

CONNECTICUT STATE EMPLOYEES  
RETIREMENT SYSTEM

June 30, 1986  
ACTUARIAL VALUATION

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CONSULTING ACTUARIES

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November 20, 1986

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 June 30, 1986 and presents cost figures for the fiscal year beginning July 1, 1987.

As summarized in Section I, the recommended contribution for the fiscal year beginning July 1, 1987, including Federal reimbursements, is \$321,597,993. This represents an increase of 2.78 million over 1986-87 costs.

The actuarial method and assumptions used in this valuation are described in Section II of the report; there have been no changes since the last valuation.

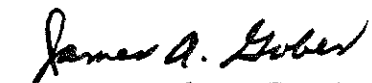
The membership data provided to us was as of June 30, 1986 and included actual compensation paid during fiscal year 1985-1986 (which has been reconciled to total State figures). Compensation figures were brought up to July 1, 1986 payroll levels by adjusting for negotiated increases, estimated merit increases, and for unreported Workers Compensation payments through that date. 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 (nor the financial data referred to below), they are consistent with comparable data from the previous valuation.

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.

The final section of the report outlines our understanding of the benefit provisions embodied in the Connecticut statutes, as amended through 1984.

In our opinion this report fairly presents the financial and actuarial position of the Connecticut State Employees Retirement System as of June 30, 1986, in accordance with generally accepted actuarial principles applied on a basis consistent with the prior valuation. 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,

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

JAG/sf

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CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION I

SUMMARY OF JUNE 30, 1985 VALUATION

A. Highlights

The recommended contribution for Fiscal Year 1987 is \$321,597,993. Compared to the FY 1986 contribution of \$318,816,449 this represents an increase of \$2.78 million.

Covered earnings are projected to increase to \$1.37 billion as of July 1987. Thus as a percent of earnings, costs are projected to decline by approximately 1% from 24.53% to 23.45%.

Now that funding is at the 100% level, the Past Service Payment will remain (approximately) level and become a reducing percentage of pay. In fact, the Unfunded Liability decreased, as a result of net actuarial gains (principally investments), so that the Past Service payment dropped by \$3.72 million. Because the Tier II Unfunded was reduced to zero, only total Unfunded Liability figures are shown in the report.

The Normal Cost component of FY 1987 costs increased by \$6.50 million and increased slightly as a percent of covered earnings from 8.79% to 8.81%.

The market value of assets increased by \$437.8 million to a total of \$1.6 billion.

SECTION I

B. 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 June 30:

<u>ASSETS</u>	<u>June 30,</u> <u>1985</u>	<u>June 30,</u> <u>1986</u>
Retirement Fund (Adjusted basis)	\$1,093,829,096	\$1,410,707,371
Present value of future Normal Cost contributions	1,259,834,961	1,311,268,744
Unfunded Accrued Liability	<u>2,665,437,082</u>	<u>2,643,312,667</u>
TOTAL ASSETS	\$5,019,101,139	\$5,365,288,782
 <u>LIABILITIES</u>		
Present value of benefits		
Active Members		
Tier I	\$ 3,464,634,014	\$3,588,294,820
Tier II	114,625,714	163,133,861
Retired Members	1,431,142,322	1,603,731,234
Terminated Vested Members	<u>8,699,089</u>	<u>10,128,867</u>
TOTAL LIABILITIES	\$ 5,019,101,139	\$5,365,288,782

SECTION I

C. Projection of Normal Costs

The valuation calculated Normal Costs as of July 1, 1986 based on earnings as of that date, including adjustments for negotiated settlements and for July 1 increases. Earnings were projected to July 1, 1987 by assuming that 6% of the Tier I employees will terminate during the twelve month period and be replaced by Tier II employees at 75% of the terminated employee's earnings level; remaining Tier I employees and all Tier II employees (including replacements of Tier II terminations) are assumed to receive increases as of July 1, 1987 equal to 10%. This produced the following projected Normal Costs:

<u>Tier</u>	<u>Plan</u>	<u>Estimated Earnings 7/1/86</u>	<u>Normal Cost Percentage</u>	<u>Projected Earnings 7/1/87</u>	<u>Normal Cost 7/1/87</u>
I	HD	\$ 103,106,101	13.0606%	\$106,611,708	\$13,924,129
I	B	861,884,610	9.0638	891,188,687	80,775,560
I	C	<u>139,382,905</u>	6.9651	<u>144,121,924</u>	<u>10,038,236</u>
Total Tier I		\$1,104,373,616		\$1,141,922,319	\$104,737,925
II	HD	\$ 14,942,336	11.1729%	\$ 21,076,344	\$ 2,354,839
	Other	<u>148,646,355</u>	6.5740	<u>208,568,029</u>	<u>13,711,262</u>
Total Tier II		\$163,588,691		\$ 229,644,373	\$16,066,101
Grand Total		\$1,267,962,307		\$1,371,566,692	\$120,804,026

1987 Normal Cost (as percent of Earnings)

Tier I	9.17%
Tier II	7.00%
Total	8.81%

SECTION I

D. Projection of Total Cost

The Unfunded Liability as of the valuation date (the beginning of the fiscal year) was brought forward to the end of the fiscal year by adding interest and the fiscal year Normal Cost, with interest, and subtracting expected contributions, also with interest:

<u>Development of Unfunded</u>	<u>Fiscal Year</u> <u>1985-86</u>	<u>Fiscal Year</u> <u>1986-87</u>
Unfunded Accrued Liability, 7-1	\$2,665,437,082	\$2,643,312,667
+ Interest	199,907,781	198,248,450
+ Normal Cost	102,549,159	114,299,990
+ Interest	3,479,083	3,877,741
- State Payments	234,323,831	280,091,209
- Federal Payments	38,585,700	38,725,240
- Employee Contributions	25,200,049	26,051,098
- Interest	<u>10,113,666</u>	<u>11,699,976</u>
Unfunded Accrued Liability, 6-30	\$2,663,149,859	\$2,603,171,325
Amortization Period	40 years	39 years
	*****	
<u>Summary of Costs</u>		
Normal Cost	\$ 114,299,990	\$ 120,804,026
Amortization of Unfunded	<u>204,516,459</u>	<u>200,793,967</u>
Total Cost	\$ 318,816,449	\$ 321,597,993
 Total Cost (as a percent of payroll)	 24.53%	 23.45%



CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

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 earnings 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 June 30, 1986, costs have been projected to July 1, 1987 in order to correspond to the fiscal year as follows:

SECTION II

A. Funding Method (cont'd)

- A. Normal costs were determined as a percentage of earnings, by Tier, as of July 1, 1986. Earnings were projected to July 1, 1987, separately for each Tier because of the shifting Tier populations, and the projected earnings were then multiplied by the normal cost factors, by Tier.
- B. The Unfunded Accrued Liability was determined as of June 30, 1986, and brought forward to June 30, 1987 by adding the Normal Cost plus interest and subtracting expected employee, State, and Federal contributions, also with interest. This amount was amortized over the 39 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.

SECTION II

B. Actuarial Assumptions

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

Investment Return 7½% compounded annually.

Salary Scale	<u>Age</u>	<u>Annual Rate of Increase</u>
	20	6.34%
	25	6.26
	30	6.10
	35	5.90
	40	5.58
	45	5.22
	50	4.95
	55	4.83
	60	4.66

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	--

SECTION II

B. Actuarial Assumptions (cont'd)

Retirement Ages

Hazardous Duty, Age 53 and 25 years of service.

All other, 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 (Per 1000 lives)</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.

SECTION II

B. Actuarial Assumptions (cont'd)

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.

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION III

MEMBERSHIP DATA

A. Active Members

We received data on a total of 49,204 members, including employees of State Aided Institutions. The following analysis compares this data with the July 1, 1985 data (see Exhibit B for distribution by age and service).

	<u>7-1-85</u>	<u>7-1-86</u>	<u>Change</u>	<u>Per Cent Change</u>
Total Employees	49,418	49,204	- 214	- 0.4%
Total Earnings (000's)	\$ 1,191.2	\$ 1,268.0	+\$ 76.8	+ 6.4%
Average Earnings	\$24,105	\$25,769	+\$1,664	+ 6.9%

Of the active records submitted to us, 332 were rejected due to missing or invalid dates of birth and/or hire. Cost calculations were done using the valid records and then adjusted proportionately for the rejected records.

