

CONNECTICUT STATE EMPLOYEES
RETIREMENT SYSTEM

June 30, 1985
ACTUARIAL VALUATION

MILLIMAN & ROBERTSON, INC.

CONSULTING ACTUARIES

THREE CORPORATE PLACE
BLOOMFIELD, CONNECTICUT 06002

203/243-1138

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ELAINE M. WYANT, F.S.A.

November 22, 1985

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, 1985 and presents cost figures for the fiscal year beginning July 1, 1986.

As summarized in Section I, the recommended contribution for the fiscal year beginning July 1, 1986 is \$318,816,449. This will also be the actual State contribution, including Federal reimbursements, since the total payment will be at the 100% level beginning in 1986.

The actuarial method and assumptions used in this valuation are described in Section II of the report; there has been no change in assumptions since the last valuation except that an estimated liability for outstanding purchases of service has been included for the first time in this valuation.

The membership data provided to us was as of June 30, 1985 and included actual compensation paid during fiscal year 1984-1985 (which has been reconciled to total State figures). Compensation figures were brought up to July 1, 1985 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.

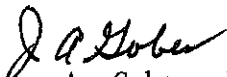
Section IV outlines the status of the retirement fund as reported to us by the Retirement Division and describes the adjustment used to spread unrealized gains and losses.

November 22, 1985

The final section of the report outlines our understanding of the benefit provisions embodied in the Connecticut statutes, as ammended 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, 1985, 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

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION I

SUMMARY OF JUNE 30, 1985 VALUATION

A. Highlights

The recommended contribution for Fiscal Year 1986 is \$318,816,449. This is \$45.9 million and 16.8% higher than the 1985 contribution. Of the increase, \$13.7 million results from the final step in the scheduled increase to 100% of costs. We consider payment of full costs a true landmark for the State Employee System. Assets of the fund also surpassed the \$1 billion mark.

Covered earnings have increased from \$1,047.7 million as of July 1, 1984 to \$1,191.2 million as of July 1, 1985 and are projected to increase to \$1,299.6 million next year. Had costs remained at the 24.07% of earnings determined for 1985, this earnings increase by itself would have generated a cost increase of \$26.2 million. In fact, costs as a percentage of covered earnings went up about $\frac{1}{2}\%$ to 24.53%. In addition to extensions of the Tier I option and inclusion of additional positions under the Hazardous Duty definition, these costs also for the first time include full recognition of outstanding purchases of service (completed purchases have been recognized for two years) and previously unreported Workers Compensation payments.

However, the transition from Tier I to Tier II is beginning to have a favorable impact on costs, the scheduled increases have been completed, and investment results continue to be favorable. These all point to more moderate cost increases in the future.

From a technical perspective, this valuation represents the first time payroll data was based on total paid compensation. Although this created many new problems for us and for the Retirement Division staff, we were able to reconcile the total compensation figures to those provided by the Controllers Department.

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, 1985:

<u>ASSETS</u>	<u>Tier I</u>	<u>Tier II</u>	<u>Total</u>
Retirement Fund (Adjusted basis)	\$1,085,420,746	\$ 8,408,350	\$1,093,829,096
Present value of future Normal Cost contributions	1,161,824,036	98,010,925	1,259,834,961
Unfunded Accrued Liability	<u>2,657,230,643</u>	<u>8,206,439</u>	<u>2,665,437,082</u>
TOTAL ASSETS	\$4,904,475,425	\$114,625,714	\$5,019,101,139
 <u>LIABILITIES</u>			
Present value of benefits			
Active Members	\$3,464,634,014	\$114,625,714	\$3,579,259,728
Retired Members	1,431,142,322	0	1,431,142,322
Terminated Vested Members	<u>8,699,089</u>	<u>0</u>	<u>8,699,089</u>
TOTAL LIABILITIES	\$4,904,475,425	\$114,625,714	\$5,019,101,139

