

REPORT ON ACTUARIAL VALUATION
MINNESOTA STATE RETIREMENT SYSTEM
JUNE 30, 1977

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TOWERS, PERRIN, FORSTER & CROSBY
ONE CENTURY PLAZA
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January 13, 1978

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

Gentlemen:

We are pleased to transmit herewith our report on the actuarial valuation of your Retirement System made as of June 30, 1977.

Pursuant to the Contract under which this valuation was authorized, the actuarial valuation was carried out on the basis of a 5% interest rate assumption, a 3-1/2% salary scale, and on the basis of certain other specified actuarial assumptions. Also, in accordance with the above noted contract, we utilized the entry age normal cost method of funding to determine the unfunded supplemental present value (unfunded accrued liability) of the System.

We hereby certify that the actuarial valuation of the Minnesota State Retirement System made as of June 30, 1977 was carried out on the basis of accepted actuarial methods and procedures and in accordance with the provisions of Minnesota Statutes, Chapter 356. The results of that valuation indicate that the contributions required from the employees and from the State under Minnesota Statutes, Chapter 352, are adequate to provide the benefits that will be paid from the System.

We look forward to the opportunity of discussing this report with you at your convenience.

Very truly yours,

TOWERS, PERRIN, FORSTER & CROSBY

H.M. Church
Harry M. Church

HMC:ldt

REPORT ON ACTUARIAL VALUATION OF THE
MINNESOTA STATE RETIREMENT SYSTEM
AS OF JUNE 30, 1977

SECTION I
INTRODUCTION

In accordance with the Contract between the State of Minnesota and this firm, we have completed the actuarial valuation of the Minnesota State Retirement System as of June 30, 1977 as it was constituted as of that date.

The Executive Director of the System furnished us with detailed employee information on all active members, inactive members and retired members of the System as of June 30, 1977. The Executive Director and his staff are to be complimented on the accuracy and completeness of the aforementioned data.

The Executive Director also furnished us with a Financial Report setting forth the assets and liabilities of the Fund as of June 30, 1977. No physical audit of these assets was made by us and our calculations are based upon the Financial Report as submitted.

The Society of Actuaries recently recommended that the term "Unfunded Supplemental Present Value" replace the often used, in the past, term "Unfunded Accrued Liability". We are in full agreement with this recommendation and have used the term "Unfunded Supplemental Present Value" throughout this report.

The following Section II sets forth the results of the actuarial valuation and Section III contains the exhibits required by Chapter 356 of the Statutes. The schedules attached at the end of the report show the actuarial assumptions used in the current valuation which were developed during the course of the actuarial investigation carried out as of June 30, 1975.

SECTION II
RESULTS OF ACTUARIAL VALUATION

The Contract under which this valuation was authorized specifies that the actuarial valuation be carried out on the basis of a 5% interest rate assumption, a 3-1/2% salary scale, the 1951 Group Annuity Mortality Table with ages set back one year for Male retirees and set back two years for Female retirees, and upon other appropriate actuarial assumptions. We were also instructed to carry out the actuarial valuation on the basis of an entry age normal cost method of funding.

The current valuation was carried out in accordance with the stipulations contained in the aforementioned Contract and on the basis of the other actuarial assumptions developed by the June 30, 1975 experience study. It is to be noted that we did not reflect the 4% salary increase that became effective July 7, 1977.

The entry age normal cost method of funding requires the determination of the level contribution rate which, if contributed on behalf of all new employees from the dates of employment to the dates of separation from service, will be adequate to provide all of their benefits. Under this funding method, the unfunded supplemental present value is taken as the total liability of the System for benefits earned in the past as well as those earnable in the future, less the assets on hand, less the present value of future employee contributions and less the present value of future State entry age normal cost contributions.

In order to develop the entry age normal cost contribution rate for new Correctional Employees, we carried out a complete valuation of all active members based on their ages at entry and upon their estimated salaries at time of entry. The results of these calculations indicate that the total entry age normal cost rate for Correctional Employees amounts to 11.04% of salary. Correctional Employees are required by law to contribute 6% and, accordingly, the State's share of the entry age normal cost contribution rate for Correctional Employees amounts to 5.04%.

For General Employees, we also carried out a complete valuation of all active members based on their ages at entry and upon their estimated salaries at time of entry. Based on this valuation, we calculated the total entry age normal cost rate to be 7.09%. General Employees are required by law to contribute 4% and, accordingly, the State's share of the entry age normal cost contribution for General Employees amounts to 3.09%.

The law requires that the State make the following contributions to the fund:

1. A "matching contribution equal to 4% of General Employees' salaries and 9% of Correctional Employees' salaries.
2. An "additional" contribution equal to 2% of General Employees' salaries and 5% of Correctional Employees' salaries.

We have been advised that it is the intent of the Minnesota Legislature to pay the "additional" contributions referred to above for a limited time only.

