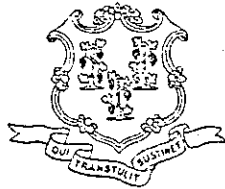


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**State of Connecticut**

STATE EMPLOYEES  
RETIREMENT COMMISSION  
OFFICE OF THE STATE COMPTROLLER  
55 ELM STREET  
HARTFORD CONNECTICUT 06106  
203-566-2126

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November 20, 1990

Honorable John B. Larson  
President Pro Tempore, State Senate  
Honorable Richard J. Balducci  
Speaker, House of Representatives  
State Capitol  
Hartford, CT 06106

Dear Senator Larson and Representative Balducci:

In accordance with Section 5-165a(a) of the Connecticut General Statutes, the Connecticut State Employees Retirement Commission is required to certify annually to the General Assembly the amount necessary, on the basis of an actuarial determination, to gradually establish and subsequently maintain the State Employees Retirement Fund.

In that connection, the Commission's consulting actuaries, Milliman & Robertson, Inc., have determined that the 1991-1992 funding requirement is \$431,236,846.

Accordingly, the Commission, at its November 15, 1990 meeting took the following action:

To accept the certification amount from Milliman & Robertson, Inc., which indicated a full funding cost of \$431,236,846. It is understood that the State will be reimbursed for a portion of this funding cost by the federal government and State funds other than the general fund.

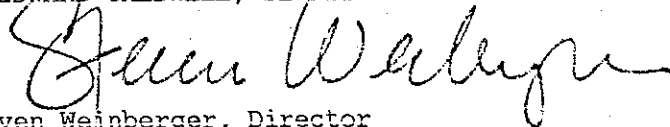
Along these lines, the Accounting Systems Division of the State Comptroller's Office has notified the Commission that the estimated reimbursement amount for the 1991-1992 fiscal year is \$55,000,000.

Enclosed is a summary of the actuarial certification and the estimated benefit cost reimbursement.

Very truly yours,

STATE EMPLOYEES RETIREMENT COMMISSION  
J. EDWARD CALDWELL, SECRETARY EX OFFICIO

BY:

  
Steven Weinberger, Director  
Retirement Division

SW/md

Enclosure

CC: Hon. Joseph H. Harper, Jr.  
Hon. William R. Dyson



## MILLIMAN & ROBERTSON, INC.

Actuaries and Consultants

Three Corporate Place  
Bloomfield, Connecticut 06002  
Telephone: 203/243-1138  
Fax: 203/286-0564

November 14, 1990

### CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

#### Actuarial Valuation

This is to certify that we have prepared an actuarial valuation of the Connecticut State Employees Retirement System as of June 30, 1990.

The valuation was made with respect to the following Members:

- a. 23,718 Retired Members and Beneficiaries.
- b. 54,926 Active Members with total annual payroll as of July 1, 1990 of \$1,802.9 million.
- c. 658 inactive employees with vested rights.

Based on the above data and the attached actuarial method and assumptions, we determined the following assets and liabilities as of the valuation date:

1. Actuarial Liability:	
a. Active Members	\$2,967,291,638
b. Retired Members and Beneficiaries	2,645,802,734
c. Vested Former Members	<u>11,567,708</u>
d. Total	5,624,662,080
2. Assets in Fund (at adjusted cost value)	2,972,748,082
3. Unfunded Liability: (1d)-(2)	2,651,913,998
4. Present Value of Vested Benefits	4,163,152,691

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Internationally WOODROW MILLIMAN

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Based on the valuation as of June 30, 1990, projected costs were developed for the Fiscal Year beginning July 1, 1991 as follows:

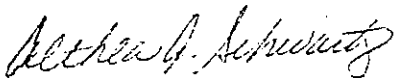
1. Employer Normal Cost	
Tier I	\$103,427,752
Tier II	<u>76,577,270</u>
Total	180,005,022
2. Payment on Unfunded Liability*	239,373,172
3. Adjustment for Retirement Incentive Bonus	11,858,652
4. Total Required State Contribution for Fiscal Year beginning July 1, 1991	\$431,236,846

\* Based on amortization of the Unfunded Actuarial Liability to be completed by June 30, 2026.

MILLIMAN & ROBERTSON, INC.



Eugene M. Kalwarski, F.S.A.  
Consulting Actuary



Althea A. Schwartz, F.S.A.  
Consulting Actuary

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RETIREMENT

SEP 17 5 45 AM '90

To: Steven Weinberger, Director  
Retirement Division  
Office of the State Comptroller  
55 Elm Street Hartford, Connecticut 06106

From: Margonis Janaus, Director  
Accounting Systems Division  
Office of the State Comptroller  
55 Elm Street. Hartford, Connecticut 06106

Date: September 14, 1990

566-4265

Subject: 1991-92 Estimated Recovery of Retirement Contributions -  
Federal Grants and Other Funds

The 1991-92 recovery of Retirement Contributions from Federal Grants and Other Funds has been estimated at \$55,000,000. This estimate is based on estimated fringe benefit cost recovery rates and the maintenance of current levels of personal service expenditures in the area of Federal Grants and Funds other than the General Fund. Not included in this estimated are recoveries involving the Transportation Fund (1201).

  
\_\_\_\_\_  
Margonis Janaus  
Director, Accounting Systems Division

MJ:RWK:jrv  
cc: B. McLoughlin  
M. Schillinger  
N. Stearns  
W. Olender

**ERRATA**

**ACTUARIAL VALUATION**  
**CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM**  
at June 30, 1990

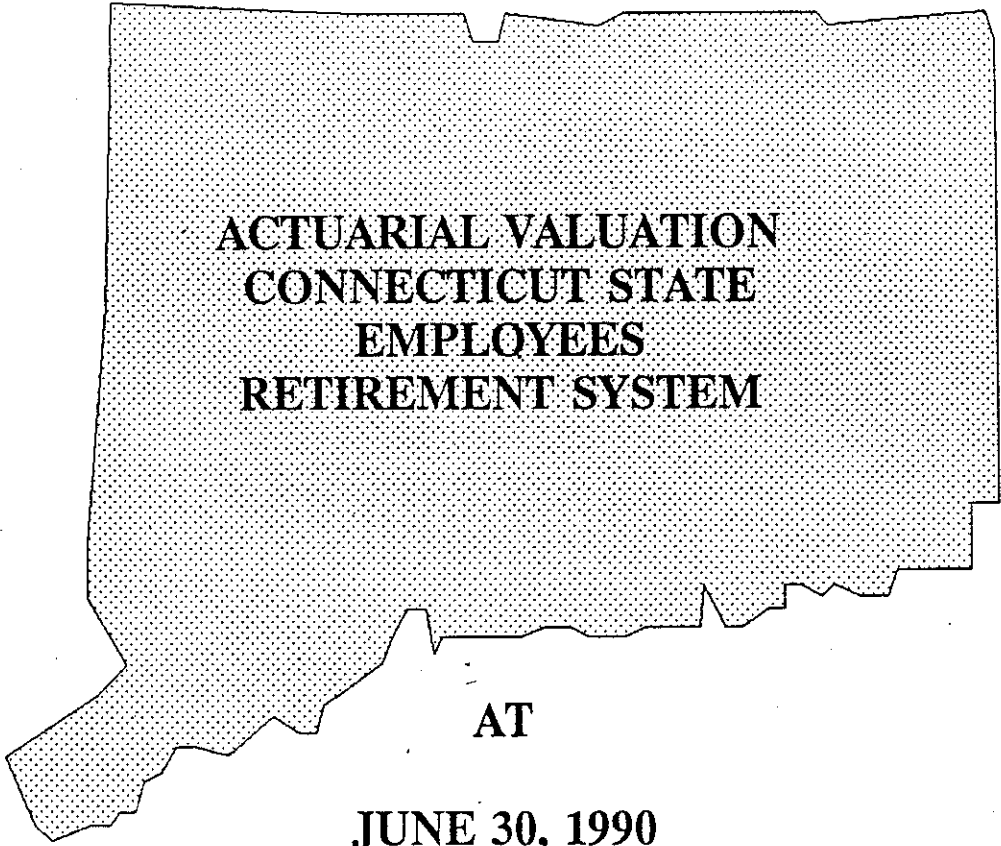
**Line 9, Page I-4**

"increase due to liability gains and membership profile" should read "increase due to liability losses and membership profile, with about 6.4 million representing the cost of benefit improvements due to the Arbitrator's Award"

**Bottom 2 Lines, Page II-2**

13.40% should be 15.00%

Down 3.11% should be Down 4.71%



**ACTUARIAL VALUATION  
CONNECTICUT STATE  
EMPLOYEES  
RETIREMENT SYSTEM**

**AT**

**JUNE 30, 1990**



Milliman & Robertson, Inc.  
Actuaries and Consultants

**ACTUARIAL VALUATION OF THE  
CONNECTICUT STATE EMPLOYEES  
RETIREMENT SYSTEM**

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**TABLE OF CONTENTS**

**Section**

-	Letter of Transmittal
I	Executive Summary
II	System Assets
III	System Liabilities and Accounting Information
IV	System Contributions

**APPENDICES**

A	Summary Statistics on System Membership
B	Summary of Plan Provisions
C	Actuarial Method and Assumptions
D	Actuarial Surplus Test
E	Entry Age Normal Valuation Results





**MILLIMAN & ROBERTSON, INC.**

Actuaries and Consultants

Three Corporate Place  
Bloomfield, Connecticut 06002  
Telephone: 203/243-1138  
Fax: 203/286-0564

November 12, 1990

State of Connecticut  
State Employees Retirement Commission  
55 Elm Street  
Hartford, CT 06106

Re: Connecticut State Employees Retirement System

Members of the Commission:

At your request, we have made an actuarial valuation of the Connecticut State Employees Retirement System as of June 30, 1990. The results of the valuation are contained in the following report.