SECTION I

C. Projection of Normal Costs

The valuation calculated Normal Costs as of July 1, 1985 based on earnings as of that date, including adjustments for negotiated settlements and for July 1 increases. Earnings were projected to July 1, 1986 by assuming that 10% of the Tier I employees will terminate during the twelve month period and be replaced by Tier II employees at the same earnings level; remaining Tier I employees and all Tier II employees (including replacements of Tier II terminations) are assumed to receive earnings increases as of July 1, 1986 equal to 10%. This produced the following projected Normal Costs:

<u>Tier</u>	<u>Plan</u>	<u>Estimated Earnings 7/1/85</u>	<u>Normal Cost Percentage</u>	<u>Projected Earnings 7/1/86</u>	<u>Normal Cost 7/1/86</u>
I	HD	\$ 101,894,605	12.5606%	\$100,875,659	\$12,670,588
I	B	843,424,671	9.2181	834,990,424	76,970,252
I	C	<u>130,533,930</u>	6.8601	<u>129,228,591</u>	<u>8,865,211</u>
Total Tier I		\$1,075,853,206		\$1,065,094,674	\$98,506,051
II	HD	\$ 7,801,658	12.0066%	\$ 18,771,284	\$ 2,253,793
	Other	<u>107,583,731</u>	6.2762	<u>215,737,964</u>	<u>13,540,146</u>
Total Tier II		\$115,385,389		\$ 234,509,248	\$15,793,939
Grand Total		\$1,191,238,595		\$1,299,603,922	\$114,299,990

SECTION I

D. Projection of Total Cost

The Unfunded Liability as of June 30, 1985 was brought forward to June 30, 1986 by adding interest and the July 1, 1985 Normal Cost, with interest, and subtracting expected contributions, also with interest:

	<u>Tier I</u>	<u>Tier II</u>	<u>Total</u>
Unfunded Accrued Liability, 6-30-85	\$2,657,230,643	\$ 8,206,439	\$2,665,437,082
+ Interest	199,292,298	615,483	199,907,781
+ Normal Cost	91,052,088	11,497,071	102,549,159
+ Interest	3,089,033	390,050	3,479,083
- State Payments	223,603,716	10,720,115	234,323,831
- Federal Payments	36,820,437	1,765,263	38,585,700
- Employee Contributions	25,200,049	0	25,200,049
- Interest	<u>9,690,087</u>	<u>423,579</u>	<u>10,113,666</u>
Unfunded Accrued Liability, 6-30-86	\$2,655,349,773	\$ 7,800,086	\$2,663,149,859

Normal Cost	\$ 98,506,051	\$15,793,939	\$ 114,299,990
Amortization of Unfunded (over 40 years)	<u>203,917,452</u>	<u>599,007</u>	<u>204,516,459</u>
Total	\$ 302,423,503	\$16,392,946	\$ 318,816,449
Cost Percentage	100%	100%	
Adjusted Cost	\$ 302,423,503	\$16,392,946	\$ 318,816,449

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, 1985, costs have been projected to July 1, 1986 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, 1985. Earnings were projected to July 1, 1986, 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, 1985, and brought forward to June 30, 1986 by adding the Normal Cost plus interest and subtracting expected employee, State, and Federal 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 7½% compounded annually.

Salary Scale	Age	Annual Rate of Increase
	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.

Age	Annual Rate of Withdrawal
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

Annual Rate
of Disability

<u>Age</u>	<u>(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 49,418 members, including an estimated 1,750 Summer employees and including employees of State Aided Institutions. The following analysis compares the current distribution with the January 1, 1985 data (see Exhibit B for distribution by age and service).

	<u>1-1-85</u>	<u>7-1-85</u> *	<u>Change</u>	<u>Per Cent Change</u>
Total Employees	47,924	47,668	- 256	- 0.5%
Total Earnings (000's)	\$ 1,136.5	\$ 1,191.2	+\$ 54.7	+ 4.8%
Average Earnings	\$23,725	\$24,990	+\$1,265	+ 5.3%
Average Age**	42.4	42.5	+ 0.1	N/A
Average Service**	9.7	9.9	+ 0.2	N/A

* Excluding Summer employees.

** Based on Members included in valuation.

Of the active records submitted to us, 1,976 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. For valuation purposes, an additional 2,376 Members were excluded because they had less than one year of service; thus the valuation was based on 45,066 Members.