We assigned the State contribution Reserve, prior to adjustment from the MAFB Fund, to Correctional and General Employees in proportion to their accumulated contributions as follows:

	<u>State Contribution Reserve</u>
General Employees	\$123,429,785
Correctional Employees	<u>3,919,033</u>
Total	\$127,348,818

The Accounting Balance Sheet shown on the following page was furnished by the Executive Director.

The Actuarial Balance Sheet shown on the page following the Accounting Balance Sheet summarizes the results of the valuation. In the current valuation we have made provision for administrative expenses amounting to .14% of salaries.

MINNESOTA STATE RETIREMENT SYSTEM

ACCOUNTING BALANCE SHEET

AS OF JUNE 30, 1977

ASSETS

Cash in State Treasury	\$ 54,819.39
Cash in Bank	200.00
Short Term Investments (at Cost)	6,264,295.47
Accounts Receivable:	
(a) Accrued employee contributions	1,025,724.37
(b) Accrued employer contributions	1,571,228.75
(c) Employee buy-backs	178,406.71
(d) Investment maturities and sales	-0-
(e) Due from other plans	54,526.57
(f) Other	5,820.82
(g) Due from MAFB Fund	2,128,201.00
Accrued Interest or Investments	2,168,420.37
Dividends Declared and Payable, but not yet received	354,831.47
Investment in Debt Securities at Amortized Cost	93,898,046.32
Investment in Mortgages at Amortized Cost	4,926,799.64
Investment in Equities at Cost (1)	101,040,866.37
Recognized unrealized appreciation in equities	289,409.37
Equipment at Depreciated Cost	14,565.03
Deferred Yield Adjustment Account	3,258,440.29
Participation in the MAFB Fund	<u>130,188,933.96</u>
Total Assets	<u>\$347,423,535.90</u>

(1) Market Values, June 30, 1977 \$104,133,709

MINNESOTA STATE RETIREMENT SYSTEM

ACCOUNTING BALANCE SHEET

AS OF JUNE 30, 1977

LIABILITIES AND RESERVES

Liabilities:

Accounts Payable:

(a) Security Purchases	\$ 188,488.17
(b) Annuities	1,440.46
(c) Annuitant Deposits	11,172.52
(d) Accrued Expenses	63,990.42
(e) Overpaid Dividends	1,785.00
(f) Transfer to Unclassified Retirement	135,858.45
(g) Due MAFB Fund	-0-

Suspense Item: Unredeemed 6 Year Old Warrants 6,617.16

Total Liabilities \$ 409,312.18

Reserves:

Minnesota Adjustable Fixed Benefit Fund

Actuarial Reserve Requirement \$140,731,017.96

Annuity Stabilization Reserve (10,542,084.00)

Reserve for Benefits \$130,188,933.96

Survivor Benefit Reserve 249,795.00

Employee Contribution Reserve 87,098,476.17

State Contribution Reserve 129,477,018.59

Total Reserves \$347,014,223.72

Total Liabilities and Reserves \$347,423,535.90

MINNESOTA STATE RETIREMENT SYSTEM

ACTUARIAL BALANCE SHEET
AS OF JUNE 30, 1977

ASSETS

1. Assets on Hand from Accounting Balance Sheet:		
a) Participation in MAFB Fund	\$130,188,934	
b) All other assets	<u>215,106,401</u>	\$345,295,335
2. Receivable from MAFB Fund for 1975, 1976 and 1977 Mortality Adjustment		2,128,201
3. Present Value of Employee's Future Contributions		160,343,096
4. Present Value of State Future Contributions Applicable to:		
a) Entry Age Normal Cost	\$124,225,534	
b) Unfunded Supplemental Present Value (Balance of "Matching" Contribution less .14% for Operating Expense)	33,226,629	
c) Unfunded Supplemental Present Value (Portion to be funded by "Additional" Contribution)	<u>130,375,918</u>	<u>287,828,081</u>
5. TOTAL ASSETS		<u><u>\$795,594,713</u></u>

LIABILITIES

6. Current Liabilities from Accounting Balance Sheet		\$ 409,312
7. Present Value of Earned and Earnable Benefits Payable to Presently Active Members:		
a) Retirement Benefits	\$526,003,120	
b) Disability Benefits	30,467,818	
c) Refundments due to death or withdrawal	95,061,375	
d) Surviving Spouse Benefits	<u>6,938,380</u>	658,470,693
8. Present Value of Benefits for Deferred Annuitants:		
a) Retirement Benefits	\$ 5,623,112	
b) Refundments due to death	<u>191,448</u>	5,814,560
9. Present Value of Refundments to former members without vested rights		461,419
10. Present Value of Survivor Benefits		249,795
11. Present Value of Benefits Payable from MAFB Fund Including 1/1/78 Increase		140,731,018
12. MAFBF Annuity Stabilization Account		<u>(10,542,084)</u>
13. TOTAL LIABILITIES		<u><u>\$795,594,713</u></u>

The Actuarial Balance Sheet is a convenient device to present the results of an actuarial valuation. The following comments are intended to assist you in your understanding of the items contained in the Actuarial Balance Sheet.