Section I contains an Executive Summary in which we present the principal results of this valuation. Details regarding system assets, liabilities, and costs are found in Sections II, III, and IV, respectively. The Appendices contain information regarding System membership, an outline of the benefit provisions, a description of the actuarial methods and assumptions employed in this valuation, details on the Actuarial Surplus as of June 30, 1990, and Entry Age Normal Results.

As summarized in Section IV, the recommended contribution for the fiscal year beginning July 1, 1991, including Federal reimbursements, is \$431,236,846.

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November 12, 1990

Re: Connecticut State Employees Retirement System

Page 2

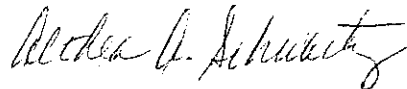
In our opinion, this report fairly presents the financial and actuarial position of the Connecticut State Employees Retirement System at June 30, 1990. On the basis of the foregoing, we hereby certify that, to the best of our knowledge, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices set forth by the American Academy of Actuaries.

Respectfully submitted,

MILLIMAN & ROBERTSON, INC.



Eugene M. Kalwarski, F.S.A.  
Consulting Actuary



Althea A. Schwartz, F.S.A.  
Consulting Actuary

**SECTION I**  
**EXECUTIVE SUMMARY**

## SECTION I

### EXECUTIVE SUMMARY

This report presents the results of our June 30, 1990 actuarial valuation of the Connecticut State Employees Retirement System.

The major findings of the valuation are summarized below:

<u>Assets &amp; Liabilities</u>	<u>Valuation Date</u>	
	<u>June 30, 1990</u>	<u>June 30, 1989</u>
Market Value of Assets	\$3.21 billion	\$2.80 billion
Actuarial Value of Assets	2.97 billion	2.61 billion
Unfunded Actuarial Liability	2.65 billion	2.46 billion

<u>Contributions</u>	<u>Projected to Fiscal Year Beginning</u>	
	<u>July 1, 1991</u>	<u>July 1, 1990</u>
Employer Contributions - Required		
• as a percent of payroll	21.95%	20.77%
• dollar amount	\$431.2 million	\$398.0 million
Amount Actually Contributed	N/A	263.8 million

#### Actuarial Surplus

There is no actuarial surplus as defined in Section 5-162h(b) of the Statute.

Each of the current year's figures differs from what would have been expected, based on the prior year's results. Details of this experience and additional findings of our valuation are presented later in this section.

431,236,846	251,231,824
- 55,000,000	
28,160,000	
348,076,846	202,794,328
80.72	

OVERALL SYSTEM EXPERIENCE

There were two unusual circumstances which have been reflected in the development of costs for the Fiscal Year beginning July 1, 1991. They are described below:

The actuarial certification for the Fiscal Year beginning July 1, 1990 called for a contribution of \$398.0 million. The actual contribution made was \$263.8 million (assuming Federal Reimbursements of \$55 million) and was determined according to the provisions of the 1990 Memorandum of Understanding between the State of Connecticut and the State Employees Bargaining Agent Coalition. This shortfall caused the Unfunded Actuarial Liability to increase \$134.2 million, resulting in additional contributions of \$12.1 million for each of the next 35 years.

*changed  
that amount  
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Approximately 2,700 employees retired early in response to the retirement incentive program, receiving bonuses over a 36 month period. These payments, currently an annual rate of \$11.9 million, are supplemental to the regular retirement benefits and are being paid from the Retirement Fund. For the next three years, the System will be reimbursed for these payments.

Each year, the primary factors which contribute to changes in the System's assets, unfunded liabilities, and contributions are: (1) expected changes due to the passage of time (eg. new employees) and (2) unexpected changes due to experience gains and losses. In the absence of performing a formal experience review of the System we estimate the source of changes as follows.

Assets:

Between June 30, 1989 and June 30, 1990, the assets of the System, measured on an actuarial basis, increased by \$361 million. This change was attributable to the following:

\$ 371	million from State, Federal, and employee contributions
- 251	million from payment of benefits and expenses
+ 241	million from recognized investment experience
= \$ 361	million total increase in assets.

Of this total change, \$346 million was expected, based on our assumption that the assets of the System would earn 8.50%. However, the effective investment return on the actuarial value of the assets was about 9.04%, resulting in an actuarial gain of \$15 million.

*why 361  
346  
15*      *last year 9.35*

*market value 13.4% gain of \$128 million*

**Unfunded Actuarial Liability:**

The following table shows the unfunded actuarial liability of the System between June 30, 1989 and June 30, 1990.

	<u>(Amounts In Millions)</u>
Unfunded Actuarial Liability, June 30, 1989	\$2,460.0
Projected to June 30, 1990 (Table IV-2 of June 30, 1989 valuation)	\$2,448.0
Increase due to Arbitrator's Award	<u>66.9</u>
Expected Unfunded Actuarial Liability, June 30, 1990	\$2,514.9
Actual Unfunded Actuarial Liability, June 30, 1990	\$2,651.9
Experience Loss	\$ 137.0 *

We estimate the following to be the components of the experience loss:

- increase due to contributions less than expected \$134.2 million
- increase due to liability losses 17.3 million
- decrease due to asset gains (14.5) million

\$137.0 million \*

The liability loss of \$17.3 million is attributable to the difference between actual and expected experience with respect to number of retirements, employment terminations, disabilities, deaths, salary increases, and new employees. Only a formal experience review can determine the particular amount each component contributed to the total liability loss. We do know, however, that more employees retired than our assumptions predicted, due to the Retirement Incentive Program.

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*of which approximately \$6.4 million relates to benefit improvements under the Arbitrator's Award*

**System Contributions:**

System contributions projected to the Fiscal Year beginning July 1, 1991 are \$431.2 million. This exceeds the prior year's projection of \$398.0 million by \$33.2 million.

The sources of this increase are as follows.

Prior year's contribution (projected to 1990)	\$398.0 million	312
• increase due to shortfall in State's Contribution for Fiscal Year beginning July 1, 1990	12.1	
• increase due to Retirement Bonuses → losses	11.9	
• increase due to liability gains and membership profile,	6.1	
• increase due to expected payroll growth to 1991	4.5	
• decrease due to asset gains	(1.4)	
Contribution projected to 7-1-91	\$431.2 million	

**SUMMARY**

During the past year, the System experienced various events which resulted in both decreases and increases in System costs. This is to be expected in future years as well since the anticipated accuracy of the actuarial assumptions are over the long term and not from year to year. Furthermore, the Projected Unit Credit actuarial funding method employed by the State tends to have some inherent instabilities and sensitivity to annual experience, given the two tier benefit levels of this System.

The overall System experience was mixed. On the one hand, the normal cost as a percent of pay decreased from 9.37% to 9.16%. This is the result of the large number of retirements from Tier I in response to the Retirement Incentive Program. Even though some of these employees were replaced, the new employees entered Tier II, which is a less costly plan than Tier I.

On the other hand, the unfunded actuarial liability, and therefore the amortization payment, increased again this year. The principal cause of the increase in the unfunded was the contribution shortfall of \$134.2 million. This is a disturbing circumstance that could lead to spiralling costs. Each year that contributions are missed, cost requirements for subsequent years are increased in order to "make up" the missed contribution.

In concluding this executive summary, we present on the following page comparative statistics and actuarial information on both the June 30, 1990 and June 30, 1989 valuations.

**CONNECTICUT STATE EMPLOYEES  
RETIREMENT SYSTEM  
PRINCIPAL RESULTS**

<u>System Membership</u>	<u>June 30, 1990</u>	<u>June 30, 1989</u>	<u>% Chg</u>
1. Active Membership			
- Number of Participants	54,926	56,202	(2.27)%
- Payroll	\$1,802,808,993	\$1,759,543,752	2.46
- Average Pay	32,823	31,307	4.84
2. Inactive Membership			
- Number of Vested Deferred Members	658	635	3.62
- Number of Retired Members	23,718	21,137	12.21
- Annual Retired Members Benefits	\$249,834,621	\$203,854,955	22.56
- Average Annual Retired Member Benefit	10,534	9,644	9.23

Assets and Liabilities

1. Assets			
- Market Value	\$3,212,789,521	\$2,798,932,658	14.79
- Actuarial Value	2,972,748,082	2,611,498,541	13.83
2. Liabilities			
- Retired and Deferred Vested	\$2,657,370,442*	\$2,089,129,002	27.20
- Active Members	2,967,291,638	2,982,390,546	(.51)
- Total Liability	5,624,662,080	5,071,519,548	10.91
- Unfunded Liability	\$2,651,913,998	\$2,460,021,007	7.80

Employer Contributions

1. Contributions as a Percent of Projected Payroll			
- Normal Cost	9.16%	9.37%	
- Unfunded Liability	12.78%	11.40%	
- Total Contribution %	21.95%	20.77%	
2. Contribution Dollars Projected to the Following FY			
- Normal Cost	\$180,005,022	\$179,549,626	.25
- Unfunded Liability	251,231,824**	218,467,282	15.00
- Total State Contribution	431,236,846	398,016,908	8.35

\* Does not include Liability for Retirement Incentive Bonuses.

