

CONNECTICUT STATE EMPLOYEES
RETIREMENT SYSTEM

December 31, 1983
ACTUARIAL VALUATION

MILLIMAN & ROBERTSON, INC.

CONSULTING ACTUARIES

THREE CORPORATE PLACE
BLOOMFIELD, CONNECTICUT 06002

203/243-1138

February 15, 1984

State of Connecticut
State Employees Retirement Commission
30 Trinity Street
Hartford, CT 06106

Ladies and Gentlemen:

We are pleased to provide this actuarial report for the Connecticut State Employees Retirement System. The report shows the financial status of the system as of December 31, 1983 and presents cost figures for the fiscal year beginning July 1, 1984.

As summarized in Section I, the recommended contribution for the fiscal year beginning July 1, 1984 is \$259,980,779. Since the State contribution will be based on 100% of Tier II costs and 90% of Tier 0 and Tier I costs, the actual State contribution, including Federal reimbursements, will be \$234,827,314.

This valuation was done using actuarial methods and assumptions which, to the extent possible are the same as those used in the December 31, 1980 valuation. These are described in Section II of the report. With the option to transfer between plans frozen as of January 1, 1984, we did not assume additional transfers from Plan B to Plan C; the previous valuation assumed a 15% transfer prior to retirement.

The membership data provided to us was as of September 30, 1983; therefore salaries were increased by 1% to project them to December 30. This data is summarized in Section III and a detailed analysis of the membership by age and service is attached as Exhibit B. Although we did not audit this data (or the financial data referred to below), comparisons with comparable data from the previous valuation indicated that they are reasonably consistent.

The basic information was compared with purchased service records and date of hire adjusted to reflect purchased service prior to the indicated date of hire; however, we understand that these records did not include a significant volume of purchases currently being processed. In addition, we used re-employment date for 4,281 Members where the original date of hire was missing from the record. Except as noted, we did not attempt to adjust for these situations.

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DONALD A. RHOLL, F.C.A.
STANLEY A. ROBERTS, F.S.A.
STUART A. ROBERTSON, F.S.A.
WALTER S. RUGLAND, F.S.A.
JOHN P. SCHREINER, F.S.A.
PAULA S. SEDLACEK, F.S.A.
DONALD J. SEGAL, F.S.A.
T. THOMAS SIMESTER, F.S.A.
JOSEPH D. SINTOV, F.S.A.
WILLIAM D. SMITH, F.S.A.
JOHN B. SNYDER, F.S.A.
STEVEN D. SOMMER, F.S.A.
DENNIS L. STANLEY, F.S.A.
KAREN I. STEFFEN, F.S.A.
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DOUGLAS G. TAYLOR, F.S.A.
WILLIAM S. THOMAS, F.S.A.
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MARK A. TRIEB, F.S.A.
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JAMES R. TYLER, F.S.A.
BRUCE N. VANDER ELS, F.S.A.
ANDREW B. WANG, F.S.A.
RONALD R. WEGNER, F.S.A.
RICHARD E. WHITE, F.S.A.
RICHARD WINKENWERDER, F.S.A.
BRUCE W. WINTERHOF, F.S.A.
BRUCE L. WORKMAN, F.C.A.

WENDELL MILLIMAN, F.S.A. (1976)
JAMES H. RIGGS, F.S.A. (1976)

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ASSOCIATED IN CANADA WITH ECKLER, BROWN, SEGAL & CO. LTD.

February 15, 1984

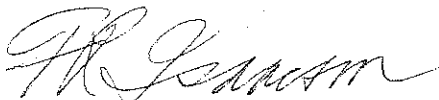
Section IV outlines the status of the retirement fund as reported to us by the Retirement Division and describes the adjustment used to spread unrealized gains and losses. As part of the actuarial method and assumptions, this adjustment uses the same approach as the previous valuation.

In accordance with Sec. 9 (b) (2) of Public Act No. 83-533, Section V projects the unfunded past service liability through June 30, 2026.

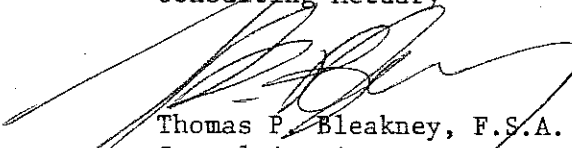
The final section of the report outlines our understanding of the benefit provisions embodied in the Connecticut statutes.

In our opinion this report fairly presents the financial and actuarial position of the Connecticut State Employees Retirement System as of December 31, 1983, in accordance with generally accepted actuarial principles. We also certify that, to the best of our knowledge and belief, this report is both complete and accurate; a copy of our separate certification is attached to the report as Exhibit A.

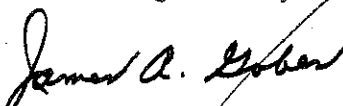
Respectfully submitted,
MILLIMAN & ROBERTSON, INC.