Item 1 shows the assets on hand and was taken directly from the Accounting Balance Sheet.

Item 2 shows the amount receivable from the MAFB Fund for the 1975, 1976 and 1977 mortality adjustment.

Item 3 shows the present value of members' future contributions required by law.

Item 4 shows the present value of the State's future contributions to the System. We have divided the present value applicable to the State's contributions as follows:

Item 4(a) The portion attributable to the State's share of the total entry age normal cost contribution of 3.09% of General Employees' salaries and 5.04% of Correctional Employees' salaries.

Item 4(b) The portion attributable to the balance of the State's "matching" contribution less .14% which is allocated for operating expenses. This amounts to .77% of General Employees' salaries and 3.82% of Correctional Employees' salaries.

Item 4(c) The portion attributable to the State's "additional" contribution. The following table shows the required information for Correctional Employees and for General Employees.

	<u>Correctional Employees</u>	<u>General Employees</u>	<u>Total</u>
1. Annualized Salaries July 1, 1977	\$12,399,792	\$470,803,712	\$483,203,504
2. State "Additional" contribution rate	5%	2%	
3. Annual State "Additional" contribution	619,990	9,416,074	10,036,064
4. Item 3(c) Actuarial Balance Sheet	4,157,040	126,218,878	130,375,918
5. Years (to nearest year) required to amortize Item 3(c) of Actuarial Balance Sheet by "Addi- tional" State Contribu- tions which increase in accordance with salary scale	7	15	14
6. First year annual con- tribution with subsequent salary scale increases required to amortize Item 3(c) of Actuarial Balance Sheet over Period Ending June 30, 1997	240,332	7,297,119	7,537,451
7. Total Unfunded Supple- mental Present Value (Item 3(b) plus Item 3(c) of Actuarial Balance Sheet)	7,540,039	156,062,508	163,602,547

Item 6 shows the current liabilities and was taken directly from the Accounting Balance Sheet.

Item 7 shows the actuarially computed present value of all benefits earned to June 30, 1977 and earnable after that date that will be paid from the System to presently active members.

Item 8 shows the actuarially computed present value of all benefits payable from the System to members who have terminated service with vested benefits.

Item 9 shows the actuarially computed present value of refundments that will be paid from the System to members who have terminated service without vested benefits.

The total of \$140,731,018 shown for Item 11 represents the value of benefits payable from the MAFB to MSRS retirees. The 4% increase that will become effective January 1, 1978 for certain retirees as of June 30, 1977 is included.

Item 12 shows the difference between the MAFB Fund participation and the present value of benefits payable from the MAFB Fund after adjustments for the January 1, 1978 increase in benefits and after adjustment for the 1977 mortality gain. The following schedule shows the determination:

1.	MAFB Fund Participation June 30, 1977	\$132,317,135
2.	Transfer from MAFB Fund to MSRS Fund for:	
	(a) 1975 and 1976 mortality adjustment	1,628,612
	(b) 1977 mortality gain	<u>499,589</u>
	(c) Total	<u>2,128,201</u>
3.	MAFB Fund Participation after Transfers (Item 1 - Item 2)	130,188,934
4.	Present Value of Benefits Payable from MAFB Fund:	
	(a) June 30, 1977 benefits	136,025,416
	(b) Increase effective January 1, 1978	<u>4,705,602</u>
	(c) Total	<u>140,731,018</u>
5.	MAFB Annuity Stabilization Account (Item 3 - Item 4)	(10,542,084)

CONCLUSIONS

In a retirement system such as yours where both the benefits and contributions are specified in the Retirement Law, the major purpose of an actuarial valuation is to determine whether or not the prescribed contributions are adequate to provide the benefits that will ultimately be paid under the system. The results of the current valuation show that the benefits to be provided under the System can be financed by the members' contributions and the State's "matching" contributions plus the State's "additional" contribution for approximately fourteen years.

Based on the actuarial assumptions utilized for the current valuation, we estimate the present value of benefits earned to June 30, 1977 by presently active and retired persons to be \$407,419,863. Applicable assets, including \$12,670,285 due from the MAFB Fund, amount to \$357,556,308. Thus, as of June 30, 1977, 87.8% of the liability for benefits earned to date have been funded. This corresponds to 80.7% as of June 30, 1976.

SECTION III
REQUIRED EXHIBITS

Minnesota Statutes, Chapter 356, requires, in Section 356.20, Subdivision 4(1), that the actuary of the System prepare an exhibit setting forth certain specified information with regard to the System as of the valuation date, including "Reserves Required" under the System. In an earlier conference with representatives of the State's Employee Retirement System's Interim Commission, we were advised that "Reserve Required", as contemplated in the aforementioned statute, may be defined as the actuarially computed present value applicable to a specified benefit reduced by the actuarially computed present value of any portion of the total entry age normal cost contribution under the System which is applicable to the specified benefit.

