,198.92	
	b. Employer additional contributions	13,321,732.19	
	c. Employer accrued contributions receivable	991,202.22	38,083,133.33
3.	From Investments		
	a. Interest on securities	12,043,409.04	
	b. Dividends on corporate stock	6,924,568.56	
	c. Recognized unrealized appreciation on stock	0.00	
	d. Gain on sale of securities	635,789.62	
	e. Interest on back payments by employees	155,586.72	19,759,353.94
4.	From MAFB Fund Participation		
	a. Participation on MAFB Fund Income		9,576,780.09
5.	Other Revenues		
	a. Miscellaneous	2,864.32	
	b. Transfer of assets from MTC/TOD	21,242,839.41	
	c. Prior year adjustment	3,318.15	21,249,021.88
6.	TOTAL INCOME		112,682,231.74
B.	DEDUCTIONS FROM INCOME		
1.	Benefits		
	a. Service retirement annuities	19,114,813.53	
	b. Disability retirement benefits	1,201,406.06	
	c. Survivor benefits (spouses)	28,433.58	20,344,653.17
2.	Refundments (Employee Contributions)		
	a. Left service	5,392,655.05	
	b. Employee deaths	280,769.88	
	c. Annuitant deposits	35,298.09	
	d. Erroneous deductions	155,348.60	
	e. Interest on Refundments	198,602.99	6,062,674.61
3.	Transfer of Unclassified Employee Retirement		1,937,274.52
4.	Operating Expenses 1/		1,041,312.08
5.	Increase in Total Reserves Required		
	a. Reserves required 6/30/78	585,941,142.00	
	b. Reserves required 6/30/79	667,101,131.00	81,159,989.00
6.	TOTAL DEDUCTIONS FROM INCOME		110,545,903.38
7.	EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		2,136,328.36
C.	REDUCTION IN UNFUNDED ACCRUED LIABILITY		
1.	Unfunded Accrued Liability 6/30/78		186,771,498.44
2.	Unfunded Accrued Liability 6/30/79		184,635,170.08
3.	DECREASE IN UNFUNDED ACCRUED LIABILITY		2,136,328.36

1/ Represents .18% of average covered payroll for the period from July 1, 1978 to June 30, 1979.

Table 5

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Analysis of Change in the Unfunded Accrued Liability
During the Fiscal Year Ending June 30, 1979

1.	Unfunded Accrued Liability as of June 30, 1978		186,771,498
2.	Change Due to Current Rate of Funding and Interest Requirements		
	a. 1978 - 79 past service contribution	(20,420,943)	
	b. 5% interest requirement	9,338,575	(11,082,368)
3.	Change due to transfer of the MTC/TOD to MSRS 1/		17,111,149
4.	Change due to providing for an actuarial equivalent decrease in benefits in lieu of a 6% reduction per year of early retirement		(1,017,444)
5.	Change due to revising the assumed retirement age for Correctional Employees from 55 to 58		(1,601,760)
6.	Change due to methodology differences from the prior year		
	a. Reflecting 40 year limitation (or service earned to April 1, 1978 if greater)	(8,978,668)	
	b. Projecting 3½% interest on employee contributions in lieu of 5% previously used	3,216,378	
	c. Reflecting the disability provision as the accrued benefit in lieu of assuming a benefit of 50% of pay	(2,171,391)	(7,933,681)
7.	Change due to actuarial gains (indicated by parentheses) or losses (no parentheses) because of 1978 - 79 experience deviations from expected:		
	a. Mortality of Retired Participants	364,151	
	b. Salary increases	12,868,518	
	c. Asset gains	(7,245,282)	
	d. Withdrawals, deaths and disability (balancing item)	(3,599,611)	2,387,776
8.	Unfunded Accrued Liability as of June 30, 1979		184,635,170

1/ Represents the unfunded accrued liability determined as of June 30, 1979.