Fenton R. Isaacson, F.S.A.
Consulting Actuary



Thomas P. Bleakney, F.S.A.
Consulting Actuary



James A. Gobes, F.S.A.
Consulting Actuary

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SECTION I

SUMMARY OF VALUATION

A. Actuarial Balance Sheet

Based on the membership and asset information provided to us (and summarized in Sections III and IV), the actuarial method and assumptions described in Section II, and our understanding of the benefit provisions embodied in Connecticut statutes as summarized in Section VI, we have prepared the following valuation of assets and liabilities as of December 31, 1983:

<u>ASSETS</u>	<u>Tier 0 and Tier I</u>	<u>Tier II</u>	<u>Total</u>
Retirement Fund (Adjusted basis)	\$ 767,984,244	\$ 0	\$ 767,984,244
Present value of future Normal Cost contributions	1,028,248,584	54,588,139	1,082,836,723
Unfunded Accrued Liability	<u>2,448,045,216</u>	<u>6,095,535</u>	<u>2,454,140,751</u>
TOTAL ASSETS	\$4,244,278,044	\$60,683,674	\$4,304,961,718
 <u>LIABILITIES</u>			
Present value of benefits			
Active Members	\$2,948,504,932	\$60,683,674	\$3,009,188,606
Retired Members	1,287,466,102	0	1,287,466,102
Terminated Vested Members	<u>8,307,010</u>	<u>0</u>	<u>8,307,010</u>
TOTAL LIABILITIES	\$4,244,278,044	\$60,683,674	\$4,304,961,718

SECTION I

B. Projection of Normal Costs

The valuation calculated Normal Costs as of January 1, 1984 based on the payroll as of that date. Payroll was projected to July 1, 1984 by assuming that 5% of the Tier 0 and Tier I payroll will terminate during the six month period and be replaced by Tier II employees at the same salary level; remaining Tier 0 and Tier I employees and all Tier II employees (including replacements of Tier II terminations) are assumed to receive pay increases by July 1 equal to 7½%. This produced the following projected Normal Costs:

<u>Tier</u>	<u>Plan</u>	<u>Estimated Payroll 1/1/84</u>	<u>Normal Cost Percentage</u>	<u>Projected Payroll 7/1/84</u>	<u>Normal Cost 7/1/84</u>
0	HD ^{HAZARDOUS DUTY}	\$ 26,700,634	9.7734%	\$ 27,268,022	\$ 2,665,013
0	B	150,854,330	7.4604	154,059,985	11,493,491
0	C	62,194,463	6.1738	63,516,095	3,921,357
I	HD	40,386,253	10.7965	41,244,461	4,452,958
I	B	534,534,368	9.3649	545,893,223	51,122,354
I	C	<u>101,927,115</u>	7.5952	<u>104,093,066</u>	<u>7,906,077</u>
Total Tier 0, plus Tier I		\$916,597,163		\$936,074,852	\$81,561,250
II	HD	\$ 3,001,330	10.9801%	\$ 6,580,774	\$ 722,576
	Other	<u>58,178,417</u>	6.8006	<u>105,017,312</u>	<u>7,141,807</u>
Total Tier II		\$61,179,747		\$111,598,086	\$ 7,864,383
Grand Total		\$977,776,910		\$1,047,672,938	\$89,425,633

SECTION I

C. Projection of Total Cost

The Unfunded Liability as of December 31, 1983 was brought forward to June 30, 1984 by adding interest and adding (six months of) the January 1, 1984 Normal Cost, with interest, and subtracting expected contributions, also with interest:

	<u>Tier 0 & Tier I</u>	<u>Tier II</u>	<u>Total</u>
Unfunded Accrued Liability, 12-31-83	\$2,448,045,216	\$6,095,535	\$2,454,140,751
+ Interest	79,561,470	198,105	79,759,575
+ 6 months Normal Cost	39,932,060	2,143,005	42,075,065
+ Interest	648,896	34,824	683,720
- Employer Payments	79,375,302	0	79,375,302
- Employee Contributions	12,146,135	0	12,146,135
- Interest	1,487,223	0	1,487,223
Unfunded Accrued Liability, 6-30-84	\$2,475,178,982	\$8,471,469	\$2,483,650,451

Normal Cost	\$ 81,561,250	\$7,864,383	\$ 89,425,633
Amortization of Unfunded (over 40 years)	<u>169,973,400</u>	<u>581,746</u>	<u>170,555,146</u>
Total	\$ 251,534,650	\$8,446,129	\$ 259,980,779
Cost Percentage	90%	100%	
Adjusted Cost	\$ 226,381,185	\$8,446,129	\$ 234,827,314

SECTION II

ACTUARIAL METHOD AND ASSUMPTIONS

A. Funding Method

1. The actuarial valuation method used in the cost calculations is the Entry Age Normal 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.
2. The Normal Cost is determined by calculating the present value of future benefits for present active Members that will become payable as the result of death, disability, retirement or termination. This cost is then spread as a level percentage of pay from entry age to termination as an Active Member.
3. If Normal Costs had been paid at this level for all prior years, a fund would have been accumulated. Because this fund represents the portion of benefits that would have been funded to date, it is termed the Accrued Liability. In fact, it is calculated by adding the present value of benefits for retired Members and Terminated Vested Members to the present value of benefits for active Members and subtracting the present value of future contributions.
4. The Unfunded Accrued Liability is the Accrued Liability less Current Assets.
5. Since the valuation was done as of January 1, costs have been projected to July 1 in order to correspond to the fiscal year as follows:
 - A. Normal costs were determined as a percentage of pay, by Tier, as of January 1. Payroll was projected to July 1, separately for each Tier because of the shifting Tier populations, and these were multiplied by the normal cost factors by Tier.

- B. The Unfunded Accrued Liability was determined as of January 1, and brought forward to July 1 by adding one-half of the January 1 Normal Cost plus interest and subtracting expected employee and State contributions, also with interest. This amount was amortized over 40 years.
- C. Normal Cost and Past Service Amortization payments were adjusted to reflect payment in twelve equal installments at the end of each month.

SECTION II

B. Actuarial Assumptions

Mortality 1971 Group Annuity Mortality Table with
ages set back 6 years for females.