Earnings figures as of January 1, 1985 were based on the annualized September 1984 payroll figures projected to year-end. Earnings figures as of July 1, 1985 are actual amounts paid during the period July 1, 1984 to June 30, 1985 adjusted for negotiated increases and merit adjustments effective through July 1, 1985.

SECTION III

B. Actives By Plan

The following analysis is based on the total of 49,418 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 408 Tier II Members. To the extent they were identified in the data base, Summer Employees (1,750 members) are excluded from this analysis.

<u>Number of Members</u>	<u>1-1-85</u>	<u>7-1-85</u>	<u>Change</u>	<u>Per Cent Change</u>
Hazardous Duty	3,270	3,521	+ 251	+ 7.7%
Plan B	32,567	30,955	-1,612	- 4.9
Plan C	6,148	5,415	- 733	- 11.9
Tier II	5,939	7,777	+1,838	+ 30.9
 <u>Total Annual Earnings (millions)</u>				
Hazardous Duty	\$ 90.7	\$109.7	+\$19.0	+ 20.9%
Plan B	805.3	843.4	+ 38.1	+ 4.7
Plan C	141.8	130.5	- 11.3	- 8.0
Tier II	98.7	104.5	+ 5.8	+ 5.9
 <u>Average Earnings</u>				
Hazardous Duty	\$ 27,727	\$31,155	+\$3,428	+ 12.4%
Plan B	24,727	27,247	+ 2,520	+ 10.2
Plan C	23,071	24,106	+ 1,035	+ 4.5
Tier II	16,622	13,437	- 3,185	- 19.2

Hazardous Duty Members continue to increase as a result of additional positions being considered Hazardous Duty. Plan C continues to decrease more rapidly than Plan B. Tier II average earnings reflects the diminishing effect of some initial pre-1973 employees who had declined participation; it also may reflect some summer employees who were not accurately identified.

SECTION III

B. Actives By Plan (cont'd)

This analysis of age and service is based on Active Members included in the valuation. Therefore it excludes 2,376 employees with less than one year of service and the 1,976 records with incorrect birth dates or hire dates.

	<u>1-1-85</u>	<u>7-1-85</u>	<u>Change</u>
<u>Average Age</u>			
Hazardous Duty	38.7	38.9	+ 0.2
Plan B	41.9	42.4	+ 0.5
Plan C	52.8	53.3	+ 0.5
Tier II	34.7	34.5	- 0.2

Average Years of Service

Hazardous Duty	10.4	10.5	+ 0.1
Plan B	10.0	10.6	+ 0.6
Plan C	12.7	13.1	+ 0.4
Tier II	3.6	2.4	- 1.2

Tier I ages and years of service go up less than one year because of retirements. 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 January 1, 1985 data.
[See Exhibit C for analysis of retirees by age, year of retirement and type of retirement].

	<u>1-1-85</u>	<u>7-1-85</u>	<u>Change</u>	<u>Per Cent Change</u>
<u>Pensioners</u>				
Number	16,930	17,237	+ 307	+ 1.8%
Total Annual Benefit*	\$121,087	\$127,521	+\$6,434	+ 5.3
Average Monthly Benefit	\$ 596	\$ 617	+\$ 21	+ 3.5
 <u>Beneficiaries</u>				
Number	607	672	+ 65	+10.7%
Total Annual Benefit*	\$ 3,506	\$ 4,050	+\$500	+14.3
Average Monthly Benefit	\$ 481	\$ 502	+\$ 21	+ 4.4
 <u>Terminated Vested</u>				
Number	476	536	+ 60	+12.6%

* (000 omitted)

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION IV

RETIREMENT FUND

A. Summary of Fund

Market Value, July 1, 1984 \$896,764,505.27

Contributions

State	\$196,201,720.00	
Federal	38,585,705.40	
Employee	30,100,011.94	
		\$264,887,437.34

Investment Income

Interest and Dividends	\$ 78,052,143.93	
Realized Gains	2,560,935.44	
Change in Unrealized Gains	<u>99,126,081.00</u>	
		\$179,739,160.37