Table 6(a)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Covered General Employee Census Data as of June 30, 1979

	Number	Annualized Payroll
Active at June 30, 1978	42,713 1/	536,593,823
New Entrants	10,023 2/	104,723,247
Total	52,736	
Less Separations from Active Service:		
Refund of Contributions 3/	5,714	50,285,636
Separation with Deferred Annuity	111	1,057,636
Separation with Neither Refundment or Right to a Deferred Annuity	1,502	9,796,058
Disability	104	1,370,233
Death, No Spouse's Benefits 3/	90	1,057,680
Service Retirement	558	7,963,194
Death, Spouse's Benefits Payable	3	32,282
Total Separations	8,082	
Net Transfers To and From Other Plans	52	
Active at June 30, 1979	44,602	592,411,825

AVERAGE ENTRY AGE OF NEW EMPLOYEES

For the Fiscal Year Ending	Male	Female	Average of Total
6/30/75	30.2	28.1	28.8
6/30/76	30.0	28.4	29.0
6/30/77	29.6	28.6	29.3
6/30/78	30.7	29.1	29.5
6/30/79	30.7	28.9	29.4

Average age at entry in State service for all active employees at 6/30/79

Male	29.7
Female	28.1
Total	28.9

1/ Incorrectly disclosed as 42,772 last year.
2/ Includes MTC/TOD transfers on July 1, 1978.
3/ Includes those who entered the plan and terminated during the period from July 1, 1978 to June 30, 1979.

Table 6(b)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

General Plan Annuitant Census Data as of June 30, 1979

	Number	Annual Annuity Benefit Payable
A. SERVICE RETIREMENT ANNUITANTS		
Receiving at June 30, 1978	7,198	15,178,319.64
New	616	1,778,654.16
Deaths	345	680,937.96
Adjustments-Net Result	563	1,597,461.12
Receiving at June 30, 1979	8,032	17,873,496.96
B. DISABLED EMPLOYEES		
Receiving at June 30, 1978	436	726,285.48
New	109	262,750.32
Deaths	45	79,799.52
Disability Rescinded	0	0.00
Adjustments-Net Result 1/	108	260,876.76
Receiving at June 30, 1979	608	1,170,113.04
C. WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT		
Beneficiaries Receiving an Optional or Reversionary Annuity		
Receiving at June 30, 1978	266	398,741.16
New	33	70,750.32
Deaths	6	7,896.96
Adjustments-Net Result	4	16,229.76
Receiving at June 30, 1979	297	477,824.28

	Number	Annual Annuity Benefit Payable
Spouses Receiving a Survivor Benefit		
Receiving at June 30, 1978	23	29,519.52
Deaths	1	2,171.88
Adjustments-Net Result	0	0.00
Receiving at June 30, 1979	22	27,347.64

D. CHILDREN RECEIVING A SURVIVOR BENEFIT

Receiving at June 30, 1979	None	

E. DEFERRED ANNUITANTS

Deferred as of June 30, 1978	580	1,260,593.37
New	151	419,382.96
Began Receiving	41	47,688.96
Adjustments (Withdrawals) 1/	9	113,300.52
Deferred as of June 30, 1979	699	1,745,587.89

AVERAGE AGE AT RETIREMENT OF NEW SERVICE ANNUITANTS

Fiscal Year Ending	Average Retirement Age
6/30/74	65.4
6/30/75	65.2
6/30/76	64.9
6/30/77	64.1
6/30/78	64.0
6/30/79	63.9
All Existing Service Annuitants	65.1

1/ Over 95% of the adjustments are members of the MTC/TOD Plan added on July 1, 1978.

Table 6(c)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Covered Correctional Employee Census Data as of June 30, 1979

	Number	Annualized Payroll
Active at June 30, 1978	995	13,684,608
New Entrants	139	1,802,250
Total	1,134	
Less Separations from Active Service:		
Refund of Contributions 1/	132	1,498,179
Separation with Deferred Annuity	4	49,172
Separation with Neither Refundment or Right to a Deferred Annuity	13	115,203
Disability	2	32,781
Death, No Spouse's Benefits	3	38,464
Service Retirement	16	277,305
Total Separations	170	
Active at June 30, 1979	964	14,452,567

AVERAGE ENTRY AGE OF NEW EMPLOYEES

For the Fiscal Year Ending	Male	Female	Average of Total
6/30/76	27.0	25.5	26.7
6/30/77	29.2	28.5	27.4
6/30/78	29.1	30.0	29.2
6/30/79	28.5	31.0	28.9

Average age at entry in State service for all active employees at 6/30/79

Male	28.0
Female	28.8
Total	28.1

1/ Includes those who entered the plan and terminated during the period from July 1, 1978 to June 30, 1979.