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.

SECTION III

B. Actives By Plan

<u>Number of Members</u>	<u>7-1-85</u>	<u>7-1-86</u>	<u>Change</u>	<u>Per Cent Change</u>
Hazardous Duty	3,521	3,695	+ 174	+ 4.9%
Plan B	30,955	29,554	-1,401	- 4.5
Plan C	5,415	5,069	- 346	- 6.4
Tier II	9,527	10,886	+1,359	+ 14.3
 <u>Total Annual Compensation (millions)</u>				
Hazardous Duty	\$109.7	\$118.0	+\$ 8.3	+ 7.6%
Plan B	843.4	861.9	+ 18.5	+ 2.2
Plan C	130.5	139.4	+ 8.9	+ 6.8
Tier II	107.6	148.6	+ 41.0	+ 38.1
 <u>Average Compensation</u>				
Hazardous Duty	\$ 31,155	\$31,948	+\$ 793	+ 2.5%
Plan B	27,247	29,163	+ 1,916	+ 7.0
Plan C	24,106	27,497	+ 3,391	+ 14.1
Tier II	11,293	13,655	+ 2,362	+ 20.9

Hazardous Duty Members include 789 Tier II Members; the number of Hazardous Duty Members continues to increase but the average compensation appears to reflect reduced levels of overtime during the past year. Plan C continues to decrease more rapidly than Plan B. Tier II average earnings reflect the reducing portion of new employees with earnings for less than a full year.

SECTION III

B. Actives By Plan (cont'd)

This analysis of age and service excludes 3,876 employees with less than one year of service and the 332 records with incorrect birth dates or hire dates.

	<u>7-1-85</u>	<u>7-1-86</u>	<u>Change</u>
<u>Average Age</u>			
Hazardous Duty	38.9	38.6	- 0.3
Plan B	42.4	43.3	+ 0.9
Plan C	53.3	53.7	+ 0.4
Tier II	34.5	34.3	- 0.2

Average Years of Service

Hazardous Duty	10.5	9.4	- 1.1
Plan B	10.6	10.5	- 0.1
Plan C	13.1	12.3	- 0.8
Tier II	2.4	2.0	- 0.4

Tier I ages go up less than one year because of retirements. Tier I service is understated on average by 0.6 years because the data received did not include all the completed purchases (however, costs include an adjustment for the missing records). Tier II service appears to decrease because the initial Tier II block included a group of pre-1973 employees who had declined participation; this group is now outweighed by new entrants.



SECTION III

C. Retired and Terminated Vested Members

The following compares the current retired data with the June 30, 1985 data. [See Exhibit C for analysis of retirees by age, year of retirement and type of retirement].

	<u>6-30-85</u>	<u>6-30-86</u>	<u>Change</u>	<u>Per Cent Change</u>
<u>Pensioners</u>				
Number	17,237	18,108	+ 871	+ 5.1%
Total Annual Benefit*	\$127,521	\$143,327	+\$15,806	+12.4
Average Monthly Benefit	\$ 617	\$ 660	+\$ 43	+ 7.0

Beneficiaries

Number	672	672	+ 0	+ 0.0%
Total Annual Benefit*	\$ 4,050	\$ 4,514	+\$464	+11.5
Average Monthly Benefit	\$ 502	\$ 560	+\$ 58	+11.5

Terminated Vested

Number	536	500	- 36	- 6.7%
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\* (000 omitted)

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION IV

RETIREMENT FUND

A. Summary of Fund

Market Value, July 1, 1985 \$1,200,908,489

Contributions

State	\$234,192,330	
Federal	38,725,240	
Employee	30,493,415	
General Assembly Transfer	<u>770,355</u>	
		\$ 304,181,340

Investment Income

Interest and Dividends	\$ 91,250,106	
Realized Gains	10,589,632	
Change in Unrealized Gains	<u>177,973,874</u>	
		\$ 279,813,612

Disbursements

Benefit payments	\$140,168,294	
Employee refunds	5,799,454	
Transferred to		
Public Defender Fund	74,214	
Expenses (Net)	<u>111,494</u>	
		\$ 146,153,456