Disbursements

Benefit payments	\$126,748,627.30	
Employee refunds	13,616,801.79	
Expenses (Net)	<u>117,185.19</u>	
		\$140,482,614.28

Market Value, June 30, 1985 \$1,200,908,488.70

SECTION IV

B. June 30, 1985 Assets

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

Cash	\$(10,332,863.42)
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Accrued Interest	5,624,112.00
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Investments

Short Term	\$ 83,571,448.00
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Fixed Income	393,144,274.78
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Equity	439,432,061.00
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Contract	17,282,645.45
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Mortgage	142,678,186.44
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Real Estate	<u>129,508,624.45</u>
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\$1,205,617,240.12

Total Market Value of Assets June 30, 1985	\$1,200,908,488.70
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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	759,544,293	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

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

The derivation of the 1985 Adjusted Cost Value is shown below.

1.	Adjusted cost value, 12-31-84	\$957,179,954
2.	Net new money, all sources	109,879,294
3.	Preliminary value, 6-30-85, [(1) + (2)]	1,067,059,248
4.	Market value, 6-30-85	1,200,908,489
5.	Current adjustment, 20% [(4) - (3)]	26,769,848
6.	Adjusted Cost Value, 6-30-85, [(3) + (5)] [Must be within \pm 20% of (4)]	\$1,093,829,096

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

SECTION V

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 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 may 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 have until October 1, 1984 to make such election.

Tier II [Sec. 23]

Employees hired on or after July 1, 1982 (or October 1, 1982 for Union Independent and CSE union members 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 $\frac{1}{2}\%$ 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 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. 5-161]

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 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.

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. 11976
STUART A. ROBERTSON, F.S.A.
CHAIRMAN EMERITUS