Table 6(d)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Correctional Plan Annuitant Census Data as of June 30, 1979

	Number	Annual Annuity Benefit Payable
A. SERVICE RETIREMENT ANNUITANTS		
Receiving at June 30, 1978	211	975,204.96
New	20	146,238.12
Deaths	6	24,549.60
Adjustments-Net Results	0	(29,082.84)
Receiving at June 30, 1979	225	1,067,810.64
B. DISABLED EMPLOYEES		
Receiving at June 30, 1978	3	6,286.08
New	2	5,191.68
Deaths	0	0.00
Adjustments-Net Results	0	0.00
Receiving at June 30, 1979	5	11,477.76
C. WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT		
Beneficiaries Receiving an Optional or Reversionary Annuity		
Receiving at June 30, 1978	2	7,062.12
New	0	0.00
Adjustments-Net Results	0	0.00
Receiving at June 30, 1979	2	7,062.12
D. CHILDREN RECEIVING A SURVIVOR BENEFIT		
Receiving at June 30, 1979	None	

Page 1 of 2

	Number	Annual Benefit Benefit Payable
E. DEFERRED ANNUITANTS		
Deferred as of June 30, 1978	3	16,883.76
New	5	31,488.00
Began Receiving	1	4,787.76
Deferred as of June 30, 1979	7	43,584.00

AVERAGE AGE AT RETIREMENT OF NEW SERVICE ANNUITANTS

Fiscal Year Ending	Average Retirement Age
6/30/76	58.8
6/30/77	57.7
6/30/78	56.5
6/30/79	57.9
All Existing Service Annuitants	59.1

Table 7

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Summary of Principal Plan Provisions as of June 30, 1979

A. GENERAL EMPLOYEES

1. Coverage:	From first date of employment.
2. Service Credit:	Service is credited from date of coverage subject to a maximum equal to the greater of: . 40 years of service; or . service earned prior to April 30, 1978
3. Contributions:	
a. Employee:	4% of salary.
b. State of Minnesota:	6% of salary.
4. Final Average Salary:	Monthly average for the highest 5 successive years of salary.
5. Normal Retirement:	
a. Eligibility:	Earlier of: . attainment of age 65 and completion of 10 years of service; or . attainment of age 62 with 30 years of service.
b. Benefit Amount:	1% of Final Average Salary for each of the first 10 years of service plus 1-1/2% of Final Average Salary for each year of service thereafter.
6. Early Retirement:	
a. Eligibility:	Earlier of: . attainment of age 62 and completion of 10 years of service; or . attainment of age 58 and completion of 20 years of service.
b. Benefit Amount:	Normal Retirement benefit formula based on service and Final Average Salary to date of early retirement but actuarially reduced to reflect payment prior to age 65 (or age 62 if 30 years of service have been completed).

7. Form of Payment: Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are also available.

8. Disability Retirement:

   a. Eligibility: Earlier of:

      - attainment of age 50 and completion of 5 years of service; or
      - completion of 10 years of service.

   b. Benefit Amount: Normal retirement benefit formula based on service and Final Average Salary to date of disability retirement.

9. Deferred Service Retirement:

   a. Eligibility: Completion of 10 years of service and election to leave employee contributions on deposit.

   b. Benefit Amount: Retirement benefits payable at normal retirement date are determined according to the normal retirement benefit formula based on the member's Final Average Salary and service at termination, such amount being subject to an increase for each year between termination and retirement of 5% for years prior to January 1, 1981 and 3% compounded annually thereafter.

10. Return of Contributions: Upon termination of employment, a member may elect the return of contributions in lieu of all other benefits under the plan. Contributions made after the first 3 years of service are credited with 3-1/2% interest compounded annually.