The exhibit required by Section 356.20, Subdivision 4(1) of Minnesota Statutes, Chapter 356, is presented on the following pages of this Section III and we hereby certify that the Reserves Required set forth therein have been computed in accordance with the Entry Age Normal Cost (level Normal Cost) basis in the manner outlined in the definition referred to above.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES CHAPTER 356,
SECTION 356.20, SUBDIVISION 4(1)
AS OF JUNE 30, 1977

ASSETS AND UNFUNDED SUPPLEMENTAL PRESENT VALUE

ASSETS

1. Cash	\$ 55,019.39
2. Short term investments (at cost)	6,264,295.47
3. Accounts Receivable:	
(a) Accrued employee contributions	1,025,724.37
(b) Accrued Employer contributions	1,571,228.75
(c) Employee back payments	178,406.71
(d) Due from other plans	54,526.57
(e) Other	5,820.82
4. Receivable from MAFB Fund for 1975, 1976 and 1977 Mortality Adjustment	2,128,201.00
5. Accrued interest in investments	2,168,420.37
6. Dividends declared and payable but not yet received	354,831.47
7. Investments in debt securities at amortized cost	98,824,845.96
8. Investment in equities at cost	101,040,866.37
9. Recognized unrealized appreciation in equities	289,409.37
10. Equipment at depreciated cost	14,565.03
11. Deferred yield adjustment account	3,258,440.29
12. Participation in the MAFB Fund	<u>130,188,933.96</u>
13. Total Assets	<u>\$347,423,535.90</u>

UNFUNDED SUPPLEMENTAL PRESENT VALUE

14. Unfunded Supplemental Present Value to be funded by portion of State's "Matching Contribution" in excess of State's share of entry age normal cost contribution and Operating Expenses	\$ 33,226,629.00
15. Unfunded Supplemental Present Value to be funded by State's "Additional" contribution	<u>130,375,918.28</u>
16. Total Unfunded Supplemental Present Value	<u>163,602,547.28</u>
17. TOTAL ASSETS AND UNFUNDED SUPPLEMENTAL PRESENT VALUE	<u>\$511,026,083.18</u>

CURRENT LIABILITIES AND RESERVES REQUIRED

CURRENT LIABILITIES

18. Accounts payable:	
(a) Security purchases	\$ 188,448.17
(b) Annuities	12,612.98
(c) Accrued expenses	65,775.42
(d) Transfer to unclassified employee retirement	135,858.45
19. Suspense item: Unredeemed 6 year old warrants	6,617.16
20. MAFBF Annuity Stabilization Account	(10,542,084.00)
21. Total Liabilities	<u>\$(10,132,771.82)</u>

RESERVES REQUIRED

22. Total Reserves Required per attached schedule	<u>\$521,158,855.00</u>
23. TOTAL CURRENT LIABILITIES AND RESERVES REQUIRED	<u>\$511,026,083.18</u>

NOTE: Accumulated contributions, without interest, of members not yet retired amounted to \$87,098,476.17 as of June 30, 1977.

MINNESOTA STATE RETIREMENT SYSTEM
DETERMINATION OF RESERVES REQUIRED
AS OF
JUNE 30, 1977

	(1)	(2)	(3)
	Present Value of Benefits	Present value of Applicable Portion of Normal Cost Contribution	Reserves Required (1) - (2)
<u>Benefits For:</u>			
1. Active Members:			
(a) Retirement Benefits	\$526,003,120	\$184,813,233	\$341,189,887
(b) Disability Benefits	30,467,818	19,150,809	11,317,009
(c) Refundments due to death or withdrawal	95,061,375	77,891,531	17,169,844
(d) Surviving Spouse Benefits	6,938,380	2,713,057	4,225,323
2. Deferred Annuitants	5,814,560	--	5,814,560
3. Former Members Without Vested Rights	461,419	--	461,419
4. Survivors	249,795	--	249,795
5. Benefits Payable from MAFB Fund	<u>140,731,018</u>	<u>--</u>	<u>140,731,018</u>
6. Total	\$805,727,485	\$284,568,630	\$521,158,855

Minnesota Statutes, Chapter 356, requires, in Section 356.20, Subdivision 4(2) and (3), that there be submitted annually an analysis of the System's income and deductions from income with increases in total reserves required being specifically referred to as a deduction from income. The exhibit required by Section 356.20, Subdivision 4(2) and (3) is presented on the following page of this Section IV. Items of income and deductions from income with the exception of increases in total reserves required were taken directly from statements prepared by the Executive Director.