Market Value, June 30, 1986 \$1,638,749,985

SECTION IV

B. June 30, 1986 Assets

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

Cash		\$22,145,905.33
Accrued Interest		7,101,290.51
Investments		
Short Term	\$ 88,315,665.00	
Fixed Income	493,477,644.62	
Equity	697,948,993.00	
Contract	9,619,665.50	
Mortgage	123,842,558.40	
Real Estate	<u>196,298,262.85</u>	
		<u>\$1,609,502,789.37</u>
Total Market Value of Assets June 30, 1986		\$1,638,749,985.21

SECTION IV

C. Adjusted Cost Value

	<u>Book Value</u>	<u>Market Value</u>	<u>Adjusted Cost Value</u>
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	759,544,293	801,667,095	767,984,244
12-31-84	940,059,215	991,903,114	957,179,954
6-30-85	1,049,938,509	1,200,908,489	1,093,829,096
6-30-86	1,309,806,130	1,638,749,985	1,410,707,371

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

The derivation of the 1986 Adjusted Cost Value is shown below.

1.	Adjusted cost value, 6-30-85	\$1,093,829,096
2.	Net new money, all sources	259,867,621
3.	Preliminary value, 6-30-86, [(1) + (2)]	1,353,696,717
4.	Market value, 6-30-86	1,638,749,985
5.	Current adjustment, 20% [(4) - (3)]	57,010,654
6.	Adjusted Cost Value, 6-30-86, [(3) + (5)] [Must be within <u>±</u> 20% of (4)]	\$1,410,707,371

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION V

SUMMARY OF PLAN PROVISIONS

Effective Date

September 1, 1939

System Eligibility

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.

Tier II [Sec. 23]

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

## Plan Eligibility

### Tier I [Sec. 6]

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. 23]

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.

## Normal Retirement Date

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

Age 47 and 20 years of service.

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 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 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 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  $\frac{1}{2}\%$  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 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 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. 5-161]

5% of earnings.

Plan C [Sec. 5-161]

5% of earnings.

Plan B [Sec. 5-161]

2% of earnings 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 \$550 per month plus \$250 to a surviving dependent child (or \$575 to surviving dependent children).

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 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. Exception: State Police benefit is accrued benefit.

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  $1 \frac{1}{3}\%$  of final average earnings, plus  $\frac{1}{2}\%$  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 I [Sec. 11]	50% Qualified Joint and Survivor (CA) <sup>1</sup> .
Tier II [Sec. 33]	50% or 100% Joint and Survivor (CA). Ten years certain and life. Twenty years certain and life. Life <sup>2</sup> .

<sup>1</sup> Normal Form if married at least 12 months.

<sup>2</sup> 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.
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CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

EXHIBIT A

CERTIFICATION

MILLIMAN & ROBERTSON, INC.  
CONSULTING ACTUARIES

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

WENDELL MILLIMAN, F.S.A. (1976)  
STUART A. ROBERTSON, F.S.A.  
CHAIRMAN EMERITUS

ARTHUR V. ANDERSON, A.S.A.  
DOUGLAS J. BENNETT, A.S.A.  
AUDREY H. BRISSE, A.S.A.  
DOUGLAS M. GEUDER, F.S.A.  
JAMES A. GOBES, F.S.A.  
LESLIE E. KORPER, II, F.S.A.  
ROBERT A. MILLER, III, F.C.A.S.  
WILLIAM C. PROUTY, F.S.A.  
WALTER S. RUGLAND, F.S.A.  
ALTHEA A. SCHWARTZ, F.S.A.

November 20, 1986

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, 1986.

The valuation was made with respect to the following Members:

- a. 18,780 pensioners (including 672 beneficiaries of deceased Members).
- b. 49,204 active Members with total annual payroll as of July 1, 1986 of \$1,267,962,307.
- c. 500 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. Accrued liability:

a. Active Members	\$2,440,159,937
b. Retired Members and Beneficiaries	1,603,731,234
c. Vested former Members	10,128,867
d. Total	\$4,054,020,038

2. Assets in fund (at adjusted cost value)	\$1,410,707,371
3. Unfunded liability (Item 1d less Item 2)	\$2,643,312,667
4. Present Value of Vested Benefits	\$2,789,549,244

Based on the valuation as of June 30, 1986, projected costs were developed for the fiscal year beginning July 1, 1987, as follows:

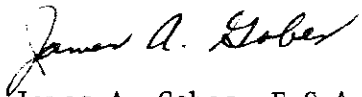
1. Employer Normal Cost

Tier I	\$104,737,925
Tier II	16,066,101
Total	<u>\$120,804,026</u>

2. Payment on Unfunded Liability*	\$200,793,967
3. Total Employer Cost	\$321,597,993

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

MILLIMAN & ROBERTSON, INC.



