



GENERAL ASSEMBLY RETIREMENT SYSTEM

ACTUARIAL VALUATION
AS OF JUNE 30, 1988



October 28, 1988

Board of Trustees
General Assembly Retirement System of Illinois
415 Iles Park Place
Springfield, Illinois 62718

Re: Actuarial Valuation As Of June 30, 1988

I am pleased to submit my actuarial report on the financial position and funding requirements of the General Assembly Retirement System of Illinois based on the actuarial valuation as of June 30, 1988.

The report consists of 10 Sections and 2 Appendices as follows:

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I would be pleased to discuss any aspects of this report with you at your convenience.

Respectfully submitted,

Sandor Goldstein
Fellow of the Society of Actuaries
Enrolled Actuary No. 3402



A. PURPOSE AND SUMMARY

We have carried out an actuarial valuation of the General Assembly Retirement System of Illinois as of June 30, 1988. The purpose of the valuation was to determine the financial position and funding requirements of the retirement system. This report is intended to present the results of the valuation. The results are summarized below:

1. Total actuarial liability	\$ 64,160,481
2. Actuarial value of assets	32,480,301
3. Unfunded actuarial liability	31,680,180
4. Funded Ratio	50.6%
5. Employer FY 89 funding requirement of normal cost plus interest on the unfunded liability	\$ 3,514,623
6. Employer FY 89 funding requirement of normal cost plus amount required to pay off unfunded liability over 40 years as a level percent of payroll	2,571,314
7. Estimated total employer contribution for FY 88	1,997,500
8. Employer FY 90 funding requirement of normal cost plus interest on the unfunded liability	3,679,149
9. Employer FY 90 funding requirement of normal cost plus amount required to pay off unfunded liability over 40 years as a level percent of payroll	2,690,667
10. Actuarial present value of credited projected benefits	\$ 64,160,481

B. DATA USED FOR THE VALUATION

Participant Data. The participant data required to carry out the valuation was supplied by the retirement system. The membership of the system as of June 30, 1988 on which the valuation was based is summarized in Exhibit 1. It can be seen that there were 185 active members, 198 members receiving retirement annuities, and 123 members receiving surviving spouse's annuities included in the valuation. The total active payroll as of June 30, 1988 was \$6,873,250.



Exhibit 1

Summary of Membership Data

1. Number of Members.		
(a) Active Members		185
(b) Members Receiving		
(i) Retirement Annuities		198
(ii) Surviving Spouse's Annuities		123
(c) Inactive Members		83
2. Annual Salaries		
(a) Total salary	\$ 6,873,250	
(b) Average Salary		37,153
3. Total accumulated employee contributions	\$ 5,421,829	
4. Annual Annuity Payments		
(a) Retirement Annuities	\$ 2,975,143	
(b) Surviving Spouse's Annuities		594,668

Assets. The asset values used for the valuation were based on the asset information contained in the unaudited statement of assets as of June 30, 1988 prepared by the system. For purposes of the valuation, the book value of the assets of the system less the amount of current liabilities was increased by the average excess of the market value of assets over the book value of assets of the system as of the last three year ends. The resulting actuarial value of assets was \$32,480,301. The development of this value is outlined in Exhibit 2.

Exhibit 2

Actuarial Value of Assets

1. Total book value of assets	\$ 30,134,856
2. Current liabilities	26,201
3. Net assets at book value (1-2)	<u>\$ 30,108,655</u>
4. Average excess of market value of assets over book value of assets over the last three years	2,371,646
5. Actuarial value of assets	<u>\$ 32,480,301</u>

C. RETIREMENT SYSTEM PROVISIONS

The actuarial valuation was based on the provisions of the retirement system in effect as of June 30, 1988 as provided in Article 2 of the Illinois Pension Code. A summary of the principal provisions of the system is provided in Appendix 1.

D. ACTUARIAL ASSUMPTIONS AND COST METHOD
Actuarial Assumptions

The same actuarial assumptions were used for the June 30, 1988 actuarial valuation as were used for the June 30, 1987 valuation. These actuarial assumptions were based on an experience analysis of the retirement system for the period 1984 through 1987. The major actuarial assumptions used for the valuation are summarized below:

Mortality Rates The UP-1984 Mortality Table was used for the valuation.