\*\* Includes payment for Retirement Incentive Bonuses.



**SECTION II**

**SYSTEM ASSETS**

## SECTION II

### SYSTEM ASSETS

In this section we present the values assigned to the assets held by the Systems. These assets are valued on two different bases: the actuarial value and the market value.

#### Actuarial Value of Assets:

For purposes of determining ongoing costs, the recognition of gains and losses are spread over five years. The resulting value is called the actuarial value of assets and is further adjusted as necessary so that the final actuarial value is within 20% (plus or minus) of the market value of assets.

#### Market Value of Assets:

For certain accounting statement purposes, System assets are valued at current market rates. These values represent the "snapshot" or "cash-out" value of System assets as of the valuation date. In addition, the market value of assets provides a reference point to compare to current accrued liabilities.

The following tables present information regarding the actuarial and market values of System assets as of June 30, 1990.

<u>Table</u>	<u>Contents</u>
II-1	Market Value - Summary of Fund Transactions
II-2	Market Value - Breakdown on June 30, 1990
II-3	Actuarial Value of Assets
II-4	Historical Summary (Actuarial and Market)

**MARKET VALUE OF ASSETS  
SUMMARY OF FUND TRANSACTIONS**

Market Value July 1, 1989 \$2,798,932,658

**Contributions**

State	\$288,368,471
Federal	53,003,216
Employee	<u>29,198,019</u>

\$ 370,569,706

**Investment Income**

Interest and Dividends	\$131,099,442
Realized Gains	17,558,291
Change in Unrealized Gains	<u>145,435,286</u>

\$ 294,093,019

**Disbursements**

Benefit Payments	\$248,812,607
Employee Refunds	1,847,639
Expenses	<u>145,616</u>

\$ 250,805,862

Market Value June 30, 1990 \$3,212,789,521

Estimated Rate of Return as of June 30, 1990 10.29%

Rate of Return as of June 30, 1989 ~~13.40%~~ 15.0

Change Down ~~3.11%~~ 4.71

**MARKET VALUE OF ASSETS  
BREAKDOWN ON JUNE 30, 1990**

The following is the Market Value of the State Employees Retirement Fund assets as reported to us by the Retirement Division:

	<u>Amount</u>	<u>% of Total</u>
Cash	\$ (4,427,447)	-.14%
Accrued Interest	\$ 3,821,812	.12%
Investments		
Cash Reserve Account	\$ 80,194,401	2.50%
Fixed Income	779,268,212	24.26
Equity	1,268,627,366	39.48
Contract	1,208,499	.04
Mortgage	12,547,531	.39
Real Estate	486,081,684	15.13
International Funds	461,556,189	14.36
Commercial Mortgage Fund	94,431,939	2.94
Venture Capital Fund	21,421,858	.67
Connecticut Programs Fund	<u>8,057,477</u>	<u>.25</u>
	\$3,213,395,156	100.02%
 Total Market Value of Assets June 30, 1990	 \$3,212,789,521	 100.00%

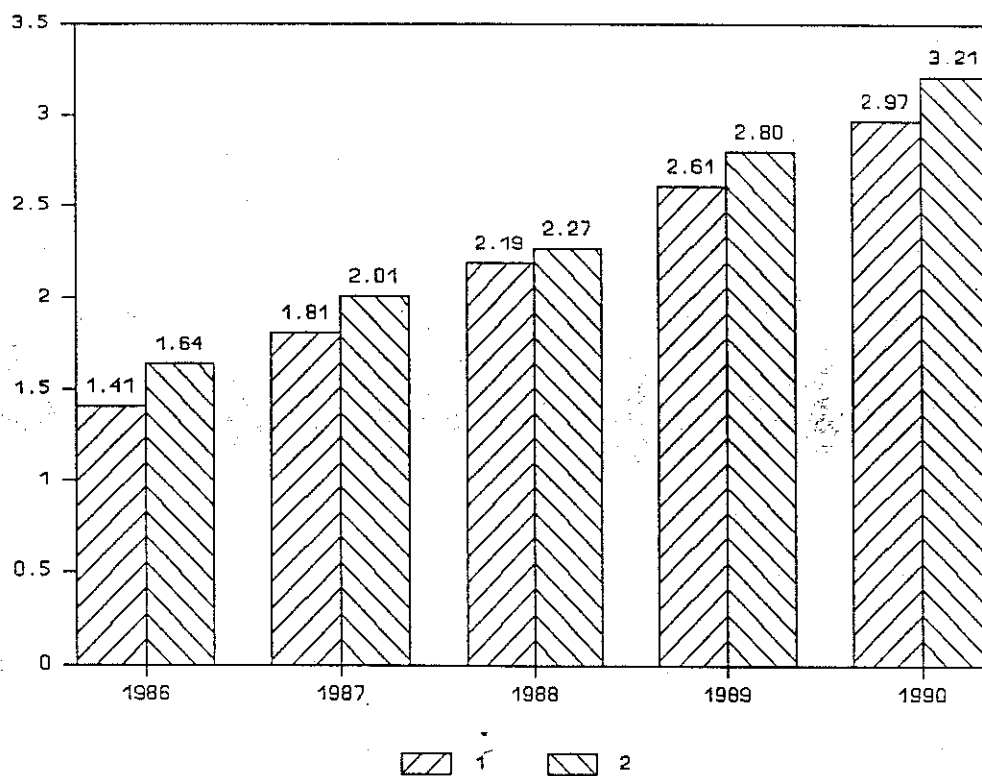
## ACTUARIAL VALUE OF ASSETS

<u>Ending</u>	<u>Realized Gains/Losses</u>	<u>Change in Unrealized Gains/Losses</u>	<u>Total Gains/Losses</u>
6-30-90	\$ 17,558,291	\$145,435,286	\$162,993,577
6-30-89	(38,287,173)	240,205,288	201,918,115
6-30-88	205,394,743	(261,372,286)	(55,977,543)
6-30-87	2,414,092	52,019,533	54,433,625
6-30-86	10,589,632	177,973,874	188,563,506

Actuarial Value of Assets as of June 30, 1990 is derived as follows:

1.	Market Value of Assets 6-30-90:	\$3,212,789,521
2.	Five-Year Gains and Losses Not Yet Recognized:	
	80% of FY 90	130,394,862
	60% of FY 89	121,150,869
	40% of FY 88	(22,391,017)
	20% of FY 87	<u>10,886,725</u>
		\$ 240,041,439
3.	20% of (1)	\$ 642,557,904
4.	Actuarial Value of Assets 6-30-90: (1) - (2), within (1) +/- (3)	\$2,972,748,082
	Rate of Return on Actuarial Value of Assets as of June 30, 1990	9.04%
	Rate of Return on Actuarial Value of Assets as of June 30, 1989	<u>9.35%</u>
	Change	Down .31%

**HISTORICAL SUMMARY OF SYSTEM ASSETS**  
(dollars in billions)



1 = Actuarial Value    2 = Market Value

**SECTION III**

**SYSTEM LIABILITIES AND  
ACCOUNTING INFORMATION**

**SECTION III**  
**SYSTEM LIABILITIES AND**  
**ACCOUNTING INFORMATION**

In this section we present values assigned to the liabilities of the System and then compare these liabilities to System assets.

The actuarial funding method used to determine System costs is based on the Projected Unit Credit method. This method is also used to determine the Projected Benefit Obligation (PBO) required by the Government Accounting Standards (GASB). A more detailed description of this method can be found in Appendix C.

The tables in this section present System liabilities as follows:

<u>Table</u>	<u>Contents</u>
III-1	System Liabilities
III-2	Accounting Information (GASB)
III-3	Historical Summary of System Liabilities



### SYSTEM LIABILITIES

	<u>June 30, 1990</u>	<u>June 30, 1989</u>
1. Liabilities for Retired Members	\$2,645,802,734*	\$2,078,455,209
2. Liabilities for Deferred Vested Members	<u>11,567,708</u>	<u>10,673,793</u>
3. Total Inactive Liability	\$2,657,370,442	\$2,089,129,002
4. Active Members Past Service Liability	<u>2,967,291,638</u>	<u>2,982,390,546</u>
5. Total System Past Service Liability	<u>\$5,624,662,080*</u>	<u>\$5,071,519,548</u>
6. Actuarial Value of Assets	2,972,748,082	2,611,498,541
7. Total System Unfunded Past Service Liability	<u>\$2,651,913,998*</u>	<u>\$2,460,021,007</u>

\* Does not reflect liability for Retirement Incentive Bonuses. (These monthly payments of \$988,221 will be paid for a three year period with a total outlay of about \$35.6 million or \$11.9 million on an annual basis).