11. Surviving Spouse Death Benefit:

   a. Eligibility: Death of member in service who is qualified at that time for early or normal retirement.

   b. Benefit Amount: The surviving spouse may elect one of:

      - refund of member contributions with 3-1/2% interest; or
      - 50% of the annuity the member would have received had he retired early (if eligible) and elected a 50% joint and survivor annuity commencing on his date of death.

12. Repayment of Contributions:

a. Eligible Members: Rehired members who are credited with at least one year of service subsequent to rehire.

b. Repayment Provision: Such rehired member may repay all refundments made to him, including interest at 6% compounded annually. In such case, service previously credited during the prior period of membership is restored.

13. Combined Service Provisions:

a. Eligible Members: Members who have had coverage under two or more Minnesota Public Retirement Systems, with a total of at least 10 years of credited service.

b. Benefit Provisions: Benefits under both plans are based on the highest Final Average Salary including all years from both plans, and on the plans in effect on the member's last day in covered public employment.

14. Proportionate Annuity: Any member who terminates after attaining age 65 and completing at least 3 years of service is entitled to a proportionate retirement annuity based on his allowable service credit.

B. CORRECTIONAL EMPLOYEES

Same as above except:

1. Contributions:

a. Employee: 6% of salary.

b. State of Minnesota: 14% of salary.

2. Normal Retirement:

a. Eligibility: Attainment of age 55 and completion of 10 years of service.

b. Retirement Benefit: General Plan benefit plus an additional benefit defined below.

c. Additional Benefit: Final Average Salary times the sum of:

- 1-1/2% for each of first 10 years of service; plus
- 1% for each of next ten years of service; plus
- 1/2% for each year of service thereafter.

d.	Limitation on Additional Benefit:	That amount which, when added to the General Plan benefit, provides a retirement benefit of 75% of Final Average Salary.
e.	Additional Benefit Period:	84 months or until attainment of age 65, whichever comes first.
f.	Minimum Benefit Following Additional Benefit Period:	That amount which when added to Social Security benefits, equals the benefit payable during the additional benefit period.

Table 8(a)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Summary of Actuarial Assumptions and Methods

1.	Pre-Retirement Mortality:	Rates based on actual experience developed by the June 30, 1971 experience analysis and set forth in the Separation from Active Service Table.
2.	Post-Retirement Mortality:	1951 Group Annuity Mortality with ages set back 1 year for males and 2 years for females.
3.	Post-Disablement Mortality:	Combined Annuity Mortality Table.
4.	Withdrawal:	Graded rates based on actual experience developed by the June 30, 1971 experience analysis and set forth in the Separation from Active Service Table.
5.	Expenses:	.14% of covered payroll.
6.	Interest Rate:	5% per annum.
7.	Salary Scale:	3-1/2% per annum.
8.	Assumed Retirement Age:	Graded rates beginning at age 58 set forth in the Separation from Active Service Table.
9.	Actuarial Cost Method:	Entry age cost method, with normal cost determined as a level percentage of future covered payroll, on an aggregate basis.
10.	Social Security:	Based on the present law (2nd phase 1979) and 3-1/2% salary scale applicable to current salaries. No wage base increases beyond those specifically prescribed in the Social Security Act of 1977 are projected. No cost of living increases are projected.

Table 8(b)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Male General Members
Probabilities of Separation From Active Service
(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	2,400	6		
21	2,250	6		
22	2,080	7		
23	1,920	7		
24	1,760	7		
25	1,600	7		
26	1,470	7		
27	1,340	7		
28	1,230	8		
29	1,130	8		
30	1,040	8	2	
31	950	9	2	
32	890	10	2	
33	830	11	2	
34	770	12	2	
35	720	13	2	
36	680	15	2	
37	640	16	2	
38	600	18	2	
39	560	20	2	
40	530	22	2	
41	500	25	2	
42	480	27	2	
43	460	29	2	
44	430	32	2	

Age	Withdrawal	Death	Disability	Age and Service Retirement
45	410	35	2	
46	390	38	3	
47	370	41	4	
48	350	44	5	
49	340	48	6	
50	320	52	7	
51	300	57	8	
52	280	63	10	
53	260	70	12	
54	240	77	14	
55	210	85	17	
56	170	93	20	
57	140	102	23	
58	90	111	28	30
59	40	120	33	30
60		130	38	40
61		140	45	150
62		150	55	150
63		160	68	250
64		170	87	1,350
65				10,000