Investment Return 6½% compounded annually.

Salary Scale	<u>Age</u>	<u>Annual Rate of Increase</u>
	20	5.34%
	25	5.26
	30	5.10
	35	4.90
	40	4.58
	45	4.22
	50	3.95
	55	3.83
	60	3.66

Turnover Estimated by excluding participants
with less than one year of service and
assuming that all other employees
terminate at the following rates.

<u>Age</u>	<u>Annual Rate of Withdrawal</u>
20	5.44%
25	5.29
30	5.07
35	4.70
40	4.19
45	3.54
50	2.47
55	.94
60	--

Retirement Ages

Hazardous Duty, Tier 0 and Tier I: Age 53 and 25 years of service.

All other, Tier 0 and Tier I: Age 61 and 10 years of service.

Tier II: Age 65 and 10 years of service or age 70 and 5 years of service, or for Hazardous Duty Members, 25 years of service.

Social Security Wage Base

Increases

3½% compounded annually.

Disability

<u>Age</u>	<u>Annual Rate of Disability</u>
20	.06
25	.09
30	.11
35	.15
40	.22
45	.36
50	.61
55	1.01
60	--

Service-connected are assumed to comprise 50% of total disabilities for Hazardous Duty and 20% for others.

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 cost value: assets are written up (or down) by 20% of the difference between market value and adjusted cost value, plus an additional write-up (or write-down) as necessary so that the resulting adjusted cost value is within 20% of market value.

SECTION III

MEMBERSHIP DATA

A. Active Members

We received data on 46,083 State employees plus 1,212 employees of State aided institutions, for a total of 47,295 Members. The following analysis compares the current distribution with the December 31, 1980 data (see Exhibit B for distribution by age and service).

	December 31 <u>1983*</u>	December 31 <u>1980</u>
Total Employees	47,295	43,787
Total Salary	\$977,776,910	\$694,406,700
Average Salary	20,674	15,900
Average Age**	42.3	42
Average Service**	9.9	9

* Salaries increased 1% to project from 10-1-83 to 12-31-83.

** Based on Members included in valuation.

Of the active records submitted to us, 2,205 were rejected due to missing or invalid dates of birth and/or hire. We also excluded 1,196 records that were exact duplicates. A list of all duplicate or incorrect data will be provided to the Retirement Division.

For valuation purposes, an additional 745 Members were excluded because they had less than one year of service; thus the valuation was based on 44,458 Members.

We also note that for 4,281 records, we used the re-employment date because the date of hire was missing; we did not attempt to adjust for the impact of this.

SECTION III

B. Actives By Plan

The following analysis is based on the total of 47,295 active Members including employees not in the valuation because they had less than one year of service or had incorrect birth and/or hire dates. Hazardous Duty Members include 183 Tier II Members

<u>Number of Members</u>	<u>December 31, 1983</u>	<u>December 31, 1980</u>
Hazardous Duty	3,192	876 (police only)
Plan B	31,601	27,682
Plan C	8,065	15,229
Tier II	4,437	x
 <u>Total Annual Salary (000's)</u>		
Hazardous Duty	70,088	18,048
Plan B	685,389	438,896
Plan C	164,122	237,463
Tier II	58,178	x
 <u>Average Salary</u>		
Hazardous Duty	21,957	20,602 (police only)
Plan B	21,699	15,900
Plan C	20,350	15,600
Tier II	13,130	x

This analysis of age and service is based on Active Members included in the valuation. Therefore it excludes 745 employees with less than one year of service and the 2,025 records with incorrect birth dates or hire dates.

	<u>December 31, 1983</u>	<u>December 31, 1980</u>
<u>Average Age</u>		
Hazardous Duty	38.9	NA
Plan B	41.3	39
Plan C	51.0	47
Tier II	32.7	x

Average Years of Service

Hazardous Duty	11.0	NA
Plan B	9.8	9
Plan C	12.6	9
Tier II	2.4	x

SECTION III

C. Retired and Terminated Vested Members

The following compares the retired data which was provided to us with the December 31, 1980 data. [See Exhibit C for analysis of retirees by age, year of retirement and type of retirement].

	<u>December 31, 1983</u>	<u>December 31, 1980</u>
<u>Pensioners</u>		
Number	16,376	15,557
Total Annual Benefit	\$110,550,855	\$87,928,164
Average Monthly Benefit	\$563	\$471

Beneficiaries

Number	504	338
Total Annual Benefit	\$ 2,588,634	\$1,589,952
Average Monthly Benefit	\$428	\$392

Terminated Vested

Number	495	369
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SECTION IV

A. 1983 Summary of Fund

Market Value, January 1 \$644,650,822.56

Contributions

State	\$147,873,250.06	
Federal	37,024,439.13	
Employee	27,427,847.87	
		\$212,325,537.06

Investment Income

Interest and Dividends	\$ 62,426,353.50	
Realized Gains	744,928.45	
Change in Unrealized Gains	<u>10,432,688.79</u>	
		\$ 73,603,970.74

Disbursements

Benefit payments	\$110,838,447.65	
Employee refunds	18,239,873.29	
Expenses	<u>91,023.68</u>	
		\$129,169,344.62