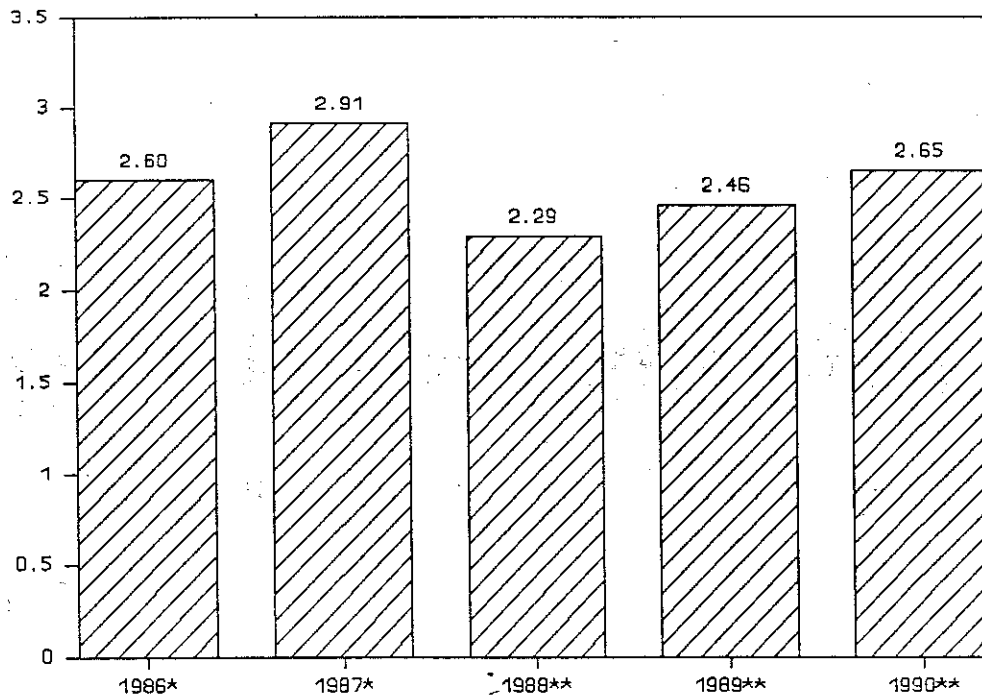
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**ACCOUNTING INFORMATION (GASB)**

	<u>June 30, 1990</u>	<u>June 30, 1989</u>
<b><u>Projected Benefit Obligation (PBO)</u></b>		
1. PBO for Retired Members	\$2,645,802,734*	\$2,078,455,209
2. PBO for Deferred Vested Members	<u>11,567,708</u>	<u>10,673,793</u>
3. Total Inactive PBO	\$2,657,370,442	\$2,089,129,002
4. PBO for Active Members		
a. Accumulated Employee Contributions with Interest	\$ 256,785,734	\$ 264,154,636
b. Employer-Financed Vested Portion	2,286,724,127	2,351,656,985
c. Employer-Financed Nonvested Portion	<u>423,781,777</u>	<u>366,578,925</u>
d. Total Active PBO	\$2,967,291,638	\$2,982,390,546
5. Total System PBO	\$5,624,662,080*	\$5,071,519,548

\* Does not reflect liability for Retirement Incentive Bonuses. (These monthly payments of \$988,221 will be paid for a three year period with a total outlay of about 35.6 million or \$11.9 million on an annual basis).

**HISTORICAL SUMMARY OF  
UNFUNDED PAST SERVICE LIABILITIES**  
(dollars in billions)



\* Entry Age Normal  
\*\* Projected Unit Credit

**SECTION IV**

**SYSTEM CONTRIBUTIONS**

## SECTION IV

### SYSTEM CONTRIBUTIONS

In this section we present the contributions required of the State in the upcoming fiscal year. Due to the timing of both the actuarial valuation process and the State's budget cycle, valuation results each June 30 must be projected to the following fiscal year in order to determine the State's required contribution.

In the following pages we present information on System contributions as follows:

<u>Table</u>	<u>Contents</u>
IV-1	Projected Unit Credit Normal Cost to 7-1-91
IV-2	Projected Unit Credit Unfunded Liability to 7-1-91
IV-3	Projected Unit Credit Total Costs to 7-1-91
IV-4	Comparison of Normal Cost Rates

Table IV-1

**PROJECTED UNIT CREDIT NORMAL COST PROJECTIONS  
TO JULY 1, 1991**

Plan	7-1-90 Normal Cost	7-1-90 Earnings	Normal Cost %	7-1-91 Projected earnings
<u>Tier I</u>				
1. Hazardous Duty	\$ 18,474,615	\$ 97,885,744	18.8737%	\$ 101,213,859
2. Plan B	97,111,832	913,477,780	10.6310	944,536,025
3. Plan C	<u>6,162,178</u>	<u>80,605,902</u>	<u>7.6448</u>	<u>83,346,503</u>
Total Tier I	121,748,625	1,091,969,426	11.1495	1,129,096,387
<u>Tier II</u>				
1. Hazardous Duty	12,070,159	98,661,140	12.2340	113,372,598
2. All Others	<u>31,322,548</u>	<u>612,178,427</u>	<u>5.1166</u>	<u>722,603,412</u>
Total Tier II	43,392,707	710,839,567	6.1044	835,976,010
Grand Total	\$165,141,332	\$1,802,808,993	9.1602	\$1,965,072,397

1,750,455,000 2.98

1,606,262,109

Normal Cost Projected to 7/1/91:  $9.1602\% \times \$1,965,072,397 = \underline{\$180,005,022}$

**PROJECTED UNIT CREDIT UNFUNDED LIABILITY  
TO JULY 1, 1991**

1.	Unfunded Actuarial Liability 7-1-90	\$2,651,913,998*
2.	One Year's Interest at 8½% <i>?</i>	225,412,690
3.	Normal Cost	176,168,626
4.	Interest on Normal Cost	6,762,233
5.	Less State Payments	(208,816,908)
6.	Less Federal Payments (expected)	(55,000,000)
7.	Less Employee Contributions <i>?</i>	(29,198,019)
8.	Less Interest on Contributions	<u>(11,247,379)</u>
9.	Unfunded Actuarial Liability 7-1-91	<u>\$2,755,995,241*</u>

*Handwritten notes and arrows pointing to line 1.*

*Handwritten note: "NO increase in contributions"*

*251,251,824 10.97*

\* Does not reflect liability for Retirement Incentive Bonuses. (These monthly payments of \$988,211 will be paid for a three year period with a total outlay of about \$35.6 million or \$11.9 million on an annual basis.)

*Handwritten numbers: 3.000, 10.00, 10.00*

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**PROJECTED UNIT CREDIT TOTAL COSTS  
TO JULY 1, 1991**

1.	Unfunded Liability 7-1-91	\$2,755,995,241	
2.	Amortization Period	35 Years	
3.	Amortization Payment	\$ 239,373,172	<u>11,5134</u>
4.	Employer Normal Cost	180,005,022	
5.	Adjustment for Retirement Incentive Bonus	\$ <u>11,858,652</u>	
6.	Total Required Employer Contribution for Fiscal Year beginning 7-1-91	\$ <u>431,236,846</u>	
7.	Projected Payroll	\$1,965,072,397	
8.	Total Employer Cost %		21.95%



## COMPARISON OF NORMAL COST RATES

	Valuation Date	
	<u>July 1, 1990</u>	<u>July 1, 1989</u>
<u>Tier I</u>		
Hazardous Duty	18.87%	19.05%
Plan B	10.63	10.99
Plan C	7.64	8.62
Total Tier I	11.15%	11.40%
<u>Tier II</u>		
Hazardous Duty	12.23%	9.38%
All Others	5.12	4.35
Total Tier II	6.10	4.87
<u>GRAND TOTAL</u>	9.16%	9.37%

APPENDIX A  
SUMMARY STATISTICS ON  
SYSTEM MEMBERSHIP

APPENDIX A  
SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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C. Analysis of Active Membership and Salary by Age and Service	A-4
D. Analysis of Retired Membership and Benefits by Age and Year of Retirement	A-9

### SUMMARY OF ACTIVE MEMBERSHIP DATA

We received data on a total of 55,152 members, including employees of State Aided Institutions. Of the active records submitted to us, 226 (.4%) were rejected due to missing or invalid dates of birth and/or hire. Cost calculations were not revised to reflect these records. The following analysis compares this data with the July 1, 1989 data (see Exhibit A-4 for distribution by age and service).

	<u>7-1-90</u>	<u>7-1-89</u>	<u>Change</u>	<u>Per Cent Change</u>
Total Employees	54,926	56,202	-1,276	-2.3%
Total Earnings (millions)	\$1,802.9	\$1,759.5	+43.4	+2.5%
Average Earnings	\$32,823	\$31,307	+1,516	+4.8%

Earnings figures as of July 1 are actual amounts paid during the previous July 1 to June 30 period, adjusted for negotiated increases and merit adjustments effective through and including July 1; new entrant earnings are annualized.

These figures are broken down by Plan in the following exhibit.