Table 8(c)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Female General Members
Probabilities of Separation From Active Service
(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	3,700	1		
21	3,550	2		
22	3,390	2		
23	3,230	2		
24	3,070	3		
25	2,910	3		
26	2,750	4		
27	2,600	4		
28	2,430	4		
29	2,270	4		
30	2,120	4		
31	1,970	4		
32	1,820	4		
33	1,680	4		
34	1,540	4		
35	1,410	4	1	
36	1,300	5	1	
37	1,190	5	1	
38	1,090	6	1	
39	1,000	7	2	
40	920	8	2	
41	850	8	2	
42	780	9	3	
43	720	11	3	
44	680	13	3	

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Age	Withdrawal	Death	Disability	Age and Service Retirement
45	630	15	3	
46	590	17	4	
47	560	19	4	
48	530	21	4	
49	500	23	5	
50	470	25	5	
51	440	27	6	
52	410	30	7	
53	390	33	8	
54	360	36	10	
55	330	39	12	
56	290	43	15	
57	230	47	18	
58	170	51	22	50
59	90	56	26	50
60		61	31	150
61		66	37	150
62		72	44	200
63		78	52	350
64		83	61	1,100
65				10,000

Table 8(d)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Male Correctional Members
Probabilities of Separation From Active Service
(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	2,400	6		
21	2,250	6		
22	2,080	7		
23	1,920	7		
24	1,760	7		
25	1,600	7		
26	1,470	7		
27	1,340	7		
28	1,230	8		
29	1,130	8		
30	1,040	8	2	
31	950	9	2	
32	890	10	2	
33	830	11	2	
34	770	12	2	
35	720	13	2	
36	680	15	2	
37	640	16	2	
38	600	18	2	
39	560	20	2	
40	530	22	2	
41	500	25	2	
42	480	27	2	
43	460	29	2	
44	430	32	2	

Age	Withdrawal	Death	Disability	Age and Service Retirement
45	410	35	2	
46	390	38	3	
47	370	41	4	
48	350	44	5	
49	340	48	6	
50	320	52	7	
51	300	57	8	
52	280	63	10	
53	260	70	12	
54	240	77	14	
55	210	85	17	
56	170	93	20	
57	140	102	23	
58				10,000

Table 8(e)

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Female Correctional Members
Probabilities of Separation From Active Service
(Number Separating at Each Age Per 10,000 Working at That Age)

Age	Withdrawal	Death	Disability	Age and Service Retirement
20	3,700	1		
21	3,500	2		
22	3,390	2		
23	3,230	2		
24	3,070	3		
25	2,910	3		
26	2,750	4		
27	2,600	4		
28	2,430	4		
29	2,270	4		
30	2,120	4		
31	1,970	4		
32	1,820	4		
33	1,680	4		
34	1,540	4		
35	1,410	4	1	
36	1,300	5	1	
37	1,190	5	1	
38	1,090	6	1	
39	1,000	7	2	
40	920	8	2	
41	850	8	2	
42	780	9	3	
43	720	11	3	
44	680	13	3	

Age	Withdrawal	Death	Disability	Age and Serivce Retirement
45	630	15	3	
46	590	17	4	
47	560	19	4	
48	530	21	4	
49	500	23	5	
50	470	25	5	
51	440	27	6	
52	410	30	7	
53	390	33	8	
54	360	36	10	
55	330	39	12	
56	290	43	15	
57	230	47	18	
58				10,000

APPENDIX

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Table References to Chapter 11 and Chapter 356

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1/ All as of June 30, 1979.

MSRS VALUATION AS OF JUNE 30, 1979

The purpose of this memorandum is to discuss the valuation report of the Minnesota State Retirement System dated May 2, 1980 which was submitted to the Commission in accordance with Minnesota Statutes, Chapter 356. The valuation was made using the entry age normal cost method and assuming 5% interest. The 1978 report was prepared by Harry M. Church and David G. Adams of Towers, Perrin, Forster and Crosby, Consulting Actuaries, and the current report was prepared by Allan J. Grosch and Alan J. Schutz of the Wyatt Company.