Inasmuch as any excess of "income" over "deductions from income" must be equal to the reduction in the Unfunded Supplemental Present Value System over the period covered by the analysis, we have confirmed that fact in Item 16 of the exhibit.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES CHAPTER 356
SECTION 356.20, SUBDIVISION 4(2) AND (3)
FISCAL YEAR ENDING JUNE 30, 1977

ANALYSIS OF INCOME AND DEDUCTIONS FROM INCOME

INCOME

1. <u>From Employees</u>		
Employee contributions		\$ 18,027,082.72
Employee accrued contributions receivable		1,025,724.37
Employee contributions, accounts receivable		61,926.59
2. <u>From Employers</u>		
Employers contributions		18,384,886.04
Employer additional contributions		9,234,395.92
Employer accrued contributions receivable		1,571,228.75
3. <u>From Investments</u>		
Interest on securities		7,381,479.92
Dividends on corporate stock		4,140,831.96
Recognized unrealized appreciation in stock		(847,232.88)
Gain on sale of securities		(335,364.56)
Interest on back payments by employees		150,733.46
4. <u>From MAFB Fund Participation</u>		
Participation in MAFB Fund income		13,162,689.08
MAFB Fund Prior Year Adjustments		6,315,763.84
5. <u>Other Revenues</u>		
Miscellaneous		1,428.83
General Fund Appropriation - Benefits		2,216,377.00
6. TOTAL INCOME		<u>\$ 80,491,951.04</u>

DEDUCTIONS FROM INCOME

7. Increase in MAFBF Annuity Stabilization Account		\$ (6,030,462.00)
8. <u>Benefits</u>		
Service retirement annuities		14,493,689.18
Disability retirement benefits		642,791.68
Survivor benefits (spouses)		29,380.20
9. <u>Refundments (Employee Contributions)</u>		
Left service		3,654,452.66
Employee deaths and annuitant deaths		303,877.91
Erroneous deductions		27,364.40
Interest on contributions		163,771.16
10. <u>Transfer to Unclassified Employee Retirement</u>		1,936,253.77
11. <u>Operating Expenses</u>		721,493.26
12. <u>Prior Year Adjustments</u>		1,519.28
13. <u>Increase in Total Reserves Required</u>		
Reserves Required 6-30-76	\$470,431,642.00	
Reserves Required 6-30-77	<u>521,158,855.00</u>	<u>50,727,213.00</u>
14. TOTAL DEDUCTIONS FROM INCOME		<u>66,671,344.50</u>
15. EXCESS OF INCOME OVER DEDUCTIONS FROM INCOME		13,820,606.54
16. REDUCTION IN UNFUNDED SUPPLEMENTAL PRESENT VALUE:		
Unfunded Supplemental Present Value 6-30-76	\$177,423,153.82	
Unfunded Supplemental Present Value 6-30-77	<u>163,602,547.28</u>	<u>\$ 13,820,606.54</u>

Minnesota Statutes, Chapter 356, requires, in Section 356.20, Subdivision 4(4), that there be submitted annually an analysis of changes in the membership of the System. Section 356.215, Subdivisions 4 and 5, requires information with respect to the annual payroll and annual annuities of the members of the System as well as certain information with respect to average ages. The exhibit required by Section 356.20, Subdivision 4 and Section 356.215, Subdivisions 4 and 5 is presented on the following pages of this Section IV. All of the information was taken directly from an exhibit prepared by the Executive Director.

MINNESOTA STATE RETIREMENT SYSTEM
GENERAL PLAN
COVERED EMPLOYEE STATEMENT
FISCAL YEAR 1977
As Required by Minnesota Statutes, Chapter 356

	<u>Number</u>	<u>Annualized Payroll</u>
Active at July 1, 1976	40,186	\$441,481,072.78
New Entrants*	<u>7,058</u>	60,455,148.20
Total	47,244	
Less Separations from Active Service:		
Refund of Contributions*	4,901	39,655,344.00
Separation with a Vested Right to a Deferred Annuity	70	726,889.17
Separation with Neither Refundment Nor Right to a Deferred Annuity	1,064	5,776,196.86
Disability	87	980,771.69
Death*	88	1,014,601.30
Service Retirement	566	6,953,362.90
Death While Eligible Annuity	<u>6</u>	103,726.00
Total Separations	6,782	
Active at June 30, 1977	40,462	470,814,459.28

AVERAGE ENTRY AGE OF NEW EMPLOYEES

<u>For the Fiscal Year Ending</u>	<u>Male</u>	<u>Female</u>	<u>Average of Total</u>
6/30/73	30 yrs. 4 mos.	27 yrs. 7 mos.	28 yrs. 6 mos.
6/30/74	29 yrs. 10 mos.	27 yrs. 10 mos.	28 yrs. 6 mos.
6/30/75	30 yrs. 2 mos.	28 yrs. 1 mo.	28 yrs. 10 mos.
6/30/76	28 yrs. 1 mo.	26 yrs. 0 mo.	26 yrs. 9 mos.
6/30/77	28 yrs. 6 mos.	26 yrs. 3 mos.	27 yrs. 1 mo.