November 22, 1985

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM

Actuarial Valuation

ALLAN D. AFFLECK, F.S.A., F.C.I.A.
DAVID V. AXENE, F.S.A.
LARRY D. BABER, F.S.A.
JAMES R. BERQUIST, F.C.A.S.
GEORGE L. BERRY, F.S.A.
DAVID R. BICKERSTAFF, F.C.A.S.
THOMAS P. BLEAKNEY, F.S.A.
BRUNO V. BOIN, F.S.A.
STEPHEN D. BRINK, F.S.A.
ROBERT C. CAMPBELL, F.S.A.
ROBERT M. CHANDLER, F.S.A.
ROBERT L. COLLETT, F.S.A.
JOHN P. COOKSON, F.S.A.
JAMES A. CURTIS, F.S.A.
THOMAS K. CUSTIS, F.S.A.
GARY E. DAHLMAN, F.S.A.
DREW S. DAVIDOFF, F.S.A.
CHRISTIAN J. DESROCHERS, F.S.A.
PHYLLIS A. DORAN, F.S.A.
ROBERT J. DYMOWSKI, F.S.A.
JOHN S. ECKERT, F.S.A.
JOHN S. EDWARDS, F.C.A.
CARY B. EKLOF, F.S.A.
DANIEL J. F. HERTY, F.C.A.S.
JAMES A. GOBES, F.S.A.
DENNIS J. GRAE, F.S.A.
PATRICK J. GRANNAN, F.C.A.S.
DENNIS L. GRAVES, F.S.A.
JANET S. GRAVES, F.C.A.S.
CHARLES W. HABECK, F.S.A.
DALE S. HAGSTROM, F.S.A.
RONALD G. HARRIS, F.S.A.
REX D. HEMME, F.S.A.
DOUGLAS C. HOLDEN, F.S.A.
SILVIO INGUI, F.S.A.
FENTON R. ISAACSON, F.S.A.
HOWARD M. ITO, F.C.A.
GREGORY D. JACOBS, F.S.A.
MARK O. JOHNSON, F.S.A.
EUGENE M. KALWARSKI, F.S.A.
DOUGLAS F. KLINE, F.C.A.S.
GERALD T. KOGER, F.C.A.
DAVID W. KRUEGER, F.S.A.
JOHN M. LENSER, F.S.A.
LEONARD R. J. LEONG, F.S.A.
FREDERIC T. LHAMON, F.S.A.
MARK E. LITOW, F.S.A.
D. ALAN LITTLE, F.S.A.
MICHAEL J. MAHONEY, F.S.A.
BRIAN J. MATTSON, F.S.A.
ROBERT G. MAJLE, F.S.A.
DANIEL J. MCCARTHY, F.S.A.
MICHAEL A. McMURRAY, F.C.A.S.
DOUGLAS MENKES, F.S.A.
STEVEN J. MIKKALO, F.S.A.
EDWARD P. MOHORIC, F.S.A.
DAVID F. OGDEN, F.S.A.
BRUCE T. OGG, 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.
WALTER S. RUGLAND, F.S.A.
JOHN P. SCHREINER, F.S.A.
T. THOMAS SIMESTER, F.S.A.
WILLIAM D. SMITH, F.S.A.
JOHN B. SNYDER, II, F.S.A.
STEVEN D. SOMMER, F.S.A.
DENIS J. SULLIVAN, F.S.A.
STANLEY B. TULIN, F.S.A.
JAMES R. TYLER, F.S.A.
ANDREW B. WANG, F.S.A.
RICHARD E. WHITE, F.S.A.
RICHARD A. WINKELWEIDER, F.S.A.
BRUCE W. WINTERHOFF, F.S.A.
BRUCE L. WORKMAN, F.C.A.
JOHN C. ANTLIFF, F.S.A.
WILLIAM F. BLUHM, F.S.A.
MARK A. CHESNER, F.S.A.
JOSEPH E. CROWNE, F.S.A.
SCOTT L. DENNISON, F.S.A.
JEFFERY T. DUKES, F.S.A.
JOHN W. EHRHARDT, F.S.A.
STEVEN A. EISENBERG, F.S.A.
MARTIN FELDMAN, F.S.A.
JOHN E. FOLEY, F.S.A.
DOUGLAS M. GEURDE, F.S.A.
MARCIA S. GREENSTEIN, F.S.A.
J. ALAN HERRINGTON, F.S.A.
GREGORY N. HERRLE, F.S.A.
STEPHEN G. HILDENBRAND, F.S.A.
GARY R. JOSEPHSON, F.C.A.S.
JACQUELINE M. KEATING, F.S.A.
LESLIE E. KORPER, II, F.S.A.
TIMOTHY D. LEE, F.S.A.
MICHAEL A. McGRATH, F.S.A.
JOHN L. MOLINAR, F.S.A.
THOMAS G. NELSON, F.S.A.
RICHARD E. OSTUW, F.S.A.
WILLIAM A. REIMERT, F.S.A.
MARCIA S. SANDER, F.S.A.
PAULA S. SEDLACEK, F.S.A.
LEE H. STRAATE, F.S.A.
MARK A. TRIEB, F.S.A.
BRUCE N. VANDER ELS, F.S.A.
NANCY R. WAGNER, F.S.A.
RONALD R. WEGNER, F.S.A.
EARL L. WHITNEY, F.S.A.
ELAINE M. WIAAT, F.S.A.

This is to certify that we have prepared an actuarial valuation of the Connecticut State Employees Retirement System as of June 30, 1985.

The valuation was made with respect to the following Members:

- a. 17,909 pensioners (including 672 beneficiaries of deceased Members).
- b. 49,418 active Members with total annual payroll as of July 1, 1985 of \$1,191,238,595.
- c. 536 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	\$2,319,424,767
b. Retired Members and Beneficiaries	1,431,142,322
c. Vested former Members	8,699,089
d. Total	\$3,759,266,178
2. Assets in fund (at adjusted cost value)	\$1,093,829,096
3. Unfunded liability (Item 1d less Item 2)	\$2,665,437,082
4. Present Value of Vested Benefits	\$2,592,886,827

Based on the valuation as of June 30, 1985, projected costs were developed for the fiscal year beginning July 1, 1986, as follows:

1. Employer Normal Cost	
Tier I	\$98,506,051
Tier II	15,793,939
Total	<u>\$114,299,990</u>

2. Payment on Unfunded Liability*

Tier I	\$203,917,452
Tier II	<u>599,007</u>
Total	\$204,516,459

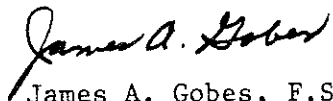
3. Total Employer Cost

Tier I	\$302,423,503
Tier II	<u>16,392,946</u>
Total	\$318,816,449

* Based on forty year amortization of the Unfunded Accrued Liability as of June 30, 1986.