This memo contains the following:

1. Statistical and Valuation Data
2. Discussion of Valuation Results
3. Experience Study
4. Conclusion

1. Statistical and Valuation Data

Results of the valuation reports as of June 30, 1978 and June 30, 1979 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

	As of June 30, 1978	As of June 30, 1979
(1) Membership		
Active Members	43,708*	45,566
Inactive Members	2,886	3,327
Retired Members	7,909	8,257
Disabled Members	439	613
Survivors of Deceased Members	291	321
Deferred Vested	583	706

*Including correctional employees numbering 995 and 964, respectively.

(2) Payroll and Annuities Payable	(Millions of Dollars)	
Total Annualized Payroll	$550.3	$606.9
Annuities (annual)	17.3	20.6

(3) Valuation Balance Sheet	(Millions of Dollars)	
Accrued Liability	$595.6	$675.8
Assets	408.8	491.2
Unfunded Accrued Liability (Deficit)	$186.8*	$184.6
Funding Ratio (Ratio of Assets to Accrued Liability)	68.6%	72.7%

*$177.9 Million for regular employees and $6.7 Million for correctional employees compared to 1978 figures of $178.5 Million and $8.3 Million, respectively.

	Percent of Covered Payroll			
	As of June 30, 1978		As of June 30, 1979	
	Regular	Correctional	Regular	Correctional
(4) Normal Cost and Funding Costs				
Normal Cost	7.06%	11.02%	6.53%	10.24%
Expenses	.14	.14	0.14	0.14
Normal Cost Plus Expenses	7.20%	11.16%	6.67%	10.38%
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Interest on Deficit	1.66	3.02	1.43	2.20
Total ("Minimum Contribution")	8.86%	14.18%	8.10%	12.58%
Normal Cost plus Expenses	7.20%	11.16%	6.67%	10.38%
Amortization by 2009	2.13	3.87	1.86	2.86
Total ("Required Contribution")	9.33%	15.03%	8.53%	13.24%
(5) Statutory Contributions				
Employee	4.0%	6.0%	4.0%	6.0%
Employer Regular	4.0	9.0	4.0	9.0
Employer Additional	2.0	5.0	2.0	5.0
Total Contributions	10.0%	20.0%	10.0%	20.0%
(6) Investment Yield (A)	6.02%		6.95%	

(A) Ratio of investment income (on an accrual basis) to mean assets.*
*Excluding assets in Minnesota Adjustable Fixed Benefit Fund; including change in recognized unrealized appreciation or depreciation.

2. Discussion of Valuation Results

The normal cost for both groups has declined. For the regular group, a correction in the handling of three plan provisions produced most of the decrease. For the correctional group, a change in the assumed average age at retirement caused the decrease.

The same elements contributed to a reduction in the amortization contribution as a percentage of payroll, but a more important factor was the change in the target date from 1997 to 2009. This factor does not show up in the above display because the 1978 amortization contribution figures have been restated to reflect this change; originally they were 2.62% for the regular group and 4.76% for the correctional group.

During the year, the unfunded accrued liability decreased from $186,771,498 to $184,635,170, a decrease of $2,136,328. This relatively small change was the net of numerous items, some of them substantial. Some of these items have already been mentioned in discussing the decrease in the normal cost. However, other items had a greater effect, and the MSRS gave the following complete analysis:

Decreases:

Amortization Contribution	$11,082,368	
Excess Interest	6,609,492	
Deviations in Terminations, Mortality and Disablement	3,599,611	
Change in Reductions for Early Retirement	1.017,444	
Change in Assumed Average Retirement Age - Correctional	1,601,760	
Corrections - Three Plan Provisions	7,933,681	
Capital Gain	635,790	
Total Decreases		$32,488,146

Increases:

Mortality Loss-Retired Lives	$ 364,151	
Transfer of MTC/TOD	17,111,149	
Salary Scale Loss	12,868,518	
Total Increases		$30,343,818
Net Decrease		$ 2,136,328

We have a slight disagreement on the handling of one of the above items, the Transfer of MTC/TOD. When the transfer was made, it was estimated that the assets of the MTC/TOD plan were $7,260,518 short of being enough to make the MTC/TOD funding ratio equal that of MSRS, and it was agreed that this was an amount owed by MTC/TOD to MSRS, which would earn interest at the rate of 6% until paid. Arrangements were made to pay off this debt over a period of years.