## SUMMARY OF ACTIVE MEMBERSHIP DATA

<u>Number of Members</u>	<u>7-1-90</u>	<u>7-1-89</u>	<u>Change</u>	<u>Per Cent Change</u>
Tier I Hazardous Duty	2,211	2,119	+92	+ 4.3%
Tier I Plan B	23,022	25,882	-2,860	-11.1%
Tier I Plan C	2,348	3,186	-838	-26.3%
Tier II Hazardous Duty	3,077	2,050	+1,027	+50.1%
Tier II Others	24,268	22,965	+1,303	+ 5.7%
Total	54,926	56,202	-1,276	-2.3%
 <u>Total Annual Compensation (millions)</u>				
Tier I Hazardous Duty	97.9	89.8	+8.1	+ 9.0%
Tier I Plan B	913.5	972.2	-58.7	- 6.0%
Tier I Plan C	80.6	102.2	-21.6	-21.1%
Tier II Hazardous Duty	98.7	61.1	+37.6	+61.5%
Tier II Others	612.2	534.2	+78.0	+14.6%
Total	1,802.9	1,759.5	+43.4	+2.5%
 <u>Average Compensation</u>				
Tier I Hazardous Duty	44,272	42,368	+1,904	+ 4.5%
Tier I Plan B	39,678	37,565	+2,113	+ 5.6%
Tier I Plan C	34,330	32,065	+2,265	+ 7.1%
Tier II Hazardous Duty	32,064	29,810	+2,254	+ 7.6%
Tier II Others	25,226	23,263	+1,963	+ 8.4%
Total	32,823	31,307	+1,516	+4.8%
 <u>Average Age</u>				
Tier I Hazardous Duty	41.5	41.6	-.1	- 0.2%
Tier I Plan B	45.1	45.3	-.2	- 0.4%
Tier I Plan C	52.6	54.3	-1.7	- 3.1%
Tier II Hazardous Duty	31.9	31.5	+.4	+ 1.3%
Tier II Others	36.6	36.1	+.5	+ 1.4%
Total	40.8	41.4	-.6	-1.4%
 <u>Average Service</u>				
Tier I Hazardous Duty	14.0	14.0	+0	+ 0.0%
Tier I Plan B	14.9	14.6	+.3	+ 2.1%
Tier I Plan C	15.2	15.8	-.6	- 3.8%
Tier II Hazardous Duty	2.8	2.5	+.3	+12.0%
Tier II Others	3.4	3.0	+.4	+13.3%
Total	9.1	9.5	-.4	-4.2%

**SUMMARY OF RETIRED MEMBERSHIP DATA**

The following compares the current retired data with the June 30, 1989 data.

<u>Retirees</u>	<u>7-1-90</u>	<u>7-1-89</u>	<u>Change</u>	<u>Percent Change</u>
Number	23,718	21,137	+2,581	+12.2%
Total Annual Benefit*	249,835	203,855	+45,980	+22.6%
Average Annual Benefit	10,534	9,644	+890	+9.2%
 <u>Terminated Vested</u>				
Number	658	635	+23	+3.6%

\* (000 omitted)

**SUMMARY OF RETIRED MEMBERSHIP DATA**

The following compares the current retired data with the June 30, 1989 data.

<u>Retirees</u>	<u>7-1-90</u>	<u>7-1-89</u>	<u>Change</u>	<u>Percent Change</u>
Number	23,718	21,137	+2,581	+12.2%
Total Annual Benefit*	249,835	203,855	+45,980	+22.6%
Average Annual Benefit	10,534	9,644	+890	+9.2%
 <u>Terminated Vested</u>				
Number	658	635	+23	+3.6%

\* (000 omitted)

Appendix A Analysis by Age and Service - Tier I - Hazardous Duty

ACTIVE MEMBERS

YEARS OF SERVICE

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	3	60	2	0	0	0	0	0	0	0	0	65
30 TO 34	14	261	104	3	0	0	0	0	0	0	0	382
35 TO 39	7	145	247	128	1	0	0	0	0	0	0	528
40 TO 44	8	75	108	233	108	6	0	0	0	0	0	538
45 TO 49	2	48	44	96	128	58	2	0	0	0	0	378
50 TO 54	5	23	24	38	37	34	13	0	0	0	0	174
55 TO 59	5	15	25	19	20	11	6	0	0	0	0	101
60 TO 64	1	8	7	9	3	0	0	1	0	0	0	29
65 AND UP	1	2	6	3	2	1	0	1	0	0	0	16
TOTALS	46	637	567	529	299	110	21	2	0	0	0	2,211

AVERAGE SALARIES

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	55,104	39,336	54,252	0	0	0	0	0	0	0	0	40,522
30 TO 34	42,203	40,131	43,338	42,478	0	0	0	0	0	0	0	41,098
35 TO 39	32,650	39,922	43,106	46,466	37,325	0	0	0	0	0	0	42,897
40 TO 44	41,272	39,272	42,346	48,056	47,545	50,273	0	0	0	0	0	45,507
45 TO 49	45,057	39,077	43,104	45,934	50,020	62,710	0	0	0	0	0	47,067
50 TO 54	35,937	45,803	41,776	45,893	45,476	50,252	57,474	0	0	0	0	46,655
55 TO 59	40,367	38,566	44,459	46,987	47,107	50,462	49,519	0	0	0	0	45,335
60 TO 64	73,298	44,501	37,614	41,766	37,891	0	54,818	0	0	0	0	42,655
65 AND UP	45,361	40,014	39,582	48,827	40,211	55,546	49,755	0	0	0	0	43,443
TOTALS	41,417	40,050	42,941	46,958	48,139	51,019	55,699	52,287	0	0	0	44,272

MILLIMAN & ROBERTSON, INC.



Analysis by Age and Service - Plan B

Appendix A

ACTIVE MEMBERS

YEARS OF SERVICE

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	2
25 TO 29	14	495	111	0	0	0	0	0	0	0	0	620
30 TO 34	63	1,117	1,367	57	0	0	0	0	0	0	0	2,604
35 TO 39	94	891	2,053	838	71	0	0	0	0	0	0	3,947
40 TO 44	56	728	1,524	1,249	755	54	0	0	0	0	0	4,366
45 TO 49	41	584	1,067	816	936	501	42	0	0	0	0	3,987
50 TO 54	29	411	805	578	682	535	343	49	0	0	0	3,432
55 TO 59	12	290	619	401	443	290	206	72	2	0	0	2,335
60 TO 64	7	199	367	257	253	121	77	44	6	0	0	1,331
65 AND UP	3	59	107	56	75	45	25	21	6	1	0	398
TOTALS	319	4,776	8,020	4,252	3,215	1,546	693	186	14	1	0	23,022

AVERAGE SALARIES

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	30,642
25 TO 29	25,654	26,657	0	0	0	0	0	0	0	0	0	27,509
30 TO 34	28,057	31,501	32,340	38,073	35,879	0	0	0	0	0	0	31,918
35 TO 39	31,614	37,120	38,073	44,118	42,436	39,191	0	0	0	0	0	36,639
40 TO 44	33,728	36,767	39,539	43,529	47,728	44,587	38,228	0	0	0	0	40,809
45 TO 49	40,886	35,229	38,368	42,891	47,860	48,823	47,057	44,275	0	0	0	41,968
50 TO 54	36,656	33,941	37,970	41,794	46,105	50,949	53,151	47,661	40,832	0	0	42,960
55 TO 59	35,168	34,291	37,113	41,794	46,105	50,949	53,151	47,661	53,622	0	0	42,724
60 TO 64	26,691	32,076	37,721	42,263	48,540	52,419	63,720	64,006	63,622	0	0	43,533
65 AND UP	43,427	24,615	39,940	49,494	52,677	51,469	53,096	61,147	63,911	99,997	0	45,200
TOTALS	32,808	33,562	36,793	42,228	46,207	47,871	50,403	52,158	56,204	99,997	0	39,678

MILLIMAN & ROBERTSON, INC.

Analysis by Age and Service - Plan C

Appendix A

ACTIVE MEMBERS

YEARS OF SERVICE

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	1	9	0	0	0	0	0	0	0	0	0	20
30 TO 34	4	55	6	0	0	0	0	0	0	0	0	107
35 TO 39	6	107	39	0	0	0	0	0	0	0	0	198
40 TO 44	7	71	60	2	0	0	0	0	0	0	0	224
45 TO 49	2	44	86	67	58	12	0	0	0	0	0	269
50 TO 54	4	59	121	72	59	23	17	12	0	0	0	367
55 TO 59	5	63	163	101	84	19	19	17	1	0	0	472
60 TO 64	6	66	173	90	91	18	4	10	1	2	0	461
65 AND UP	3	28	83	42	47	9	1	4	7	6	0	230
TOTALS	38	393	868	477	388	83	41	43	9	8	0	2,348

AVERAGE SALARIES

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	0	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	0	0	0	0	0	0	0	0	0	0	0	0
25 TO 29	27,969	35,033	0	0	0	0	0	0	0	0	0	32,133
30 TO 34	19,367	30,575	29,015	30,604	30,049	0	0	0	0	0	0	30,460
35 TO 39	22,151	32,348	33,604	33,136	33,136	0	0	0	0	0	0	32,001
40 TO 44	33,610	33,496	36,449	37,478	37,489	35,942	0	0	0	0	0	33,929
45 TO 49	62,181	34,529	36,454	37,478	38,378	30,094	0	0	0	0	0	35,994
50 TO 54	36,920	31,424	35,908	38,378	42,742	42,742	38,050	34,347	0	0	0	34,193
55 TO 59	28,761	31,612	37,478	38,105	40,220	40,220	38,107	41,355	32,824	0	0	34,899
60 TO 64	28,157	31,233	33,230	38,848	41,652	43,884	43,884	58,474	28,859	36,322	0	34,301
65 AND UP	34,096	32,743	37,596	36,337	43,444	43,444	23,071	48,389	42,949	48,876	0	35,878
TOTALS	30,544	32,122	35,753	37,331	40,012	38,280	44,035	41,088	43,872	43,872	0	34,330

MILLIMAN & ROBERTSON, INC.