Market Value, December 31 \$801,410,985.74

SECTION IV

B. December 31, 1983 Assets
(Market Value Basis)

Cash		\$(18,879,316.22)
Accrued Interest		3,140,822.47
Investments		
Short Term	\$147,402,349.00	
Fixed Income	239,498,029.21	
Equity	248,630,207.00	
Contract	11,297,520.00	
Mortgage	117,422,283.42	
Real Estate	<u>53,155,200.00</u>	
		817,405,588.63
Due from General Fund		118,662.06
(Less) Liabilities		
Expenses	8,454.81	
Interest	364,107.62	
Escheat	<u>2,208.77</u>	
		<u>(374,771.20)</u>
Total Market Value of Assets 12/31/83		\$801,410,985.74

SECTION IV

C. Adjusted Cost Value

	<u>Book Value</u>	<u>Market Value</u>	<u>Adjusted Cost Value</u>
12-31-78	\$199,937,761	NA	\$200,036,795
12-31-79	271,219,899	\$260,210,421	269,097,231
12-31-80	363,951,995	362,983,337	362,060,129
12-31-81*	475,679,076	445,754,990	468,180,766
12-31-82	612,960,709	644,650,823	613,300,084
12-31-83	759,288,183	801,410,986	767,984,244

* Including \$2,000,000 estimated interest accrued.

The derivation of the 1983 Adjusted Cost Value is shown below. Values for 12-31-81 and 12-31-82 were developed similarly to create the starting point for the 1983 adjustment.

1.	Adjusted cost value, 12-31-82	\$613,300,084
2.	Net new money, all sources	146,327,474
3.	Preliminary value, 12-31-83, [(1) + (2)]	759,627,558
4.	Market value, 12-31-83	801,410,986
5.	Current adjustment, 20% [(4) - (3)]	8,356,686
6.	Adjusted Cost Value, 12-31-83, [(3) + (5)] [Must be within <u>±</u> 20% of (4)]	\$767,984,244

SECTION V

Projection of Unfunded Liability

Sec. 9 (b) (2) of Public Act No. 83-533 calls for a projection of the Unfunded Liability year by year through June 30, 2026, including reflection of less than one hundred percent payments until July 1, 1986.

<u>Year</u>	<u>June 30 Unfunded Liability</u>		
	<u>Tiers 0 and I</u>	<u>(000's)</u> <u>Tier II</u>	<u>Total</u>
1984	\$2,475,179	\$8,471	\$2,483,650
1985	2,486,980	8,423	2,495,403
6	2,486,019	8,372	2,494,391
7	2,471,864	8,317	2,480,181
8	2,456,789	8,459	2,465,048
9	2,440,735	8,197	2,448,932
1990	2,423,637	8,131	2,431,768
1	2,405,427	8,060	2,413,487
2	2,386,034	7,985	2,394,019
3	2,365,380	7,906	2,373,286
4	2,343,384	7,821	2,351,205
1995	2,319,958	7,730	2,327,688
6	2,295,009	7,634	2,302,643
7	2,268,439	7,531	2,275,970
8	2,240,141	7,422	2,247,563
9	2,210,005	7,305	2,217,310
2000	2,177,909	7,181	2,185,090
1	2,143,727	7,049	2,150,776
2	2,107,324	6,908	2,114,232
3	2,068,554	6,785	2,075,312
4	2,027,264	6,599	2,033,863
2005	1,983,290	6,429	1,989,719
6	1,936,458	6,248	1,942,706
7	1,886,582	6,055	1,892,637
8	1,833,464	5,850	1,839,314
9	1,776,893	5,631	1,782,524
2010	1,716,645	5,398	1,722,043
1	1,652,481	5,150	1,657,631
2	1,584,146	4,886	1,589,032
3	1,511,370	4,605	1,515,975
4	1,433,863	4,305	1,438,168

June 30 Unfunded Liability

<u>Year</u>	(000's)		<u>Total</u>
	<u>Tiers 0 and I</u>	<u>Tier II</u>	
2015	1,351,318	3,986	1,355,304
6	1,263,408	3,646	1,267,054
7	1,169,783	3,285	1,173,068
8	1,070,073	2,899	1,072,972
9	963,882	2,489	966,371
2020	850,788	2,052	852,840
1	730,344	1,586	731,930
2	602,070	1,090	603,160
3	465,459	562	466,021
4	319,968	0	319,968
2025	165,020	0	165,020
6	0	0	0

SECTION VI

Summary of Plan Provisions

Effective Date

September 1, 1939

System Eligibility

Tier 0 and 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.

Tier II [Sec. 23]

Each state employee becomes a member on the first day of employment.

Plan Eligibility

Tier I [Sec. 6]

Employees hired prior to January 1, 1984 may elect (no later than January 2, 1984) to be covered under either Plan B or Plan C.

Tier II [Sec. 23]

Employees hired on or after July 1, 1982 who are not in any other plan, and any other employees who have not previously been covered under any plan.

Normal Retirement Date

State Police [Sec. 5-173 as amended by Sec. 17]

Age 47 and 20 years of service.

Tier 0 and Tier I
[Sec. 5-162]

Age 55 and 25 years of service, age 60 and 10 years of service, or age 70.

Tier II [Sec. 28 & 30]

Age 65 and 10 years of service or age 70 and 5 years of service, except hazardous duty members may retire after 25 years.

Normal Retirement Benefit

State Police [Sec. 5-173 as amended by Sec. 17]

50% of Final Average Earnings plus 2% for each year in excess of 20.

Tier 0 and Tier I, Plan B
Benefit [Sec. 5-162]
Minimum [Sec. 10]

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 0 and Tier I, Plan C
Benefit [Sec. 5-162]
Minimum [Sec. 10]

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. 30]

2% of Final Average Earnings times years of service. Minimum with 25 years, \$300 per month (or less if retirement before 7-1-87).