Average age at entry in State service for all active employees at 6/30/76

Average Male 29 yrs. 11 mos.

Average Female 28 yrs. 5 mos.

Total Average 29 yrs. 1 mo.

*Includes new and separated same year.

CORRECTIONAL RETIREMENT PLAN
COVERED EMPLOYEE STATEMENT
FISCAL YEAR 1977
As Required by Minnesota Statutes, Chapter 356

	<u>Number</u>	<u>Annualized Payroll</u>
Active at July 1, 1976	926	\$11,733,926.72
New Entrants*	<u>187</u>	1,967,408.58
Total	1,113	
Less Separations from Active Service:		
Refundment of Contributions*	121	1,261,419.57
Separation with Deferred Annuity	0	-
Separation with Neither Refundment or Deferred Annuity	20	197,380.80
Death	1	10,293.54
Disability Retirement	1	12,584.00
Service Retirement	<u>38</u>	517,073.44
Total Separations	181	
Active at June 30, 1977	932	12,399,809.96

AVERAGE ENTRY AGE OF NEW EMPLOYEES

<u>For the Fiscal Year Ending</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
6/30/74	29 yrs. 4 mos.	25 yrs. 2 mos.	28 yrs. 8 mos.
6/30/75	29 yrs. 5 mos.	29 yrs. 7 mos.	29 yrs. 5 mos.
6/30/76	27 yrs. 0 mos.	25 yrs. 6 mo.	26 yrs. 9 mos.
6/30/77	29 yrs. 2 mo.	28 yrs. 6 mo.	27 yrs. 5 mos.

Average Entry Age for All Active Employees at 6/30/77:

<u>Male</u>	<u>Female</u>	<u>Total</u>
28 yrs. 10 mos.	27 yrs. 3 mos.	28 yrs. 5 mos.

*Includes new and separated same year.

MINNESOTA STATE RETIREMENT SYSTEM
GENERAL PLAN
ANNUITANT STATEMENT AT JUNE 30, 1977
As Required by Minnesota Statutes, Chapter 356

	<u>Number</u>	<u>Annual Annuity Benefit Payable</u>
(1) SERVICE RETIREMENT ANNUITANTS*		
Receiving at June 30, 1976	6,464	\$12,342,186.72
New	619	1,449,925.68
	7,083	13,792,112.40
Deaths	249	466,261.92
	6,834	13,325,850.48
Adjustments-Net Result	2	312,526.44
Receiving at June 30, 1977	6,836	13,638,376.92
(2) DISABLED EMPLOYEES		
Receiving at June 30, 1976	348	526,559.88
New	92	177,513.60
	440	704,073.48
Deaths	36	69,112.92
	404	634,960.56
Disability Rescinded	2	2,034.60
	402	632,925.95
Adjustments-Net Result	1	8,030.64
Receiving at June 30, 1977	401	640,956.60
(3) WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT		
A. Beneficiaries Receiving an Optional or Reversionary Annuity		
Receiving at June 30, 1976	226	287,085.00
New	28	60,821.16
	254	347,906.16
Deaths	6	5,424.36
	248	342,481.80
Adjustments-Net Results	0	10,579.08
Receiving at June 30, 1977	248	353,060.88
B. Spouses Receiving a Survivor Benefit		
Receiving at June 30, 1976	24	26,932.80
Adjustments-Net Result	0	2,511.60
Receiving at June 30, 1977	24	29,444.40
(4) CHILDREN RECEIVING A SURVIVOR BENEFIT		
Receiving at June 30, 1977	None	

	<u>Number</u>	<u>Annual Annuity Benefit Payable</u>
(5) DEFERRED ANNUITANTS*		
Deferred as of June 20, 1976	461	\$ 916,687.18
New	116	268,462.40
	<u>577</u>	<u>1,185,149.58</u>
Began Receiving	33	36,706.08
	<u>544</u>	<u>1,149,073.50</u>
Adjustments (Withdrawals)	25	32,887.28
		<u>32,887.28</u>
Deferred as of June 30, 1977	519	\$ 1,116,185.22

AVERAGE AGE AT RETIREMENT OF NEW SERVICE ANNUITANTS

<u>FISCAL YEAR ENDING</u>	<u>AVERAGE RETIREMENT AGE</u>
6/30/72	66 yrs. 3 mos.
6/30/73	65 yrs. 11 mos.
6/30/74	65 yrs. 4 mos.
6/30/75	65 yrs. 2 mos.
6/30/76	64 yrs. 11 mos.
6/30/77	64 yrs. 1 mos.

AVERAGE AGE AT RETIREMENT OF ALL EXISTING SERVICE ANNUITANTS

65 yrs. 6 mos.

- * Deferred Annuities refers to those inactive members who have a vested right to receive an annuity at some later date. The Deferred Annuitants listed in prior years reports were those that were inactive with vested rights at the time they began receiving their annuities. These people are reported with the Service Retirement Annuitants this year.