Appendix A Analysis by Age and Service - Tier II - Hazardous Duty

ACTIVE MEMBERS

YEARS OF SERVICE

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	1	0	0	0	0	0	0	0	0	0	0	1
20 TO 24	408	11	0	0	0	0	0	0	0	0	0	419
25 TO 29	925	182	1	0	0	0	0	0	0	0	0	1,108
30 TO 34	485	177	3	0	0	0	0	0	0	0	0	665
35 TO 39	257	107	3	0	0	0	0	0	0	0	0	367
40 TO 44	181	76	3	0	0	0	0	0	0	0	0	260
45 TO 49	90	34	2	1	0	0	0	0	0	0	0	127
50 TO 54	49	25	1	0	0	0	0	0	0	0	0	75
55 TO 59	29	10	1	0	0	0	0	0	0	0	0	40
60 TO 64	7	5	0	0	0	0	0	0	0	0	0	12
65 AND UP	2	1	0	0	0	0	0	0	0	0	0	3
TOTALS	2,434	628	14	1	0	0	0	0	0	0	0	3,077

AVERAGE SALARIES

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	19,416	0	0	0	0	0	0	0	0	0	0	19,416
20 TO 24	25,579	29,764	0	0	0	0	0	0	0	0	0	25,579
25 TO 29	31,553	36,696	34,904	0	0	0	0	0	0	0	0	32,401
30 TO 34	32,265	35,366	50,487	0	0	0	0	0	0	0	0	33,172
35 TO 39	32,588	37,215	28,624	0	0	0	0	0	0	0	0	33,905
40 TO 44	31,342	36,857	25,744	0	0	0	0	0	0	0	0	32,889
45 TO 49	32,614	37,244	35,848	16,160	0	0	0	0	0	0	0	33,775
50 TO 54	37,069	33,947	24,417	0	0	0	0	0	0	0	0	35,860
55 TO 59	30,791	36,869	62,454	0	0	0	0	0	0	0	0	33,102
60 TO 64	31,057	35,790	0	0	0	0	0	0	0	0	0	33,029
65 AND UP	41,207	142,035	0	0	0	0	0	0	0	0	0	74,816
TOTALS	30,930	36,391	36,288	16,160	0	0	0	0	0	0	0	32,064

Appendix A Analysis by Age and Service - Tier II - All Others

ACTIVE MEMBERS

YEARS OF SERVICE

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	278	0	0	0	0	0	0	0	0	0	0	278
20 TO 24	2,386	161	0	0	0	0	0	0	0	0	0	2,547
25 TO 29	3,814	1,173	0	0	0	0	0	0	0	0	0	4,988
30 TO 34	2,911	1,317	29	1	0	0	0	0	0	0	0	4,258
35 TO 39	2,360	1,070	45	14	8	0	0	0	0	0	0	3,497
40 TO 44	2,002	993	56	44	36	0	0	0	0	0	0	3,131
45 TO 49	1,444	698	36	16	22	3	0	0	0	0	0	2,219
50 TO 54	916	461	21	14	12	1	0	0	0	0	0	1,425
55 TO 59	578	365	22	8	15	2	0	0	0	0	0	990
60 TO 64	330	262	6	1	5	1	1	0	0	0	0	606
65 AND UP	148	161	15	3	1	0	0	1	0	0	0	329
TOTALS	17,167	6,661	231	101	99	7	1	1	0	0	0	24,268

AVERAGE SALARIES

AGE	UNDER 5	5 TO 10	10 TO 15	15 TO 20	20 TO 25	25 TO 30	30 TO 35	35 TO 40	40 TO 45	45 TO 50	50 & UP	ALL YEARS
UNDER 20	4,205	0	0	0	0	0	0	0	0	0	0	4,205
20 TO 24	16,416	22,526	0	0	0	0	0	0	0	0	0	16,802
25 TO 29	24,405	27,423	13,468	0	0	0	0	0	0	0	0	25,113
30 TO 34	25,288	29,853	22,774	5,490	0	0	0	0	0	0	0	26,678
35 TO 39	25,842	31,170	25,700	30,741	36,136	0	0	0	0	0	0	27,514
40 TO 44	25,983	30,572	33,864	42,036	40,243	0	0	0	0	0	0	27,969
45 TO 49	25,075	29,192	38,621	44,091	47,720	29,410	0	0	0	0	0	26,957
50 TO 54	25,323	28,259	31,856	41,675	37,082	34,977	0	0	0	0	0	26,636
55 TO 59	23,323	27,365	31,965	31,720	37,911	21,097	0	0	0	0	0	25,290
60 TO 64	24,058	27,741	38,798	19,611	31,606	60,080	28,882	0	0	0	0	25,919
65 AND UP	18,736	23,180	27,785	40,897	3,740	0	4,090	0	0	0	0	21,435
TOTALS	23,512	29,007	30,904	39,311	40,031	32,211	28,882	4,090	0	0	0	25,226

Appendix A Analysis of Retired Members by Retirement Year

RETIREMENT YEAR	NUMBER OF RETIREES				AVERAGE BENEFIT			
	SERVICE	SERVICE CONNECTED	NON-SERVICE CONNECTED	HAZARDOUS DUTY	SERVICE	SERVICE CONNECTED	DISABILITY NON-SERVICE CONNECTED	HAZARDOUS DUTY
PRE-1959	120	14	31	8	6,406	4,491	4,384	6,435
1959	45	2	5	5	6,592	6,632	5,339	8,839
1960	38	6	3	2	5,923	4,136	4,681	8,634
1961	44	3	6	4	6,855	6,331	4,948	7,842
1962	77	3	3	0	6,608	5,035	4,662	0
1963	83	8	10	1	7,317	5,555	5,398	7,208
1964	83	10	8	2	6,464	5,730	5,302	8,786
1965	85	2	6	2	6,932	4,998	5,765	8,527
1966	118	9	17	0	6,563	5,268	5,204	0
1967	119	5	20	0	6,673	3,981	6,133	0
1968	168	11	16	2	7,546	6,065	5,866	7,565
1969	272	12	21	2	7,858	6,491	6,922	9,580
1970	273	11	45	4	8,550	6,674	7,041	9,786
1971	418	15	56	6	9,253	7,510	6,930	11,965
1972	492	25	64	22	9,272	8,193	7,888	12,632
1973	582	27	64	21	9,665	9,922	8,169	14,163
1974	478	23	42	22	8,703	9,641	8,604	16,437
1975	751	46	65	18	9,294	9,333	7,848	17,527
1976	825	13	49	23	8,602	8,276	7,762	15,414
1977	657	12	26	23	8,130	6,296	6,959	14,288
1978	716	10	38	13	7,853	6,968	5,721	16,228
1979	1,373	11	38	25	8,310	8,724	6,380	16,035
1980	883	18	36	33	7,532	6,171	5,656	15,088
1981	731	21	35	52	8,347	7,080	5,963	15,248
1982	630	18	26	35	8,647	8,612	8,612	16,542
1983	644	16	37	43	10,026	9,070	8,251	17,631
1984	817	32	42	63	10,434	9,878	8,485	18,384
1985	922	34	37	68	11,228	9,176	9,930	19,512
1986	1,006	47	48	57	12,671	9,404	10,184	22,565
1987	986	36	47	80	13,422	10,547	8,800	22,406
1988	1,137	62	53	95	13,716	10,878	8,967	21,948
1989	3,275	58	58	254	13,963	13,046	10,387	25,295
1990	97	1	9	48	13,556	19,440	17,804	24,040

Appendix A Analysis of Retired Members by Current Age

CURRENT AGE	NUMBER OF RETIREES			AVERAGE BENEFIT			
	SERVICE	SERVICE CONNECTED	DISABILITY NON-SERVICE CONNECTED	SERVICE	SERVICE CONNECTED	DISABILITY NON-SERVICE CONNECTED	HAZARDOUS DUTY
LESS THAN 40	1	34	17	12,705	11,597	5,330	0
40 TO 44	2	55	22	11,295	9,855	8,572	23,860
45 TO 49	2	71	49	12,845	12,184	10,637	23,788
50 TO 54	2	82	83	26,082	11,571	10,415	22,975
55 TO 59	1,224	98	163	15,950	8,315	9,402	21,214
60 TO 64	3,282	89	182	12,998	8,039	7,274	19,621
65 TO 69	4,570	72	168	10,953	6,094	6,631	17,582
70 TO 74	4,059	55	127	9,274	6,908	6,504	14,622
75 TO 79	2,967	37	108	8,486	7,899	7,731	13,484
80 TO 84	1,693	20	90	8,618	7,375	6,660	11,201
85 TO 89	824	7	41	7,721	5,172	5,796	9,527
90 TO 94	256	0	10	6,143	0	4,892	0
95 TO 99	63	1	1	4,135	2,240	3,585	0
FINAL TOTALS	18,945	621	1,061	10,449	8,982	7,715	20,018

**APPENDIX B**  
**SUMMARY OF PLAN PROVISIONS**

## APPENDIX B

### SUMMARY OF PLAN PROVISIONS

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#### CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

Established September 1, 1939

Reflects Arbitrator's Award

#### 1. Membership

Tier I [Sec. 5-160]: Each state employee appointed to classified service shall become a member on the first day of the pay period following permanent appointment.