All Other [Sec. 28]

1 1/3% of Final Average Earnings plus 1/2% of Final Average Earnings in excess of the year's breakpoint*, times years of service from 10-1-82. 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.

Early Retirement

State Police

None.

Tier 0 and Tier I
[Sec. 5-162]

Age 55 and 10 years of service; Normal Retirement Benefit reduced additionally for retirement prior to age 60.

Tier II [Sec. 29]

Age 55 and 10 years of service; Normal Retirement Benefit reduced 1/2% for each month prior to age 65; Minimum benefit with 25 years, \$300 per month (or less if retirement prior to 7-1-87).

Deferred Retirement

Tier 0 and Tier I
[Sec. 5-162]

May be deferred but not beyond age 70.

Tier II [Sec. 28 (b) and (e)] May be deferred but not beyond age 70.

Benefit is based on salary and service to actual retirement.

Vesting

Tier 0 and Tier I
[Sec. 5-166 as amended in
part by Sec. 13]

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. 17]

As above, but may receive full benefits at age 47 if 20 years of service at termination.

Tier II [Sec. 31]

Ten years of service or age 70 and 5 years; benefit payable at age 65 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).

Employee Contributions

State Police, Hazardous Duty
[Sec. 5-148 and 5-161]

Same as Plan C plus 1 3/4% (maximum \$84 per year) for survivor's benefits.

Plan C [Sec. 5-161]

5% of salary.

Plan B [Sec. 5-161]

2% of salary up to Social Security Taxable Wage Base plus 5% above that level.

Tier II [Sec. 37]

None.

Cost of Living

[Sec. 5-162b, 5-162d,
Sec. 9 & Sec. 35]

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.

Death Benefits

State Police
[Sec. 5-146]

Survivor benefits to spouse of \$275 per month plus \$100 to a surviving dependent child (or \$175 to surviving dependent children).

Tier 0 and Tier I
[Sec. 5-165a as amended
by Sec. 12]

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 as amended
by Sec. 13]

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. 34]

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. 36]

If death is due to employment, a spouse with dependent child(ren) 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.

Disability Benefits

Tier 0, [Sec. 5-169]

For disabilities occurring prior to age 60 and after 5 years of service (or regardless of years, if disability is due to service); benefit is the same as Tier 1 below except maximum benefit is based on service to age 60.

Tier I [Sec. 16]

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.

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 [Sec. 32]

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 or service to Date of Disability if greater than 30 years). Same maximum as Tier I.

Options

Tier 0 [Sec. 5-165]

Life [Normal Form]
Husband and Wife.

Tier I [Sec. 11]

50% Qualified Joint and Survivor (CA)¹.

Tier II [Sec. 33]

50% or 100% Joint and Survivor (CA).

Ten years certain and life.

Twenty years certain and life.

Life².

¹ Normal Form if married at least 12 months.

² Normal Form if not married at least 12 months.

Part-Time Employment

[Sec. 5-162g & Sec. 27]

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.

EXHIBIT A
CERTIFICATION

MILLIMAN & ROBERTSON, INC.

CONSULTING ACTUARIES

THREE CORPORATE PLACE
BLOOMFIELD, CONNECTICUT 06002
203/243-1138

February 15, 1984

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 December 31, 1983.

The valuation was made with respect to the following Members:

- a. 16,880 pensioners (including 504 beneficiaries of deceased Members).
- b. 47,295 active Members with total annual salaries of \$977,776,910.
- c. 495 inactive employees with vested rights.

Based on the above data and the attached actuarial method and assumptions, we determined cost factors as of the valuation date as follows:

1. Accrued liability--	
a. Active Members	\$1,926,351,883
b. Retired Members and Beneficiaries	1,287,466,102
c. Vested former Members	8,307,010
d. Total	\$3,222,124,995
2. Assets in fund (at adjusted cost value)	\$ 767,984,244
3. Unfunded liability (Item 1d less Item 2)	\$2,454,140,751
4. Present Value of Vested Benefits	\$2,342,359,336

Based on the valuation as of December 30, 1983, projected costs were developed for the fiscal year beginning July 1, 1984, as follows:

1. Employer Normal Cost	
Tier 0 and Tier I	\$ 81,561,250
Tier II	7,864,383
Total	\$ 89,425,633

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PETER J. BONDY, F.S.A.
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MILTON F. CHAUDNER, F.S.A.
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ROBERT W. OMDAL, F.S.A.
RICHARD E. OSTUW, F.S.A.
GREGORY W. PARKER, F.S.A.
PAUL J. PATTERSON, F.S.A.
J. LYNN PEABODY, F.S.A.
MARGARET E. PEARSON, F.S.A.
KRIS E. PETERSON, F.S.A.
RAYMOND E. PINCZKOWSKI, F.S.A.
ROBERT A. PRYOR, F.S.A.
DONALD A. RHOLL, F.C.A.
STANLEY A. ROBERTS, F.S.A.
STUART A. ROBERTSON, F.S.A.
WALTER S. RUGLAND, F.S.A.
JOHN P. SCHREINER, F.S.A.
PAULA S. SEDLACEK, F.S.A.
DONALD J. SEGAL, F.S.A.
T. THOMAS SIMESTER, F.S.A.
JOSEPH D. SINTOV, F.S.A.
WILLIAM D. SMITH, F.S.A.
JOHN B. SNYDER, II, F.S.A.
STEVEN D. SOMMER, F.S.A.
DENNIS L. STANLEY, F.S.A.
KAREN I. STEFFEN, F.S.A.
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ANDREW B. WANG, F.S.A.
RONALD R. WEGNER, F.S.A.
RICHARD E. WHITE, F.S.A.
RICHARD WINKENWERDER, F.S.A.
BRUCE W. WINTERHOF, F.S.A.
BRUCE L. WORKMAN, F.C.A.