CORRECTIONAL RETIREMENT PLAN
ANNUITANT STATEMENT AT JUNE 30, 1977
As Required by Minnesota Statutes, Chapter 356

	<u>Number</u>	<u>Annual Annuity Benefit Payable</u>
(1) SERVICE RETIREMENT ANNUITANTS		
Receiving at June 30, 1976	162	\$739,642.08
New	38	202,925.28
	<u>200</u>	<u>942,567.36</u>
Deaths	3	16,123.80
	<u>197</u>	<u>926,443.16</u>
Adjustments-Net Results	0	23,894.16
Receiving at June 30, 1977	197	902,549.40
(2) DISABLED EMPLOYEES		
Receiving at June 30, 1976	2	4,849.56
New	1	1,194.72
	<u>3</u>	<u>6,044.28</u>
Deaths	None	
Receiving at June 30, 1977	3	6,044.28
(3) WIDOWS RECEIVING AN ANNUITY OR SURVIVOR BENEFIT		
A. Beneficiaries Receiving an Optional or Reversionary Annuity		
Receiving at June 30, 1976	None	
New	1	2,446.68
Receiving at June 30, 1977	1	2,446.68
B. Spouses Receiving a Survivor Benefit	None	
(4) CHILDREN RECEIVING A SURVIVOR BENEFIT	None	
(5) DEFERRED ANNUITANTS		
Receiving at June 30, 1976	1	4,787.76
Receiving at June 30, 1977	1	4,787.76

AVERAGE AGE AT RETIREMENT

New Service Annuitants
Fiscal Year Ending

Average Retirement Age

6/30/74

62 yrs. 3 mos.

6/30/75

60 yrs. 4 mos.

6/30/76

58 yrs. 9 mos.

6/30/77

57 yrs. 1 mo.

All Existing Service Annuitants

59 yrs. 6 mos.

Section 356.215, Subdivision 4 of the Minnesota Statutes requires an analysis of the increase or decrease in the Unfunded Supplemental Present Value that occurred since the last valuation. This exhibit is shown on the following page.

MINNESOTA STATE RETIREMENT SYSTEM

EXHIBIT REQUIRED BY MINNESOTA STATUTES, CHAPTER 356,
SECTION 356.215, SUBDIVISION 4
FISCAL YEAR ENDING JUNE 30, 1977

1.	Unfunded Supplemental Present Value June 30, 1976		\$177,423,154
2.	Change due to current rate of funding and interest requirement:		
	(a) 1976-77 Past Service Contribution	\$11,808,280	
	(b) 5% interest requirement	<u>8,871,158</u>	- 2,937,122
3.	Change due to actuarial gains (-) or losses (+) because of 1976-77 experience deviations from expected:		
	(a) Mortality of Retired Persons*	- 2,128,201	
	(b) Excess interest earnings	- 1,310,856	
	(c) Recognized Unrealized Appreciation	+ 847,233	
	(d) Withdrawals	- 992,902	
	(e) Age and Service retirements	+ 936,436	
	(f) Disability retirements	+ 90,742	
	(g) Deaths in active service	- 877,307	
	(h) Salary increases	<u>+ 2,120,128</u>	- 1,314,727
4.	Change due to 1976-77 entrants		- 2,827,500
5.	Change due to rescinding 1976 statutory mortality loss		- 12,058,953
6.	Change due to new EANC rates (balancing item)		+ 5,317,695
7.	Unfunded Supplemental Present Value June 30, 1977		\$163,602,547

* Includes adjustments for 1975, 1976 and 1977.

SCHEDULE 1

Male General Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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	
45	410	35	2	
46	390	38	3	
47	370	41	4	
48	350	44	5	
49	340	48	6	

SCHEDULE 1

Male General Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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

SCHEDULE 2

Female General Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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	
45	630	15	3	
46	590	17	4	
47	560	19	4	
48	530	21	4	
49	500	23	5	

SCHEDULE 2

Female General Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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

SCHEDULE 3

Male Correctional Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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	
45	410	35	2	
46	390	38	3	
47	370	41	4	
48	350	44	5	
49	340	48	6	

SCHEDULE 3

Male Correctional Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
50	320	52	7	
51	300	57	8	
52	280	63	10	
53	260	70	12	
54	240	77	14	
55				10,000

SCHEDULE 4

Female Correctional Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
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	
45	630	15	3	
46	590	17	4	
47	560	19	4	
48	530	21	4	
49	500	23	5	

SCHEDULE 4

Female Correctional Members

Probabilities of Separation From Active Service

(Number Separating at Each Age Per 10,000 Working at That Age)

<u>Age</u>	<u>Withdrawal</u>	<u>Death</u>	<u>Disability</u>	<u>Age and Service Retirement</u>
50	470	25	5	
51	440	27	6	
52	410	30	7	
53	390	33	8	
54	360	36	10	
55				10,000

June 22, 1978

MSRS VALUATION AS OF JUNE 30, 1977

The purpose of this memorandum is to discuss the valuation report of the Minnesota State Retirement System dated January 13, 1978 which was submitted to the Commission in accordance with Chapter 356 of Minnesota Laws 1974. The valuation was made using the entry age normal cost method and assuming 5% interest. The report was prepared by Harry M. Church of Towers, Perrin, Forster and Crosby, Consulting Actuaries.