James A. Gobes, F.S.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	7½% compounded annually.																				
Salary Scale	<table><thead><tr><th><u>Age</u></th><th><u>Annual Rate of Increase</u></th></tr></thead><tbody><tr><td>20</td><td>6.34%</td></tr><tr><td>25</td><td>6.26</td></tr><tr><td>30</td><td>6.10</td></tr><tr><td>35</td><td>5.90</td></tr><tr><td>40</td><td>5.58</td></tr><tr><td>45</td><td>5.22</td></tr><tr><td>50</td><td>4.95</td></tr><tr><td>55</td><td>4.83</td></tr><tr><td>60</td><td>4.66</td></tr></tbody></table>	<u>Age</u>	<u>Annual Rate of Increase</u>	20	6.34%	25	6.26	30	6.10	35	5.90	40	5.58	45	5.22	50	4.95	55	4.83	60	4.66
<u>Age</u>	<u>Annual Rate of Increase</u>																				
20	6.34%																				
25	6.26																				
30	6.10																				
35	5.90																				
40	5.58																				
45	5.22																				
50	4.95																				
55	4.83																				
60	4.66																				
Turnover	Estimated by excluding participants with less than one year of service and assuming that all other employees terminate at the following rates. <table><thead><tr><th><u>Age</u></th><th><u>Annual Rate of Withdrawal</u></th></tr></thead><tbody><tr><td>20</td><td>5.44%</td></tr><tr><td>25</td><td>5.29</td></tr><tr><td>30</td><td>5.07</td></tr><tr><td>35</td><td>4.70</td></tr><tr><td>40</td><td>4.19</td></tr><tr><td>45</td><td>3.54</td></tr><tr><td>50</td><td>2.47</td></tr><tr><td>55</td><td>.94</td></tr><tr><td>60</td><td>--</td></tr></tbody></table>	<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	--
<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

Age	Annual Rate of Disability (Per 1000)
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.

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

EXHIBIT B

ANALYSIS BY AGE AND SERVICE

ANALYSIS BY AGE AND SERVICE - HAZARDOUS DUTY - 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										
20 to 24	26									26
25 to 29	235	72	1							308
30 to 34	197	209	113							519
35 to 39	110	148	249	68	3					578
40 to 44	78	73	126	171	80	1				529
45 to 49	55	30	46	85	111	34	2			363
50 to 54	36	27	36	56	52	26	11			244
55 to 59	29	18	20	27	30	13	12	1		150
60 to 64	7	10	12	15	17	8	10	3	1	83
65 & Up	1	5	3	4	2	1	2		1	19
TOTALS	774	592	606	426	295	83	37	4	2	2,819

AVERAGE SALARIES\*

Under 20										
20 to 24	\$ 27,335									\$27,335
25 to 29	28,163	30,861	\$44,054							28,845
30 to 34	29,058	32,072	33,620							31,265
35 to 39	29,109	31,992	35,016	36,754	\$31,095					33,302
40 to 44	29,167	32,766	35,265	36,808	40,392	\$38,006				35,300
45 to 49	31,016	32,061	34,800	34,932	38,526	39,915	\$42,916			35,694
50 to 54	30,118	31,007	34,769	35,602	36,973	39,820	41,525			35,170
55 to 59	30,489	32,103	30,986	32,802	34,353	37,253	45,930	27,154		33,737
60 to 64	31,180	29,495	33,999	32,214	32,506	38,219	42,937	34,520	24,836	33,982
65 & Up	30,110	31,968	33,150	35,697	35,181	33,861	39,688		42,753	34,660
TOTALS	\$ 29,009	\$31,898	\$34,629	\$35,841	\$37,889	\$39,209	\$43,311	\$32,679	\$33,795	\$33,282

\* Based on Members and salaries input to Valuation.