WENDELL MILLIMAN, F.S.A. (1976)
JAMES H. RIGGS, F.S.A. (1978)

ALBANY - ATLANTA - CHICAGO - DALLAS - DENVER - HARTFORD - HOUSTON - INDIANAPOLIS - LOS ANGELES - MILWAUKEE - MINNEAPOLIS
NEW YORK - OMAHA - PHILADELPHIA - PHOENIX - PORTLAND - SAN FRANCISCO - SEATTLE - WASHINGTON, D.C.

ASSOCIATED IN CANADA WITH ECKLER, BROWN, SEGAL & CO., LTD.

2. Payment on Unfunded Liability*

Tier 0 and Tier I	\$169,973,400
Tier II	<u>581,746</u>
Total	\$170,555,146

3. Total Employer Cost

Tier 0 and Tier I	\$251,534,650
Tier II	<u>8,446,129</u>
Total	\$259,980,779

* Based on forty year amortization of the Unfunded Accrued Liability as of June 30, 1984.

In accordance with Connecticut statutes, the actual contribution for the fiscal year 1984-85 will be 90% of Tier 0 and Tier I costs and 100% of Tier II costs; the 90% will be increased to 95% for fiscal year 1985-86 and 100% thereafter.

MILLIMAN & ROBERTSON, INC.

James A. Gobes

James A. Gobes, F.S.A., M.A.A.A.
Consulting Actuary

Actuarial Method and Assumptions

Funding Method

Entry Age Normal.

Mortality

1971 Group Annuity Mortality Table with ages set back 6 years for females.

Investment Return

6½% compounded annually.

Salary Scale

<u>Age</u>	<u>Annual Rate of Increase</u>
20	5.34%
25	5.26
30	5.10
35	4.90
40	4.58
45	4.22
50	3.95
55	3.83
60	3.66

Turnover

Estimated by excluding participants with less than one year of service and assuming that all other employees terminate at the following rates.

<u>Age</u>	<u>Annual Rate of Withdrawal</u>
20	5.44%
25	5.29
30	5.07
35	4.70
40	4.19
45	3.54
50	2.47
55	.94
60	--

Retirement Ages

Hazardous Duty, Tier 0 and Tier I: Age 53 and 25 years of service.
All other, Tier 0 and Tier I: Age 61 and 10 years of service.
Tier II: Age 65 and 10 years of service or age 70 and 5 years of service, or for Hazardous Duty Members, 25 years of service.

Social Security Wage Base
Increases

3½% compounded annually.

Disability

<u>Age</u>	<u>Annual Rate of Disability</u>
20	.06
25	.09
30	.11
35	.15
40	.22
45	.36
50	.61
55	1.01
60	--

Service-connected are assumed to comprise 50% of total disabilities for Hazardous Duty and 20% for others.

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 cost value: assets are written up (or down) by 20% of the difference between market value and adjusted cost value, plus an additional write-up (or write-down) as necessary so that the resulting adjusted cost value is within 20% of market value.

EXHIBIT B

ANALYSIS BY AGE AND SERVICE

ANALYSIS BY AGE AND SERVICE - PLAN B
ACTIVE MEMBERS*

AGE	YEARS OF SERVICE											ALL YEARS			
	UNDER 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 & Up						
Under 20	29														29
20 to 24	1,279	120													1,399
25 to 29	2,668	1,466	55												4,189
30 to 34	1,978	2,217	560	45											4,800
35 to 39	1,588	1,482	935	534	33										4,572
40 to 44	1,188	1,032	618	748	365	37									3,988
45 to 49	971	779	492	510	361	329	40								3,482
50 to 54	793	642	471	485	281	308	280	40							3,300
55 to 59	572	474	414	474	242	171	177	184	64						2,772
60 to 64	295	276	253	301	195	92	41	68	182						1,703
65 & Up	102	108	91	101	62	33	18	19	59						593
TOTALS	11,463	8,596	3,889	3,198	1,539	970	556	311	305						30,827
<u>AVERAGE SALARIES*</u>															
Under 20	\$11,220														\$11,220
20 to 24	14,349	\$15,670													14,462
25 to 29	16,664	17,859	\$18,479												17,106
30 to 34	18,749	21,084	21,309	\$21,979											20,156
35 to 39	20,387	22,802	24,929	23,520	\$25,359										22,500
40 to 44	21,284	21,682	24,825	25,955	24,530	\$23,819									23,133
45 to 49	23,574	21,191	26,119	26,669	27,233	25,861	\$25,339								24,469
50 to 54	23,208	20,759	23,558	25,153	26,830	28,537	26,255	\$27,065							24,179
55 to 59	23,981	19,485	23,232	23,748	25,697	29,242	30,318	28,876	\$30,417						24,413
60 to 64	24,899	18,942	21,171	23,024	24,989	25,732	30,587	26,447	30,854						23,939
65 & Up	27,083	17,056	19,901	21,039	21,574	27,527	23,484	36,370	29,532						23,006
TOTALS	\$19,454	\$20,604	\$23,742	\$24,726	\$25,725	\$27,274	\$27,712	\$28,569	\$30,506						\$21,772

* Based on Members included in valuation.