Each officer elected by the people and each appointee of such officer exempt from classified service may elect to become a member, effective on the first day of the pay period following receipt of such election.

Each other state employee exempt from classified service shall become a member on the first day of the pay period following six months of employment.

Except as noted below employees hired prior to January 1, 1984 could elect (no later than January 2, 1984) to be covered under either Plan B or Plan C. Employees under contracts with Union Independent and CSEA unions hired prior to October 1, 1982 had until October 1, 1984 to make such election.

Tier II [Sec. 5-192e]: Tier II consists of employees first joining the retirement system on or after January 1, 1984 plus employees hired between July 1, 1982 and January 1, 1984 who elected Tier II. Each state employee becomes a member on the first day of employment.

#### 2. Normal Retirement Eligibility

Tier I - Hazardous Duty [Sec. 5-173]: 20 years of service.

Tier I - Plans B and C [Sec. 5-162]: Age 55 and 25 years of service, age 60 and 10 years of service, or age 70.

Tier II [Sec. 5-192]: Age 62 and 10 years of service (effective 7/1/92) or age 60 and 25 years of service or age 70 and 5 years of service, except hazardous duty members may retire after 20 years.



### 3. Normal Retirement Benefit

Tier I - Hazardous Duty [Sec. 5-173]: 50% of Final Average Earnings plus 2% for each year in excess of 20.

Tier I Plan B [Sec. 5-162]: Same as Plan C up to age 65; thereafter 1% of Final Average Earnings up to \$4,800 plus 2% of Final Average Earnings in excess of \$4,800 times years, reduced for retirement prior to age 65 with less than 25 years. Minimum benefit with 25 years, \$300 per month.

Tier I Plan C [Sec. 5-162]: 2% of Final Average Earnings times years of service, reduced for retirement prior to age 65 with less than 25 years. Minimum with 25 years, \$300 per month.

Tier II Hazardous Duty Members [Sec. 5-192n]: 2½% of Final Average Earnings times up to 20 years of service plus 2% of Final Average Earnings times years of service in excess of 20 years, if any. Minimum with 25 years, \$300 per month (or less if retirement before 7-1-87).

Tier II All Other [Sec. 5-192l]: 1 1/3% of Final Average Earnings plus ½% of Final Average Earnings in excess of the year's breakpoint\*, times up to 35 years of service from 10-1-82 plus 1 5/8% of Final Average Earnings times years of service in excess of 35 years, if any. Minimum with 25 years, \$300 per month (or less if retirement before 7-1-87).

\* \$10,700 increased by 6% each year after 1982, rounded to the nearest \$100, but not greater than Social Security Covered Compensation.

### 4. Early Retirement

Tier I - Hazardous Duty: None.

Tier I [Sec. 5-162]: Age 55 and 10 years of service; Normal Retirement Benefit reduced actuarially for retirement prior to age 60.

Tier II [Sec. 5-192m]: Age 55 and 10 years of service; Normal Retirement Benefit reduced ¼% (effective 7/1/91) for each month prior to age 65; Minimum benefit with 25 years, \$300 per month (or less if retirement prior to 7-1-87).

### 5. Deferred Retirement

Tier I [Sec. 5-162]: May be deferred but not beyond age 70.

Tier II [Sec. 5-192l]: May be deferred but not beyond age 70. Benefit is based on salary and service to actual retirement.

## 6. Vesting

Tier I [Sec. 5-166]: Ten years of service; actuarially reduced benefit payable at age 55; in addition employees are always fully vested in their own contributions (after 1-1-83, Tier I, contributions with 5% interest from 1-1-82).

Tier I - Hazardous Duty [Sec. 5-173(f)]: As above.

Tier II [Sec. 5-192o]: Ten years of service or age 70 and 5 years; benefit payable at Normal Retirement Age or early retirement benefit payable at age 55; minimum benefit with 25 years, payable after age 55, \$300 per month (or less if retirement before 7-1-87).

## 7. Member Contributions

Tier I - Hazardous Duty [Sec. 5-161]: 4% of earnings up to Social Security Taxable Wage Base plus 5% above that level.

Tier I - Plan B [Sec. 5-161]: 2% of earnings up to Social Security Taxable Wage Base plus 5% above that level.

Tier I - Plan C [Sec. 5-161]: 5% of earnings.

Tier II - All Other [Sec. 5-192u]: None.

Tier II - Hazardous Duty [Sec. 5-192u]: 4% of earnings

## 8. Cost of Living

[Sec. 5-162b, 5-162d]: Annual adjustment each July 1 of up to 5% for retirements prior to 7-1-80; 3% for retirements after 7-1-80. For members (or beneficiaries) not covered by Social Security and age 62 and over, the maximum increase is 6%. If an actuarial surplus (as defined in the law) exists, the Commission may further increase retired benefits.

## 9. Death Benefits

Tier I - State Police [Sec. 5-146]: Survivor benefits to spouse of \$670 per month plus \$300 to a surviving dependent child (or \$700 to surviving dependent children).

Tier I [Sec. 5-165a]: If eligible for early or normal retirement, spouse benefit equal to 50% of average of Life Benefit and 50% J&S benefit member would have received. If not eligible to retire but 25 years, same benefit calculated as though age 55 using service and earnings at death.

[Sec. 5-168]: If not eligible for retirement, return of contributions (after 10-1-82, Tier I, with interest from 1-1-82 at 5%).

Tier II [Sec. 5-192r]: If eligible for early or normal retirement, spouse benefit equal to 50% of member's benefit under a 50% J&S. If not eligible to retire but 25 years, same benefit calculated as though age 55 using service and earnings at death.

[Sec. 5-192t]: If death is due to employment, a spouse with dependent children under 18 will be paid \$7,500 in not less than 60 installments while living and not remarried; also \$20 per month per child under 18. If no children under 18, spouse [or dependent parent(s), if no spouse] will be paid \$4,000 in not less than 60 installments.

## 10. Disability Benefits

Tier I [Sec. 5-142, 5-169, 5-173]: For non-service disabilities occurring prior to age 60 and after 5 years of service, benefit equals 3% times base salary times years of service (Maximum  $1 \frac{2}{3}\%$  times service to 65). If disability occurs prior to age 60 and is due to service, benefit equals  $1 \frac{2}{3}\%$  of salary times service projected to 65 (maximum 30 years) and is payable regardless of length of service. Exception: State Police benefit is accrued benefit if more than 20 years of service. State Police receive an additional benefit of \$360 per month plus \$300 to spouse plus \$300 to a surviving dependent child (or \$700 to surviving dependent children).

Maximum disability benefit is lesser of: 100% of salary less Workers Compensation and Social Security and less non-rehabilitation earnings, or 80% of salary less Workers Compensation and Social Security. Social Security is primary plus family.

Tier II [5-192p]: Prior to age 65 and due to service or after 10 years of service, benefit is 1 1/3% of final average earnings, plus 1/2% of excess earnings times service projected to 65 (maximum 30 years of service to Date of Disability if greater than 30 years). Same maximum as Tier I.

Minimum disability benefit including Workers Compensation and Social Security is 60% of salary.

#### 11. Optional Forms of Payment

Tier I [Sec. 5-165]: 50% Qualified Joint and Survivor (Normal Form if married at least 12 months).

Tier II [Sec. 5-192q]: 50% or 100% Joint and Survivor (Normal Form if married at least 12 months). Ten years certain and life. Twenty years certain and life. Life (Normal Form if not married at least 12 months).

#### 12. Part-Time Employment

[Sec. 5-162g & Sec. 5-192k]: Service treated as if full-time for eligibility. If consistent part-time for all periods, treat as full-time. If varying schedule or some part-time, some full-time, service and salary proportionately adjusted.

**APPENDIX C**

**ACTUARIAL METHOD AND ASSUMPTIONS**

## APPENDIX C

### ACTUARIAL METHOD AND ASSUMPTIONS

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#### A. Funding Method

1. The actuarial valuation method used is the Projected Unit Credit Cost Method. Recommended annual contributions until the accrued liability is completely funded will consist of two pieces: Normal Cost plus a payment towards the Unfunded Accrued Liability.
  - a. The Accrued Liability is determined directly as the present value of benefits accrued to date, where the accrued benefits for each Member is the pro-rata portion (based on service to date) of the projected benefit payable at death, disability, retirement or termination.
  - b. The Normal Cost is then similarly determined as the present value of the portion of the projected benefit attributable to the current year.
2. The Unfunded Accrued Liability is the Accrued Liability less Current Assets.
3. Since the valuation was done as of June 30, 1990, costs have been projected to July 1, 1991 in order to correspond to the fiscal year as follows:
  - a. Normal Costs were determined as a percentage of earnings, by Tier, as of July 1, 1990. Earnings were projected to July 1, 1991, separately for each Tier because of the shifting Tier populations, and the projected earnings were then multiplied by the total system normal cost factor.
  - b. The Unfunded Accrued Liability was determined as of June 30, 1990, and brought forward to June 30, 1991 by adding the Normal Cost plus interest and subtracting expected employee, State, and Federal contributions, also with interest. This amount was amortized over the 35 years remaining in the original 40 year amortization period.
  - c. Normal Cost and Past Service Amortization payments were adjusted to reflect payment in twelve equal installments at the end of each month.