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

AGE	<u>YEARS OF SERVICE</u>									ALL YEARS
	<u>UNDER 5</u>	<u>5 to 10</u>	<u>10 to 15</u>	<u>15 to 20</u>	<u>20 to 25</u>	<u>25 to 30</u>	<u>30 to 35</u>	<u>35 to 40</u>	<u>40 &amp; Up</u>	
Under 20	1									1
20 to 24	108									108
25 to 29	216	1								217
30 to 34	106									106
35 to 39	56									56
40 to 44	27		1							28
45 to 49	9				1					10
50 to 54	2									2
55 to 59	4									4
60 to 64										
65 & Up										
TOTALS	529	1	1		1					532

AVERAGE SALARIES\*

Under 20	\$14,426								\$14,426
20 to 24	19,993								19,993
25 to 29	21,542	35,413							21,606
30 to 34	22,352								22,352
35 to 39	22,752								22,752
40 to 44	21,612		\$33,639						22,041
45 to 49	24,078				\$39,371				25,608
50 to 54	25,681								25,681
55 to 59	24,066								24,066
60 to 64									
65 & Up									
TOTALS	\$21,584	\$35,413	\$33,639		\$39,371				\$21,666

\* Based on Members and salaries input to valuation.

ANALYSIS BY AGE AND SERVICE - PLAN B  
ACTIVE MEMBERS\*

AGE	<u>YEARS OF SERVICE</u>									<u>ALL YEARS</u>
	<u>UNDER 5</u>	<u>5 to 10</u>	<u>10 to 15</u>	<u>15 to 20</u>	<u>20 to 25</u>	<u>25 to 30</u>	<u>30 to 35</u>	<u>35 to 40</u>	<u>40 &amp; Up</u>	
Under 20										
20 to 24	385	103								488
25 to 29	1,214	1,402	85							2,701
30 to 34	1,202	2,246	797	30						4,275
35 to 39	1,052	1,716	1,262	538	49					4,617
40 to 44	937	1,292	822	716	453	34				4,254
45 to 49	688	974	567	546	456	306	46			3,583
50 to 54	563	899	522	525	394	318	224	26		3,471
55 to 59	436	735	504	547	376	246	177	37	10	3,068
60 to 64	230	418	272	372	282	164	79	45	17	1,879
65 & Up	54	141	125	96	95	54	33	13	11	622
TOTALS	6,761	9,926	4,956	3,370	2,105	1,122	559	121	38	28,958

AGE	<u>AVERAGE SALARIES*</u>									
Under 20										
20 to 24	\$17,273	\$17,512								\$17,323
25 to 29	20,661	20,874	\$21,861							20,809
30 to 34	23,315	24,215	25,287	\$24,089						24,160
35 to 39	25,532	26,386	29,393	28,736	\$26,909					27,293
40 to 44	27,633	27,104	29,805	32,231	30,927	\$28,623				29,025
45 to 49	28,198	26,889	27,930	30,911	32,781	33,220	\$34,026			29,300
50 to 54	29,822	27,856	27,214	30,259	31,475	34,035	33,567	\$31,946		29,818
55 to 59	29,973	28,239	28,043	29,348	29,678	34,122	36,847	32,024	\$33,897	29,860
60 to 64	29,462	28,957	26,954	27,878	31,562	32,312	35,606	40,216	39,139	29,840
65 & Up	32,487	29,356	29,937	27,948	27,831	30,562	32,050	43,192	33,545	29,905
TOTALS	\$25,188	\$25,588	\$28,017	\$30,009	\$31,060	\$33,249	\$34,842	\$36,254	\$36,140	\$27,356

\* Based on Members and salaries input to valuation.