Termination Rates. Termination rates based on the recent experience of the system were used. The following termination rates were used:

<u>Age</u>	<u>Rate of Termination</u>
20 - 54	.080
55 and over	.000

Disability Rates. Disability rates based on the recent experience of the system as well as on published disability rate tables were used. The following is a sample of the disability rates that were used for the valuation:

<u>Age</u>	<u>Rate of Disability</u>
30	.00057
35	.00064
40	.00083
45	.00115
50	.00170

Retirement Rates. Rates of retirement for each age from 55 to 70 based on the recent experience of the system were used. The following are samples of the rates of retirement that were used:

<u>Age</u>	<u>Rate of Retirement</u>
55	.2
60	.1
65	.1
70	1.0

The above retirement rates are equivalent to an average retirement age of approximately 62.

Salary Increase. A salary increase assumption of 6.0% per year, compounded annually, was used.



Interest Rate. An interest rate assumption of 7.5% per year, compounded annually, was used.

Marital Status. It was assumed that 75% of active members will be married at the time of retirement.

Spouse's Age. The age of the spouse was assumed to be 4 years younger than the age of the employee.

Actuarial Cost Method

The projected unit credit actuarial cost method was used for the June 30, 1988 valuation. This is the same actuarial cost method that was used for the June 30, 1987 valuation.

E. ACTUARIAL LIABILITY

The actuarial liability as determined under the valuation for the various classes of members is summarized in Exhibit 3. The total actuarial liability is then compared with the actuarial value of assets in order to arrive at the unfunded actuarial liability. (The actuarial terms used in this report are defined in Appendix 2)

As of June 30, 1988, the total actuarial liability is \$64,160,481, the actuarial value of assets is \$32,480,301, and the unfunded actuarial liability is \$31,680,180. The ratio of the actuarial value of assets to the actuarial liability, or funded ratio, is 50.6%.



Exhibit 3

Actuarial Liability As Of June 30, 1988

1. Actuarial Liability For Active Members	
(a) Basic retirement annuity	\$ 11,371,459
(b) Annual increase in retirement annuity	2,026,428
(c) Pre-retirement survivor's annuity	1,069,933
(d) Post-retirement survivor's annuity	2,308,897
(e) Withdrawal benefits	4,812,165
(f) Disability benefits	147,696
(g) Total	<u>\$ 21,736,578</u>
2. Actuarial Liability For Members Receiving Benefits	
(a) Retirement annuities	\$ 32,335,057
(b) Survivor annuities	4,820,324
(c) Total	<u>\$ 37,155,381</u>
3. Actuarial Liability For Inactive Members	<u>5,268,522</u>
4. Total Actuarial Liability	\$ 64,160,481
5. Actuarial Value of Assets	\$ 32,480,301
6. Unfunded Actuarial Liability	\$ 31,680,180
7. Funded Ratio	50.6%

F. Employer's Normal Cost

The employer's share of the normal cost for the year beginning July 1, 1988 is developed in Exhibit 4. For the year beginning July 1, 1988, the total normal cost is determined to be \$2,013,416, employee contributions are estimated to be \$790,424, resulting in the employer's share of the normal cost of \$1,222,992.

Based on a payroll of \$6,873,250, the employer's share of the normal cost can be expressed as 17.79% of payroll.



Exhibit 4

Employer's Normal Cost For Year Beginning July 1, 1988

	<u>Dollar Amount</u>	<u>Per Cent Of Payroll</u>
1. Basic retirement annuity	\$ 935,498	13.61%
2. Annual increase in retirement annuity	160,902	2.34
3. Pre-retirement survivor's annuity	103,613	1.51
4. Post-retirement survivor's annuity	190,454	2.77
5. Withdrawal benefits	494,556	7.20
6. Disability benefits	14,344	.21
7. Administrative expenses	114,049	1.66
8. Total normal cost	<u>\$ 2,013,416</u>	<u>29.29%</u>
9. Employee contributions	790,424	11.50%
10. Employer's share of normal cost	<u>\$ 1,222,992</u>	<u>17.79%</u>

Note. The above figures are based on a total active payroll of \$6,873,250 as of June 30, 1988.