In accordance with Connecticut statutes, the actual contribution will be increased to 100% for fiscal year 1986-87 and thereafter.

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%																				
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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 (Per 1000)</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.

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	60	2										62
25 to 29	288	110	3									401
30 to 34	170	286	121	2								579
35 to 39	89	159	290	93	6							637
40 to 44	59	61	121	186	80	6						513
45 to 49	37	33	48	101	124	34	2					379
50 to 54	16	23	39	74	54	34	13	1				254
55 to 59	7	19	26	40	35	22	24	1				174
60 to 64	6	13	11	19	12	12	11	4				88
65 & Up	1	2	5	4	1	3	2	1	1			21
TOTALS	733	708	664	519	312	111	52	8	1			3,108

AVERAGE SALARIES*

Under 20												
20 to 24	\$23,302	\$23,988										\$23,324
25 to 29	24,667	28,277	\$29,445									25,693
30 to 34	24,794	28,314	29,525	\$32,905								27,549
35 to 39	23,632	28,397	31,890	31,846	\$32,051							29,859
40 to 44	24,377	28,623	31,220	32,678	33,346	\$30,672						30,978
45 to 49	25,677	29,538	31,430	30,708	34,782	33,640	\$30,848					31,803
50 to 54	25,879	28,111	30,851	30,779	30,612	32,547	37,614	\$26,143				30,772
55 to 59	25,465	26,641	28,139	30,247	29,094	32,023	39,035	31,629				30,559
60 to 64	24,944	27,815	28,039	28,929	30,470	31,823	36,021	27,549				29,810
65 & Up	28,042	23,044	32,777	30,334	34,137	32,453	33,947	33,701	35,039			31,485
TOTALS	\$24,528	\$28,323	\$31,028	\$31,533	\$32,833	\$32,596	\$37,532	\$29,421	\$35,039	\$35,039	\$29,421	\$29,306

* Based on Members and salaries input to Valuation.

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

<u>AGE</u>	<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 & Up</u>		
Under 20	1										1
20 to 24	96	1									97
25 to 29	146	2									148
30 to 34	82	1									83
35 to 39	35	1		1							37
40 to 44	17		1								18
45 to 49	9	1									10
50 to 54	5										5
55 to 59	3									1	3
60 to 64											1
65 & Up											403
<u>TOTALS</u>	394	6	1	1							

AVERAGE SALARIES*

Under 20	\$22,635										\$22,635
20 to 24	14,727	\$26,167									14,845
25 to 29	17,416	24,974									17,518
30 to 34	17,112	28,280									17,246
35 to 39	16,737	18,112		\$28,184							17,084
40 to 44	18,126		\$25,431								18,532
45 to 49	20,976	33,024									22,181
50 to 54	19,334										19,334
55 to 59	13,626										13,626
60 to 64										\$5,957	5,957
65 & Up											\$16,917
<u>TOTALS</u>	\$16,758	\$25,922	\$25,431	\$28,184						\$5,957	\$16,917

* Based on Members and salaries input to valuation.

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	5										5
20 to 24	724	156									880
25 to 29	1,543	1,787	75								3,405
30 to 34	1,162	2,490	913	68							4,633
35 to 39	926	1,961	1,151	717	55						4,810
40 to 44	708	1,395	750	890	493	42					4,278
45 to 49	500	1,119	578	636	457	365	53				3,708
50 to 54	369	978	490	623	398	375	236	28			3,497
55 to 59	267	798	471	624	387	283	181	83	8		3,102
60 to 64	137	399	257	408	272	168	85	56	24		1,806
65 & Up	24	144	100	103	100	48	28	19	7		573
TOTALS	6,365	11,227	4,785	4,069	2,162	1,281	583	186	39		30,697