ANALYSIS BY AGE AND SERVICE - PLAN C  
ACTIVE MEMBERS\*

AGE	<u>YEARS OF SERVICE</u>									
	<u>UNDER 5</u>	<u>5 to 10</u>	<u>10 to 15</u>	<u>15 to 20</u>	<u>20 to 25</u>	<u>25 to 30</u>	<u>30 to 35</u>	<u>35 to 40</u>	<u>40 &amp; Up</u>	<u>ALL YEARS</u>
Under 20										
20 to 24	15	2								17
25 to 29	41	67	7							115
30 to 34	69	117	52	5						243
35 to 39	70	106	62	36	3					277
40 to 44	85	139	62	55	10	1				352
45 to 49	94	179	71	56	19	8	7			434
50 to 54	120	254	146	86	33	41	48	5		733
55 to 59	139	309	235	192	72	45	53	17	5	1,067
60 to 64	89	294	266	267	102	49	40	28	22	1,157
65 & Up	46	103	144	142	54	34	23	17	28	591
TOTALS	768	1,570	1,045	839	293	178	171	67	55	4,986

AGE	<u>AVERAGE SALARIES*</u>									
Under 20										
20 to 24	\$ 16,335	\$22,618								\$ 17,074
25 to 29	18,956	20,237	\$ 22,158							19,898
30 to 34	22,430	23,373	22,799	\$ 24,603						23,007
35 to 39	24,646	24,897	24,674	23,081	\$ 18,441					24,478
40 to 44	28,489	26,905	24,449	25,091	25,926	\$18,443				26,519
45 to 49	28,504	27,283	24,312	24,144	25,028	29,750	\$25,509			26,574
50 to 54	28,767	27,958	24,779	23,262	28,815	26,518	28,667	\$ 26,364		26,900
55 to 59	29,121	26,006	23,361	25,536	25,176	30,242	33,770	30,874	22,707	26,315
60 to 64	30,049	24,246	23,610	24,069	25,847	24,481	34,448	31,538	31,087	25,316
65 & Up	34,553	29,050	25,454	25,201	25,106	29,796	28,938	37,945	30,520	27,681
TOTALS	\$ 27,552	\$ 25,895	\$ 24,082	\$ 24,546	\$ 25,754	\$ 27,625	\$ 31,508	\$ 32,609	30,036	25,925

\* Based on Members and salaries input to Valuation.

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

AGE	<u>YEARS OF SERVICE</u>									ALL YEARS
	<u>UNDER 5</u>	<u>5 to 10</u>	<u>10 to 15</u>	<u>15 to 20</u>	<u>20 to 25</u>	<u>25 to 30</u>	<u>30 to 35</u>	<u>35 to 40</u>	<u>40 &amp; Up</u>	
Under 20	55									55
20 to 24	1,389	4								1,393
25 to 29	1,782	11								1,793
30 to 34	1,280	20	6	1						1,307
35 to 39	924	22	23	28	1					998
40 to 44	690	14	17	21						742
45 to 49	427	9	7	7						450
50 to 54	312	10	6	8						336
55 to 59	219	5	1	8	1			1		235
60 to 64	170	5	2	5		1				183
65 & Up	111	4	1	2	1				1	120
TOTALS	7,359	104	63	80	3	1		1	1	7,612

AGE	<u>AVERAGE SALARIES*</u>									
Under 20	\$ 8,778									\$ 8,778
20 to 24	13,543	\$ 8,067								13,528
25 to 29	15,936	18,774								15,954
30 to 34	16,937	16,994	\$ 22,586	\$ 5,375						16,955
35 to 39	16,856	24,095	30,574	26,084	\$32,806					17,607
40 to 44	15,813	16,181	25,568	30,141						16,449
45 to 49	15,938	22,452	31,845	28,819						16,516
50 to 54	15,518	23,064	26,926	25,405						16,182
55 to 59	14,449	7,762	41,098	22,129	3,807			43,060		14,858
60 to 64	14,628	23,491	12,840	21,100		35,539				15,142
65 & Up	7,085	24,171	8,472	24,917	2,744				3,641	7,898
TOTALS	\$ 15,483	\$ 19,656	\$ 27,510	\$ 26,325	\$ 13,119	\$ 35,539		\$43,060	\$3,641	\$ 15,758

\* Based on Members and salaries input to valuation; may include some summer employees.