G. EMPLOYER'S FUNDING REQUIREMENT FOR YEAR BEGINNING JULY 1, 1988

I. Employer's Actuarial Funding Requirement Of Normal Cost Plus Interest On The Unfunded Liability

A number of organizations that have in the past advocated actuarial funding for public retirement systems have recommended that as a minimum, public employers contribute annually an amount equal to "normal cost plus interest on the unfunded liability". By paying the normal cost each year, the accruing cost of pensions is met as service is rendered by employees. By paying interest on the unfunded actuarial liability, the unfunded actuarial liability is stabilized. Although no attempt is made to pay off the unfunded actuarial liability, this approach is nevertheless considered acceptable for public retirement systems where permanence can be taken for granted and full funding is not regarded as essential.

The employer's funding requirement of normal cost plus interest on the unfunded liability for the year beginning July 1, 1988 is developed in Exhibit 5.

It can be seen from Exhibit 5 that for the year beginning July 1, 1988, the employer funding requirement of normal cost plus interest on the unfunded actuarial liability amounts to \$3,514,623. Total state appropriations for the year are estimated to amount to \$1,997,500. Thus, employer contributions for the year are expected to fall short of the employer funding requirement by \$1,517,123. This deficiency in employer contributions can be expressed as 22.07% of payroll.

Exhibit 5Funding Requirement For Year Beginning July 1, 1988

1. Employer's share of normal cost	\$ 1,222,992
2. Interest on the unfunded actuarial liability	<u>2,291,631</u>
3. Employer's funding requirement of normal cost plus interest on the unfunded actuarial liability	\$ 3,514,623
4. Estimated employer contribution for the year	<u>1,997,500</u>
5. Estimate of amount by which employer contributions are expected to fall short of the funding requirement of normal cost plus interest on the unfunded liability	<u>\$ 1,517,123</u>

II. Employer's Actuarial Funding Requirement Of Normal Cost Plus Amount Required To Pay Off Unfunded Liability Over 40 Years As A Level Percent Of Payroll

Paying interest on the unfunded liability is one approach for controlling a retirement system's unfunded liability. There is an alternative to this approach under which contributions toward the unfunded liability are initially somewhat lower but which in the long run can still be considered to be a fiscally sound approach for funding public retirement systems. Under this alternative approach, the unfunded liability is amortized by payments which represent a level percentage of active membership payroll. This is sometimes referred to as the level percentage of payroll amortization approach.

Since the active payroll can be expected to increase over time, the level percentage of payroll amortization approach will require a lower contribution toward the unfunded liability in the earlier years than the "interest only" approach and will require greater contributions in the later years. However, the contribution as a percentage of payroll is expected to remain level over time.

In the early years, the level percentage of payroll payment toward the unfunded liability is less than an amount equal to interest on the unfunded liability, resulting in increases in the unfunded liability for a period of time. Eventually the payroll base will increase to a point where the level percentage of payroll approach should pay off the unfunded liability over the amortization period. A potential risk associated with this approach is that payroll increases that are assumed may not materialize. Nevertheless, the level percentage of payroll amortization approach can represent a fiscally sound approach for funding public retirement systems.

The employer's funding requirement of normal cost plus the amount required to amortize the unfunded liability over 40 years as a level percent of payroll is developed in Exhibit 6.

It can be seen from Exhibit 6 that for the year beginning July 1, 1988, the employer funding requirement of normal cost plus the amount required to amortize the unfunded liability over 40 years as a level percent of payroll amounts to \$2,571,314. Actual employer contributions for the year are



estimated to amount to \$1,997,500. Thus, employer contributions for the year are expected to fall short of the employer funding requirement determined under this basis by \$573,814, which can be expressed as 8.35% of payroll.

Exhibit 6

Funding Requirement For Year Beginning July 1, 1988

1. Employer's share of normal cost	\$ 1,222,992
2. Amount required to amortize the unfunded liability over 40 years as a level percent of payroll	1,348,322
3. Employer's total funding requirement (1. + 2.)	<u>\$ 2,571,314</u>
4. Estimated employer contribution for the year	1,997,500
5. Estimate of amount by which employer contributions are expected to fall short of funding requirement (3. - 4.)	<u>\$ 573,814</u>

H. STATE APPROPRIATION REQUIREMENTS FOR FISCAL YEAR BEGINNING JULY 1, 1989

The June 30, 1988 actuarial valuation is used to develop the actuarial funding requirements of the system for the year beginning July 1, 1988. For State budgeting purposes, it is necessary to make a projection of the system's actuarial funding requirement for the fiscal year beginning July 1, 1989. Under Section 22-1001 of the Illinois Pension Code, the retirement system is required to submit to the Illinois Economic and Fiscal Commission information regarding the amount required to meet the State's share of the normal cost plus interest on the unfunded liability for the fiscal year commencing July 1, 1989.