Therefore, in our opinion, this $7,260,518 should have been entered on the MSRS balance sheet as a interest-bearing asset with the amount rendered each year as payments are made (current principal $6,342,502). If this practice had been followed, the unfunded liability figure would be somewhat smaller and the Transfer item in the above analysis $6,000,000 to $7,000,000 less.

3. Experience Study

The following charts summarize the most important items of the experience study. The first five show the expected number of events in accordance with the actuarial assumptions, the actual number and the ratio of actual to expected. The sixth chart shows the average ages at retirement in recent plan years.

	Withdrawals			Mortality-Actives		
	Act.	Exp.	Ratio	Act.	Exp.	Ratio
Male	8,975	6,155	145.8%	251	342	73.4%
Female	16,269	16,389	99.3	114	134	85.1
Total	25,244	22,544	112.0%	365	476	76.7%

	Disablement			Mortality-Age Retireds		
	Act.	Exp.	Ratio	Act.	Exp.	Ratio
Male	233	68	342.6%	785	796	98.6%
Female	100	44	227.3	388	449	86.4
Total	333	112	297.3%	1,173	1,245	94.2%

	Mortality-Dis. Lives		
	Act.	Exp.	Ratio
Male	94	39	241.0%
Female	34	25	136.0
Total	128	64	200.0%

Average Retirement Age		
Year	General	Correctional
1976	64.9	58.8
77	64.1	57.7
78	64.0	56.5
79	63.9	57.9

Although the withdrawal chart shows that more withdrawals occur than predicted, additional analysis reveals that very little actuarial gain results because most withdrawals occur among younger employees with little service. Therefore, the MSRS Actuary recommends that no change be made in the assumption.

The death rates among both active employees and age retirees turned out to be less than assumed, especially among active. Since similar results were obtained in the 1975 experience study, a more conservative mortality table is indicated.

On the contrary, the death rates among disabled retirees were considerably larger than assumed. Since the observed number of lives is too small to produce credible results, one might be tempted to play safe and not to make any change. However, since similar results were seen in the 1975 experience study, the MSRS Actuary suggests the use of a less conservative mortality table.

The number of disablements during the period greatly exceeded the number predicted by the assumptions, especially at the older ages. The MSRS Actuary recommends a change in the ratio to fit the actual experience more closely.

The trend in the average retirement age among general employees as well as another analysis (not shown here) suggest increasing the assumed rates of retirement at earlier ages. However, the MSRS Actuary suggests waiting to see the possible effects of the Age Discrimination in Employment Act and of continuing inflation and recommends no change at the present time.

The same reasoning plus changes in the conditions under which correctional employees may continue to work beyond age 55 were the factors behind the change in the assumed average retirement age from 55 to 58.

As frequently happens with these experience studies, no information was given on the rate of return on investments and on salary increases. This omission probably occurs because these two rates are set by statute. We dug into our recent files and found the following figures for the ratio of investment income to mean assets and for the increase in the ratio of the annualized payroll to the number of active participants.

Year	Interest Rate	Average Salary Increase General	Correctional
1976	4.92%	NA	NA
77	5.74%	4.12%	3.22%
78	6.02%	7.82%	3.38%
79	6.95%	5.73%	9.01%

4. Conclusion

The 1979 Valuation and Experience Study filed by MSRS conforms with the requirements of Chapter 356. The results of this valuation indicate that the deficit might be retired in about 11 years with the present level of support. However, the recommended changes in the actuarial assumptions will produce a less favorable picture, and we look forward to seeing the 1980 Report.