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

EXHIBIT C

RETIRED BENEFIT ANALYSIS



ANALYSIS OF RETIRED MEMBERS  
BY CURRENT AGE

AGE	-----NUMBER OF RETIREES-----				-----AVERAGE BENEFIT-----			
	SERVICE	DISABILITY		HAZARDOUS	SERVICE	DISABILITY		HAZARDOUS
	<u>SERVICE</u>	<u>SERVICE</u>	<u>NON-SERVICE</u>	<u>HAZARDOUS</u>	<u>SERVICE</u>	<u>SERVICE</u>	<u>NON-SERVICE</u>	<u>HAZARDOUS</u>
		<u>CONNECTED</u>	<u>CONNECTED</u>	<u>DUTY</u>		<u>CONNECTED</u>	<u>CONNECTED</u>	<u>DUTY</u>
less than 40		22	5			\$10,705	\$4,560	
40-44		41	24			7,747	7,232	
45-49		39	41	29		8,708	8,796	\$18,591
50-54	3	62	100	116	17,375	7,537	8,215	16,466
55-59	974	75	161	139	10,398	6,695	6,781	15,559
60-64	2,404	58	191	142	9,312	6,068	6,005	15,292
65-69	3,801	64	174	101	7,954	5,913	5,586	13,481
70-74	3,523	48	144	36	7,423	6,543	6,629	11,819
75-79	2,382	31	133	24	7,285	6,506	6,043	9,838
80-84	1,348	17	78	5	6,837	6,670	5,176	9,397
85-89	616	8	28	1	5,646	5,802	4,394	5,074
90-94	208	2	1		3,712	1,876	3,854	
95-99	37	1	5		4,639	2,124	5,099	
TOTALS	15,296	468	1,085	593	\$7,841	\$6,996	\$6,363	\$14,939

ANALYSIS OF RETIRED MEMBERS  
BY YEAR OF RETIREMENT

YEAR OF RETIREMENT	----- NUMBER OF RETIREES -----				----- AVERAGE BENEFIT -----			
	SERVICE	DISABILITY <sup>1</sup>	DISABILITY <sup>2</sup>	HAZARDOUS DUTY	SERVICE	DISABILITY <sup>1</sup>	DISABILITY <sup>2</sup>	HAZARDOUS DUTY
Pre-1957	134	12	36	7	\$5,505	\$3,495	\$3,571	\$5,385
1957	39	4	6	3	5,896	5,994	5,069	5,776
1958	46	4	4	1	4,717	4,459	4,316	6,999
1959	71	4	5	5	5,247	4,383	4,626	7,579
1960	55	7	4	3	4,861	3,571	3,946	7,035
1961	75	3	8	3	5,454	5,432	4,316	6,802
1962	118	9	6	0	5,723	4,535	4,034	0
1963	127	8	13	2	5,758	4,765	4,752	6,609
1964	119	13	12	1	4,978	6,155	4,747	7,136
1965	140	6	6	1	5,867	5,260	4,946	9,948
1966	161	10	19	0	5,664	4,587	4,628	0
1967	176	7	25	1	5,497	4,462	5,196	9,859
1968	237	13	23	2	6,202	5,521	4,749	6,525
1969	377	14	33	1	6,856	5,973	5,959	6,187
1970	368	12	58	3	7,463	5,532	6,099	7,352
1971	539	18	74	6	7,693	7,086	6,152	10,422
1972	629	29	82	26	8,057	7,209	6,772	11,824
1973	710	28	82	22	8,251	8,845	7,070	13,076
1974	559	26	59	24	7,510	8,877	7,245	14,393
1975	869	50	80	21	8,317	8,202	7,158	15,845
1976	942	16	59	27	7,426	7,316	6,900	13,548
1977	766	12	30	15	7,068	5,421	6,242	12,730
1978	806	10	42	27	6,944	6,307	5,071	14,735
1979	1,501	11	47	44	7,297	6,827	5,394	14,355
1980	992	17	40	35	6,846	5,445	5,147	13,833
1981	805	22	38	53	7,529	6,213	5,421	14,236
1982	694	16	34	36	7,814	7,780	6,753	15,148
1983	707	13	43	48	9,030	8,310	7,521	16,255
1984	893	36	51	64	9,609	8,240	7,083	17,023
1985	993	31	42	71	10,298	7,627	9,388	17,773
1986 (to July)	648	7	24	41	11,243	14,537	9,680	19,466

<sup>1</sup> Service Connected  
<sup>2</sup> Non-Service Connected