ANALYSIS BY AGE AND SERVICE - PLAN C
ACTIVE MEMBERS*

AGE	YEARS OF SERVICE											40 & Up	40 & Up	ALL YEARS		
	Under 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 & Up	40 & Up	ALL YEARS					
Under 20	6															6
20 to 24	76	11														87
25 to 29	196	205	18													419
30 to 34	169	247	124	5												545
35 to 39	147	185	145	69	2											548
40 to 44	169	174	134	78	34	1										590
45 to 49	194	216	134	69	35	60	6									714
50 to 54	255	301	249	120	56	79	87	9								1,156
55 to 59	254	388	371	236	86	57	68	84	26							1,570
60 to 64	176	343	364	278	95	53	43	52	126							1,530
65 & Up	58	125	160	129	53	25	20	27	69							666
TOTALS	1,700	2,195	1,699	984	361	275	224	172	221							7,831
<u>AVERAGE SALARIES*</u>																
Under 20	\$17,747															\$17,747
20 to 24	14,147	\$13,733														14,095
25 to 29	16,254	17,233	\$17,382													16,781
30 to 34	18,893	20,064	19,559	\$19,800												18,963
35 to 39	17,856	20,801	22,932	21,371	\$16,913											20,633
40 to 44	18,692	19,648	20,900	21,299	18,908	\$27,858										19,848
45 to 49	19,693	18,802	21,801	22,709	23,114	22,444	\$22,472									20,533
50 to 54	19,417	18,594	21,457	20,627	22,840	23,914	22,452	\$20,195								20,475
55 to 59	19,132	18,532	20,453	21,504	22,023	25,544	23,153	22,456	\$24,509							20,485
60 to 64	19,499	18,583	20,360	20,506	22,424	25,146	27,363	25,386	24,003							20,851
65 & Up	22,505	18,676	21,123	21,736	22,578	26,021	25,820	25,518	26,694							22,099
TOTALS	\$18,456	\$18,889	\$20,898	\$21,196	\$22,120	\$24,374	\$23,909	\$23,705	\$24,904							\$20,281

* Based on Members included in valuation.

ANALYSIS BY AGE AND SERVICE - HAZARDOUS DUTY - TIER 0 & TIER I
ACTIVE MEMBERS*

AGE	YEARS OF SERVICE											ALL YEARS	
	UNDER 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 & Up				
Under 20													107
20 to 24	107												426
25 to 29	316	110											558
30 to 34	193	265	95	5									548
35 to 39	102	136	241	64	5								466
40 to 44	48	62	109	157	86	4							363
45 to 49	31	46	61	90	63	61	11						244
50 to 54	18	35	32	51	38	27	35	8					164
55 to 59	12	20	9	34	29	14	16	24	6				88
60 to 64	4	14	10	19	11	6	7	4	13				18
65 & Up	1	3	2	4	1		2		4				2,982
TOTALS	832	691	559	424	233	113	71	36	23				

AVERAGE SALARIES*

Under 20															\$15,441
20 to 24	\$15,441														20,413
25 to 29	20,238	\$20,914													21,208
30 to 34	19,672	21,689	\$23,806	\$24,683											24,241
35 to 39	17,813	19,856	27,512	30,652	\$34,891										25,768
40 to 44	16,026	20,131	25,439	29,777	27,998	\$33,664									24,587
45 to 49	16,279	19,787	21,570	27,314	27,712	27,830	\$26,608								21,960
50 to 54	17,235	14,930	24,206	24,904	23,734	26,096	21,023	\$22,052							18,862
55 to 59	10,351	19,676	13,299	19,195	16,186	31,549	23,898	19,130	\$8,476						17,025
60 to 64	11,249	17,995	19,878	13,132	11,598	11,291	21,403	20,102	25,185						14,227
65 & Up	20,418	17,137	7,250	3,791	1,294	200	17,828		29,361						\$22,335
TOTALS	\$18,552	\$20,444	\$25,032	\$26,901	\$24,851	\$26,960	\$22,484	\$19,887	\$21,553						

* Based on Members included in Valuation.

ANALYSIS BY AGE AND SERVICE - HAZARDOUS DUTY - TIER II
ACTIVE MEMBERS*

AGE	YEARS OF SERVICE										ALL YEARS	
	UNDER 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 & Up			
Under 20												
20 to 24	43											43
25 to 29	46	1										47
30 to 34	19	2										21
35 to 39	10		1									11
40 to 44	9											9
45 to 49	2											2
50 to 54	3											3
55 to 59	1											1
60 to 64	1											1
65 & Up												
TOTALS	134	3	1									138

AVERAGE SALARIES*

Under 20												
20 to 24	\$16,340											\$16,340
25 to 29	17,908	\$17,638										17,902
30 to 34	14,605	17,944										14,924
35 to 39	10,873		\$26,706									12,312
40 to 44	15,876											15,876
45 to 49	18,977											18,977
50 to 54	21,163											21,163
55 to 59	19,426											19,426
60 to 64	23,654											23,654
65 & Up												
TOTALS	\$16,417	\$17,842	\$26,706									\$16,523

* Based on Members included in valuation.