Franklin C. Smith
Associate, Society of Actuaries
Commission Actuary

Table 7

MINNESOTA STATE RETIREMENT SYSTEM
STATE EMPLOYEES RETIREMENT FUND

Summary of Principal Plan Provisions as of June 30, 1979

A. GENERAL EMPLOYEES

1.	Coverage:	From first date of employment.
2.	Service Credit:	Service is credited from date of coverage subject to a maximum equal to the greater of: . 40 years of service; or . service earned prior to April 30, 1978
3.	Contributions:	
	a. Employee:	4% of salary.
	b. State of Minnesota:	6% of salary.
4.	Final Average Salary:	Monthly average for the highest 5 successive years of salary.
5.	Normal Retirement:	
	a. Eligibility:	Earlier of: . attainment of age 65 and completion of 10 years of service; or . attainment of age 62 with 30 years of service.
	b. Benefit Amount:	1% of Final Average Salary for each of the first 10 years of service plus 1-1/2% of Final Average Salary for each year of service thereafter.
6.	Early Retirement:	
	a. Eligibility:	Earlier of: . attainment of age 62 and completion of 10 years of service; or . attainment of age 58 and completion of 20 years of service.
	b. Benefit Amount:	Normal Retirement benefit formula based on service and Final Average Salary to date of early retirement but actuarially reduced to reflect payment prior to age 65 (or age 62 if 30 years of service have been completed).

7. Form of Payment: Life annuity with return on death of any balance of contributions over aggregate monthly payments. Actuarially equivalent options are also available.

8. Disability Retirement:

a. Eligibility: Earlier of:

- attainment of age 50 and completion of 5 years of service; or
- completion of 10 years of service.

b. Benefit Amount: Normal retirement benefit formula based on service and Final Average Salary to date of disability retirement.

9. Deferred Service Retirement:

a. Eligibility: Completion of 10 years of service and election to leave employee contributions on deposit.

b. Benefit Amount: Retirement benefits payable at normal retirement date are determined according to the normal retirement benefit formula based on the member's Final Average Salary and service at termination, such amount being subject to an increase for each year between termination and retirement of 5% for years prior to January 1, 1981 and 3% compounded annually thereafter.

10. Return of Contributions: Upon termination of employment, a member may elect the return of contributions in lieu of all other benefits under the plan. Contributions made after the first 3 years of service are credited with 3-1/2% interest compounded annually.

11. Surviving Spouse Death Benefit:

a. Eligibility: Death of member in service who is qualified at that time for early or normal retirement.

b. Benefit Amount: The surviving spouse may elect one of:

- refund of member contributions with 3-1/2% interest; or
- 50% of the annuity the member would have received had he retired early (if eligible) and elected a 50% joint and survivor annuity commencing on his date of death.

12. Repayment of Contributions:

a. Eligible Members: Rehired members who are credited with at least one year of service subsequent to rehire.

b. Repayment Provision: Such rehired member may repay all refundments made to him, including interest at 6% compounded annually. In such case, service previously credited during the prior period of membership is restored.

13. Combined Service Provisions:

a. Eligible Members: Members who have had coverage under two or more Minnesota Public Retirement Systems, with a total of at least 10 years of credited service.

b. Benefit Provisions: Benefits under both plans are based on the highest Final Average Salary including all years from both plans, and on the plans in effect on the member's last day in covered public employment.

14. Proportionate Annuity: Any member who terminates after attaining age 65 and completing at least 3 years of service is entitled to a proportionate retirement annuity based on his allowable service credit.

B. <u>CORRECTIONAL EMPLOYEES</u>

Same as above except:

1. Contributions:

a. Employee: 6% of salary.

b. State of Minnesota: 14% of salary.

2. Normal Retirement:

a. Eligibility: Attainment of age 55 and completion of 10 years of service.

b. Retirement Benefit: General Plan benefit plus an additional benefit defined below.

c. Additional Benefit: Final Average Salary times the sum of:

- 1-1/2% for each of first 10 years of service; plus
- 1% for each of next ten years of service; plus
- 1/2% for each year of service thereafter.

d.	Limitation on Additional Benefit:	That amount which, when added to the General Plan benefit, provides a retirement benefit of 75% of Final Average Salary.
e.	Additional Benefit Period:	84 months or until attainment of age 65, whichever comes first.
f.	Minimum Benefit Following Additional Benefit Period:	That amount which when added to Social Security benefits, equals the benefit payable during the additional benefit period.