AVERAGE SALARIES*

Under 20	\$11,292										\$11,292
20 to 24	15,835	\$16,385									15,932
25 to 29	18,911	19,673	\$20,988								19,357
30 to 34	20,379	23,167	24,357	\$22,697							22,696
35 to 39	21,211	25,403	28,189	27,603	\$26,511						25,603
40 to 44	20,861	25,653	28,058	30,400	29,447	\$25,034					26,700
45 to 49	21,046	27,058	27,103	30,006	31,282	31,327	\$31,067				27,758
50 to 54	20,616	26,875	26,368	29,055	31,185	32,138	30,855	\$27,199			27,858
55 to 59	20,727	28,085	26,534	27,503	29,415	32,751	35,806	30,361	\$31,433		28,211
60 to 64	20,034	29,402	25,850	26,410	31,078	30,442	36,766	39,595	37,507		28,629
65 & Up	25,988	32,060	27,882	26,380	30,240	31,126	33,622	40,256	26,367		29,938
TOTALS	\$19,768	\$24,612	\$26,712	\$28,565	\$30,316	\$31,549	\$33,406	\$33,676	\$34,262		\$25,384

* Based on Members and salaries input to valuation.

ANALYSIS BY AGE AND SERVICE - PLAN C
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																	33	
20 to 24	18	15															173	
25 to 29	65	103	5														279	
30 to 34	50	159	63	7													288	
35 to 39	60	99	69	57	3												337	
40 to 44	61	129	64	66	16	1											438	
45 to 49	69	174	84	62	19	18											781	
50 to 54	81	254	154	126	39	61	10										1,159	
55 to 59	99	358	236	243	79	50	33										1,264	
60 to 64	52	297	307	315	115	62	44										598	
65 & Up	15	116	127	155	68	30	21										5,350	
TOTALS	570	1,704	1,109	1,031	339	222	108	202	202	202	202	202	202	202	202	202	202	
AVERAGE SALARIES*																		
Under 20																		17,795
20 to 24	\$17,320	\$18,366																18,635
25 to 29	17,907	19,177	\$16,935															20,590
30 to 34	18,447	20,919	21,442	\$20,783														21,431
35 to 39	18,565	22,448	22,186	21,709	\$22,589													22,449
40 to 44	19,507	22,400	22,002	25,570	22,446	\$30,841												21,812
45 to 49	17,818	20,598	22,880	25,429	24,957	27,456	\$22,780											22,796
50 to 54	18,870	22,361	22,176	22,008	26,965	25,966	27,412	\$23,699										22,747
55 to 59	19,164	21,536	21,223	23,839	24,834	26,570	29,639	27,465	\$24,660									23,245
60 to 64	18,886	21,670	22,037	23,191	23,090	28,000	31,680	29,231	29,046									24,937
65 & Up	22,061	22,523	22,745	24,949	25,811	29,582	27,932	31,314	30,241									\$22,674
TOTALS	\$18,719	\$21,544	\$21,978	\$23,652	\$24,558	\$27,301	\$28,785	\$28,584	\$28,923									

* Based on Members and salaries input to 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	87											87
20 to 24	1,282	3										1,285
25 to 29	1,490	37										1,527
30 to 34	1,083	53	12	7								1,155
35 to 39	790	47	48	30								915
40 to 44	532	41	22	18								613
45 to 49	355	23	11	13								402
50 to 54	267	14	12	14	3		1					311
55 to 59	198	8	2	8			2					218
60 to 64	116	5	8	6	1							136
65 & Up	44	15	5	5	4	3	1	1				78
TOTALS	6,244	246	120	101	8	3	4	1	1			6,727
<u>AVERAGE SALARIES*</u>												
Under 20	\$ 6,478											\$ 6,478
20 to 24	10,679	\$10,540										10,679
25 to 29	13,083	14,910										13,127
30 to 34	14,107	17,158	\$21,614	\$21,194								14,368
35 to 39	13,942	17,884	27,320	26,288								15,251
40 to 44	13,447	18,931	26,432	35,487								14,927
45 to 49	13,269	22,607	26,753	23,283								14,496
50 to 54	13,952	26,354	21,160	22,361	\$8,842		\$40,321					15,202
55 to 59	13,559	14,089	18,868	23,199			20,411					14,044
60 to 64	14,985	17,392	20,024	21,018	2,774							15,546
65 & Up	7,510	14,545	12,896	9,688	12,654	\$4,343	1,787	\$4,814				9,382
TOTALS	\$12,874	\$17,952	\$24,690	\$25,264	\$ 9,990	\$4,343	\$20,733	\$4,814				\$13,452