ANALYSIS BY AGE AND SERVICE - TIER II - ALL OTHERS
ACTIVE MEMBERS*

AGE	YEARS OF SERVICE										ALL YEARS
	UNDER 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40	40 & Up		
Under 20	26										26
20 to 24	578	4									582
25 to 29	712	23									735
30 to 34	432	30	24	1							487
35 to 39	264	18	46	4							332
40 to 44	183	9	13	2							207
45 to 49	107	10	13	2							132
50 to 54	90	4	9	11							115
55 to 59	54	3	6	1	1						67
60 to 64	29	1	5	3					1		38
65 & Up	17	5	2	1	1						26
TOTALS	2,492	107	118	25	2				2	1	2,747

AVERAGE SALARIES*

Under 20	\$10,635										\$10,635
20 to 24	11,730	\$9,931									11,718
25 to 29	12,402	14,571									12,470
30 to 34	14,293	16,722	\$20,283	\$27,362							14,764
35 to 39	16,549	19,964	24,437	22,056							17,892
40 to 44	16,737	16,769	26,348	26,194							17,433
45 to 49	18,707	15,809	21,255	10,186							18,609
50 to 54	15,925	34,548	18,971	17,658					\$15,631		16,974
55 to 59	19,441	14,261	15,558	24,514	\$7,570				3,326	\$19,276	18,517
60 to 64	16,793	18,814	16,831	20,767							17,164
65 & Up	25,886	15,880	27,451	10,549	16,696						23,138
TOTALS	\$14,007	\$17,047	\$22,312	\$19,198	\$12,133				\$9,479	\$19,276	\$14,526

* Based on Members included in valuation.

EXHIBIT C

RETIRED BENEFIT ANALYSIS

ANALYSIS OF RETIRED MEMBERS
BY CURRENT AGE

<u>AGE</u>	<u>NUMBER OF RETIREES</u>				<u>AVERAGE BENEFIT</u>			
	<u>SERVICE</u>	<u>DISABILITY</u>		<u>HAZARDOUS DUTY</u>	<u>SERVICE</u>	<u>DISABILITY</u>		<u>HAZARDOUS DUTY</u>
		<u>SERVICE CONNECTED</u>	<u>NON-SERVICE CONNECTED</u>			<u>SERVICE CONNECTED</u>	<u>NON-SERVICE CONNECTED</u>	
less than 40		29	10		\$6,712	\$4,337		
40-44		25	14		7,988	5,441		
45-49	4	43	43	18	6,918	6,822	\$15,074	
50-54	151	48	112	83	6,456	6,542	13,692	
55-59	1,106	57	146	110	6,111	5,641	13,449	
60-64	2,108	56	228	98	6,029	5,398	12,905	
65-69	3,499	68	167	63	6,224	5,604	11,627	
70-74	3,128	46	191	34	5,958	5,969	9,652	
75-79	2,102	30	143	23	5,909	5,214	7,293	
80-84	1,182	14	78	4	4,636	4,385	5,514	
85-89	545	5	18		2,619	3,805		
90-94	162	1	4		1,981	4,567		
95-99	22		3			4,588		
100-104	2					3,029		
105-109	1					1,874		
TOTALS	14,012	422	1,157	433	\$6,261	\$5,587	\$12,476	

ANALYSIS OF RETIRED MEMBERS
BY YEAR OF RETIREMENT

YEAR OF RETIREMENT	NUMBER OF RETIREES				AVERAGE BENEFIT			
	DISABILITY		HAZARDOUS DUTY		DISABILITY		HAZARDOUS DUTY	
	SERVICE CONNECTED	NON-SERVICE CONNECTED	SERVICE CONNECTED	NON-SERVICE CONNECTED	SERVICE CONNECTED	NON-SERVICE CONNECTED	SERVICE CONNECTED	NON-SERVICE CONNECTED
Pre-1954	81	9	41	5	\$5,102	\$2,817	\$3,298	\$4,929
1954	31	1	3	3	4,878	3,227	3,715	4,820
1955	43	2	3	1	5,299	3,022	3,445	4,732
1956	42	1	8	4	4,633	4,542	4,489	5,174
1957	56	5	8	4	5,423	4,990	4,736	5,310
1958	60	6	6	3	4,300	4,440	4,273	5,567
1959	96	4	7	7	4,724	4,088	4,386	6,842
1960	76	7	6	6	4,624	3,556	3,861	6,906
1961	96	3	9	3	5,026	5,066	3,911	6,344
1962	141	11	8	1	5,256	4,076	3,750	6,457
1963	155	8	14	2	5,258	4,294	4,420	6,164
1964	170	13	18	1	4,458	5,906	4,179	6,655
1965	175	7	9	1	5,084	4,731	4,508	92,78
1966	201	10	25	0	5,201	4,470	4,180	0
1967	210	8	31	1	4,830	4,126	4,762	9,195
1968	274	17	38	2	5,641	4,866	4,249	6,085
1969	438	15	37	1	6,350	5,623	5,446	5,770
1970	436	14	68	3	6,911	5,333	5,696	6,857
1971	609	19	92	6	7,185	7,043	5,738	9,720
1972	727	32	98	27	7,494	6,951	6,141	11,270
1973	781	31	104	24	7,613	8,224	6,492	12,464
1974	611	28	73	25	6,956	8,275	6,937	13,515
1975	961	51	95	22	7,638	7,622	6,839	14,774
1976	1,019	16	67	28	6,758	6,691	6,259	12,550
1977	828	13	35	16	6,484	4,932	5,608	11,831
1978	852	10	48	27	6,470	5,779	4,832	13,598
1979	1,598	14	56	45	6,699	6,419	4,881	13,056
1980	1,054	16	41	34	6,380	4,997	4,815	12,797
1981	836	23	42	53	7,055	6,685	4,887	13,304
1982	733	14	41	37	7,279	7,311	5,864	14,111
1983*	618	13	25	41	8,518	7,209	7,140	15,286

* Through September 1983.