**B. Actuarial Assumptions**

**Mortality:** 1983 Group Annuity Mortality Table with ages set back 4 years for females.

Service connected deaths are assumed to comprise 20% of total Death for Hazardous Duty employees and 0% for all other employees.

**Investment Return:** 8½%. According to Memorandum of Understanding between the State of Connecticut and the State Employees Bargaining Agent Coalition (SEBAC). See Page C-5 of this Appendix.

**Salary Scale:**

<u>Age</u>	<u>Annual Rate of Increase</u>
20	10.2%
25	9.2
30	8.1
35	7.1
40	6.5
45	6.0
50	6.0
55	6.0
60	6.0

**Disability:**

<u>Age</u>	<u>Annual Rate of Disability (Per 1000 lives)</u>
20	0.75
25	0.85
30	0.97
35	1.21
40	1.70
45	2.79
50	5.09
55	9.25
60	14.42

Service connected disabilities are assumed to comprise 50% of total Disability for Hazardous Duty employees and 20% for all other employees.

**Social Security Wage Base Increases:**

6½% compounded annually.

B. Actuarial Assumptions (cont'd)

Retirement Ages:

Hazardous Duty:

<u>Age</u>	<u>First Year There- Eligible</u>	<u>after</u>
47-50	50%	10%
51	48	10
52	46	10
53	44	10
54	42	10
55	40	10
56	38	10
57	36	10
58	34	10
59	30	10
60	50	30
61	50	30
62-70	100	100

All Others:

55-60	20%	5%
61	40	5
62	40	30
63	40	30
64	60	30
65	80	60
66	80	60
67	80	60
68	80	60
69	80	60
70	100	100



**B. Actuarial Assumptions (cont'd)****Turnover:**

Five year select and ultimate rates as shown in the Turnover Table below for non-hazardous duty males; the same table with rates increased 10% for females; the same table with rates reduced 50% for hazardous duty.

**Turnover Table**

Age	Years of Participation					
	0	1	2	3	4	5 & Over
20	50%	45%	30%	25%	20%	15%
25	45	35	30	25	20	10
30	40	30	25	20	15	8
35	35	28	20	15	10	6
40	30	20	10	8	6	4
45	20	10	8	6	4	2
50	10	8	6	4	2	0
55	10	7	5	2	0	0
60	10	0	0	0	0	0

**Cost of Living Increases:**

3% per year for retirees on or after 1-1-80.  
4½% per year for retirees prior to 1-1-80.

**Asset Valuation:**

Adjusted market value: assets are written up (or down) by spreading recognition of gains and losses over five years, plus an additional write-up (or write-down) as necessary so that the final adjusted value is within 20% of market value.

### C. Memorandum of Understanding

The Memorandum of Understanding sets forth the procedure to be used to determine the interest rate assumption for the June 30, 1990 through June 30, 1992 valuations:

	<u>9 Year Average of Actual Rates of Return</u>		<u>Rate of Return for FY ending on Valuation Date</u>		<u>Interest Rate Assumption</u>
If	at least 13.5%	and	at least 13.5%	then use	9.5%
If	between 13.0% and 13.5%	and	between 13.0% and 13.5%	then use	9.0%
If	less than 13.0%	and	less than 13.0%	then use	8.5%

For the June 30, 1990 valuation, this leads to the following result:

<u>9 Year Average of Actual Rates of Return</u>	<u>Rate of Return for FY ending on June 30, 1990</u>	<u>Interest Rate Assumption</u>
13.5%	10.3%	8.5%

### Supporting Data

<u>Fiscal Year End</u>	<u>Rate of Return*</u>
1982	4.2%
1983	31.3
1984	3.3
1985	21.6
1986	21.6
1987	10.9
1988	3.2
1989	15.0
1990	<u>10.3</u>
Average	13.5%

\* Provided by the Office of the Treasurer and used by us without audit.

**APPENDIX D**

**ACTUARIAL SURPLUS TEST  
AS OF JUNE 30, 1990**

## APPENDIX D

### ACTUARIAL SURPLUS TEST AS OF JUNE 30, 1990

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Section 5-162h(b) of the General Statutes of Connecticut provides that the Retirement Commission may grant additional cost of living adjustments for retired employees if an actuarial surplus exists. An actuarial surplus is deemed to exist if three criteria are met:

I. **Investment Income:** actual rate of return for the Fiscal Year ending June 30, 1990 must exceed the actuarial assumption of 8.5%.

A.	Market Value of Assets July 1, 1989	\$2,798,932,658
B.	Market Value of Assets June 30, 1990	3,212,798,521
I.	Investment Income for FY 89-90	294,093,019

$$\text{Actual Rate of Return for FY89-90} = \frac{2I}{A+B-I} = 10.29\%$$

Actual Rate of Return of 10.29% exceeds assumption of 8.5%, so first criteria is met.

II. **Assets Versus Liabilities:** Market value of assets must exceed 50% of specified liabilities.

A.	Market Value of Assets June 30, 1990	\$3,212,798,521
B.	Specified Liabilities June 30, 1990	
	Liability for Retired Members	\$2,645,802,734
	Liability for Terminated Vested Members	11,567,708
	Active Member Contributions	222,541,359
	Interest on Active Member Contributions	<u>48,869,999</u>
	Total	\$2,928,781,800
C.	50% of Specified Liabilities	\$1,464,390,900

Market Value of Assets exceeds 50% of Specified Liabilities, so second criteria is met.

III. **Unfunded Liability:** actual unfunded liability must be less than the projected unfunded liability five years from determination date.

A.	Actual Unfunded Liability June 30, 1990	\$2,651,913,998
B.	Projected Unfunded Liability June 30, 1995	<u>1,870,068,000</u> <i>not included</i>

Actual Unfunded Liability exceeds Projected Unfunded Liability so third criteria is not met and an actuarial surplus does not exist.

### Projection of Unfunded Liability

\* Section 5-162-h(b)(2) of the General Statutes of Connecticut specifies the means of calculating the Projected Unfunded Liability used in the third criteria of the Actuarial Surplus Test. The Projection reflects the actual unfunded liability as of December 31, 1983 adjusted for changes in actuarial assumptions and cost methods through the determination date. The following Projection reflects the following changes: data correction (June 30, 1987), change in actuarial assumptions (June 30, 1987), change in actuarial cost method (June 30, 1988), change in actuarial assumptions - interest rate only (June 30, 1989), change in actuarial cost method - amortization period only (June 30, 1992). *plan benefit?*

<u>Year</u>	<u>(000) June 30 Unfunded Liability</u>	<u>Year</u>	<u>(000) June 30 Unfunded Liability</u>	<u>Year</u>	<u>(000) June 30 Unfunded Liability</u>
1984	2,155,459	1999	1,780,421	2014	1,007,747
1985	2,201,605	2000	1,753,053	2015	914,701
1986	2,206,090	2001	1,723,359	2016	813,746
1987	2,524,556	2002	1,691,140	2017	704,209
1988	1,954,257	2003	1,656,182	2018	585,363
1989	1,432,333	2004	1,618,254	2019	456,415
1990	1,939,758	2005	1,577,101	2020	316,505
1991	1,930,524	2006	1,532,450	2021	164,704
1992	1,920,505	2007	1,484,003	2022	0
1993	1,905,044	2008	1,431,439		
1994	1,888,269	2009	1,374,407		
1995	<u>1,870,068</u>	2010	1,312,528		
1996	<u>1,850,320</u>	2011	1,245,388		
1997	1,828,893	2012	1,172,542		
1998	1,805,645	2013	1,093,503		

**APPENDIX E**

**ENTRY AGE NORMAL  
VALUATION RESULTS**

## APPENDIX E

### ENTRY AGE NORMAL VALUATION RESULTS

	<u>June 30, 1990</u>	<u>June 30, 1989</u>
<b>A. <u>Current Results</u></b>		
1. Present Value of Future Benefits		
- Active Members	\$5,469,590,164	\$5,327,647,771
- Retired and Beneficiaries	2,645,802,734	2,078,455,209
- Deferred Vested Members	<u>11,567,708</u>	<u>10,673,793</u>
- Total Present Value	8,126,960,606	7,416,776,773
2. Present Value Future Normal Cost Contributions	1,758,094,970	1,624,815,816
3. Total Actuarial Liability: (1)-(2)	6,368,865,636	5,791,960,957
4. Actuarial Value of Assets	2,972,748,082	2,611,498,541
5. Unfunded Actuarial Liability: (3)-(4)	3,396,117,554	3,180,462,416
6. Total Normal Cost	174,371,501	160,100,956
7. Expected Employee Contributions	31,729,498	28,071,664
8. Employer Normal Cost: (6)-(7)	142,642,003	132,029,292
<b>B. <u>Projections to Following Year</u></b>		
1. Employer Normal Cost	\$ 162,657,469	\$ 150,071,194
2. Unfunded Actuarial Liability	3,536,356,917	3,152,216,670
3. Total Cost*	469,809,296	422,555,181
4. Total Cost as a Percent of Pay	23.91%	22.05%

**Note:** The June 30, 1989 values do not reflect adjustment for Arbitrator's Award or Early Retirement Incentives; the 1990 values reflect the Arbitrator's Award, but do not reflect the Early Retirement Incentives.