This memo contains the following:

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

1. Statistical and Valuation Data

Results of the valuation reports as of June 30, 1976 and June 30, 1977 are shown for comparative purposes. Figures are rounded where necessary for simplicity of presentation.

	As of June 30, 1976	As of June 30, 1977
(1) <u>Membership</u>		
Active Members	41,112*	41,394*
Inactive Members	3,802	3,664
Retired Members	6,626	7,033
Disabled Members	350	404
Survivors of Deceased Members	250	273
Deferred Vested	461	520

*Including correctional employees numbering 926 and 932, respectively.

(2) Payroll and Annuities Payable

Total Annualized Payroll	\$461.0 Million	\$483.2 Million
Annuities (annual)	13.9 Million	15.6 Million

(3) Valuation Balance Sheet

Accrued Liability	\$470.4 Million	\$521.2 Million
Assets	293.0 Million	357.6 Million
Unfunded Accrued Liability (Deficit)	\$177.4 Million*	\$163.6 Million*

Funding Ratio (Ratio of Assets to Accrued Liability)	62.3% 59.2%	68.4% 62.3%
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*\$156.1 Million for regular employees and \$7.5 Million for correctional employees compared with 1976 figures of \$168.7 Million and \$8.7 Million, respectively.

Percent of Covered Payroll				
	As of June 30, 1976		As of June 30, 1977	
	<u>Regular</u>	<u>Correctional</u>	<u>Regular</u>	<u>Correctional</u>
(4) <u>Normal Cost and Funding Costs</u>				
Normal Cost	7.30%	10.78%	7.09%	11.04%
Expenses	<u>.14</u>	<u>0.14</u>	<u>.14</u>	<u>.14</u>
Normal Cost plus Expenses	7.44%	10.92%	7.23%	11.18%
Normal Cost plus Expenses	7.44%	10.92%	7.23%	11.18%
Interest on Deficit	<u>1.88</u>	<u>3.62</u>	<u>1.66</u>	<u>3.04</u>
Total ("Minimum Contribution")	9.32%	14.54%	8.89%	14.22%
Normal Cost plus Expenses	7.44%	10.92%	7.23%	11.18%
Amortization by 1997	<u>2.79</u>	<u>5.39</u>	<u>2.53</u>	<u>4.65</u>
Total ("Required Contribution")	10.23%	16.31%	9.76%	15.83%
(5) <u>Statutory Contributions</u>				
Employee	4.0%	6.0%	4.0%	6.0%
Employer Regular	4.0	9.0	4.0	9.0
Employer Additional	<u>2.0</u>	<u>5.0</u>	<u>2.0</u>	<u>5.0</u>
Total Contributions	10.0%	20.0%	10.0%	20.0%
(6) Investment Yield (A)	4.92%		5.74%	

(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 decrease in the normal cost rate is the composite result of a small decrease for previous participants coupled with a substantially lower rate for new entrants (6.65%). The decrease in the deficit together with a larger payroll has produced the reduction in the amortization contribution for the regular group from 2.79% to 2.53%. A similar reduction occurred in the amortization figures for the correctional group.

Attention is directed to the fact that this year's report shows the actual support and the required support for the regular group to be in balance contrasted to a slight imbalance in 1976.

During the year, the unfunded accrued liability decreased from \$177,423,154 to \$163,602,547, a decrease of \$13,820,607. The MSRS Actuary gave the following analysis of the net decrease:

Decreases:

Amortization Contribution	\$2,937,122	
Excess Interest	1,310,856	
Deviations in Terminations	992,902	
Mortality Gain - Active Lives	877,307	
Mortality Gains and Adjustments		
- Retired Lives	14,187,154	
Effect of New Entrants	<u>2,827,500</u>	
Total Decreases		\$23,132,841

Increases:

Change in Recognized Unrealized		
Appreciation	\$ 847,233	
Deviation in Retirements	936,436	
Deviation in Disablements	90,742	
Salary Scale Loss	2,120,128	
New Normal Cost Rates	<u>5,317,695</u>	
Total Increases		<u>9,312,234</u>

Net Decrease \$13,820,607

3. Conclusion

The 1977 Valuation Report filed by MSRS conforms with the requirements of Chapter 356. The material on the financing of the deficit is presented in a manner different from that used on the reports of the other funds, but it can easily be recast in the usual form.

Franklin C. Smith
Associate, Society of Actuaries
Stennes & Associates, Inc.
Commission Actuaries