* 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 YEAR OF RETIREMENT

YEAR OF RETIREMENT	NUMBER OF RETIREES			AVERAGE BENEFIT			HAZARDOUS DUTY
	SERVICE	DISABILITY ¹	DISABILITY ²	SERVICE	DISABILITY ¹	DISABILITY ²	
Pre-1956	124	12	34	\$5,309	\$3,243	\$3,346	\$5,107
1956	34	1	7	4,810	4,679	4,727	5,329
1957	46	5	6	5,293	5,140	4,869	5,469
1958	50	4	4	4,555	4,272	4,146	6,724
1959	79	4	6	4,881	4,210	4,654	7,077
1960	64	7	5	4,767	3,430	3,852	7,257
1961	84	3	9	5,173	5,218	4,028	6,534
1962	130	11	6	5,406	4,198	3,876	0
1963	142	8	13	5,527	4,577	4,565	6,349
1964	132	13	15	4,803	6,083	4,387	6,855
1965	155	6	6	5,528	5,245	4,751	9,556
1966	176	10	22	5,383	4,604	4,368	0
1967	186	8	27	5,218	4,127	4,932	9,470
1968	251	13	31	5,884	5,304	4,309	6,268
1969	398	14	33	6,523	5,820	5,725	5,943
1970	392	12	61	7,108	5,314	5,842	7,063
1971	560	18	84	7,429	6,807	5,904	10,011
1972	662	31	87	7,728	6,974	6,459	11,470
1973	738	29	90	7,901	8,435	6,758	12,435
1974	577	27	65	7,169	8,593	6,935	13,941
1975	894	50	86	7,950	7,910	7,098	15,184
1976	970	16	64	7,103	7,048	6,478	13,040
1977	794	13	31	6,819	5,425	5,872	12,243
1978	822	10	47	6,759	6,074	4,959	14,187
1979	1,531	14	49	7,056	7,504	5,112	13,747
1980	1,014	17	41	6,653	5,337	4,983	13,460
1981	813	22	38	7,320	6,572	5,264	13,820
1982	706	16	38	7,603	7,553	6,297	14,744
1983	719	14	48	8,855	8,044	7,208	15,734
1984	915	33	46	9,509	8,961	7,401	18,502
1985 (to July)	590	11	16	10,216	12,393	10,170	17,251

¹ Service Connected

² Non-Service Connected

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</u>	<u>SERVICE</u>	<u>DISABILITY</u>	<u>HAZARDOUS</u>
	<u>CONNECTED</u>	<u>NON-SERVICE</u>	<u>DUTY</u>	<u>CONNECTED</u>	<u>NON-SERVICE</u>	<u>DUTY</u>
		<u>CONNECTED</u>		<u>CONNECTED</u>	<u>CONNECTED</u>	
less than 40	24	6		\$9,983	\$6,145	
40-44	37	24		8,081	6,184	
45-49	45	41	34	8,618	6,906	\$16,456
50-54	5	97	101	6,914	7,857	16,821
55-59	1,050	169	134	6,563	6,249	14,470
60-64	2,371	210	130	6,014	5,648	14,265
65-69	3,609	161	78	5,932	5,478	12,475
70-74	3,384	156	34	6,585	6,391	10,400
75-79	2,268	143	23	6,284	5,657	8,923
80-84	1,277	82	5	4,229	4,769	7,435
85-89	561	20		5,690	4,107	
90-94	191	3		1,881	4,463	
95-99	32	3		4,544	4,726	
TOTALS	14,748	1,115	539	\$6,837	\$5,974	\$14,139