We have therefore made some projections to estimate the amount of State appropriations required to meet the system's actuarial funding requirements for the fiscal year commencing July 1, 1989. This has been done under both of the approaches for controlling the system's unfunded liability that were outlined in Section G.

<u>Actuarial Funding Requirement</u>	<u>Required State Appropriations</u>	
	<u>For FY 90</u>	
	<u>Dollar Amount</u>	<u>% of Payroll</u>
Normal Cost Plus Interest On The Unfunded Liability	\$3,679,149	51.2%
Normal Cost Plus Amount Required To Amortize Unfunded Liability Over 40 Years As A Level Percent Of Payroll	\$2,690,667	37.5%

Note. The above figures are based on a projected payroll of \$7,182,546 for the fiscal year commencing July 1, 1989.



I. RECONCILIATION OF CHANGE IN UNFUNDED LIABILITY

The net actuarial experience during the period July 1, 1987 to June 30, 1988 resulted in an increase in the system's unfunded actuarial liability of \$1,140,211. This increase in unfunded liability is a result of several kinds of gains and losses. The financial effect of the most significant gains and losses is illustrated in Exhibit 7.

The employer funding requirement for the year of normal cost plus interest on the unfunded actuarial liability amounted to \$3,273,090, whereas the actual employer contribution for the year amounted to \$1,970,000. Thus, the employer contribution for the year fell short of meeting normal cost plus interest on the unfunded liability by \$1,267,090. Had all aspects of the system's experience been in line with the actuarial assumptions, the unfunded liability would have increased by this amount.

The net rate of investment return earned by the system was slightly under the assumed rate of 7.5%. This resulted in an increase in the unfunded liability of \$18,000. Salaries increased at an average rate of 5.0% per year in comparison with an assumed rate of 6.0% per year, resulting in a decrease in the unfunded liability of \$206,000.

The various other aspects of the system's experience resulted in a net increase in the unfunded liability of \$1,140,211.

The aggregate financial experience of the system resulted in an increase in the unfunded liability of \$2,219,301.

Exhibit 7Reconciliation of Change in Unfunded Liability
Over the Period July 1, 1987 to June 30, 1988

1. Unfunded actuarial liability as of 7/1/87	\$ 29,460,879
2. Employer contribution requirement of normal cost plus interest on the unfunded liability for the period 7/1/87 to 6/30/88	3,273,090
3. Actual employer contribution for the year	<u>1,970,000</u>
4. Increase in unfunded liability due to employer contributions being less than normal cost plus interest on unfunded liability	1,267,090
5. Increase in unfunded liability due to investment return greater than assumed	18,000
6. Decrease in unfunded liability due to salary increases less than assumed	206,000
7. Increase in unfunded liability due to other sources	<u>1,140,211</u>
8. Net increase in unfunded liability for the year (4+5+7-6)	\$ 2,219,301
9. Unfunded actuarial liability as of 6/30/88 (1+8)	\$ 31,680,180

J. Actuarial Present Value of Credited Projected Benefits

In November 1986, the Governmental Accounting Standards Board (GASB) issued Statement No. 5 entitled Disclosure of Pension Information by Public Employee Retirement Systems and State and Local Governmental Employers. The statement established standards of disclosure of pension information by public employee retirement systems.

GASB Statement No. 5 requires the disclosure of the actuarial present value of credited projected benefits as the standardized measure of the accrued pension obligation. This measure represents the discounted value of the amount of benefits estimated to be payable in the future as a result of employee service to date, computed by attributing an equal benefit amount to each year of service of the employee.

It should be noted that the actuarial present value of credited projected benefits is equal to the actuarial liability computed under the projected unit credit actuarial cost method. Thus, since the projected unit credit actuarial cost method was used for the valuation, the total actuarial liability of



\$64,160,481 as developed in Section E of this report is also the actuarial present value of credited projected benefits that is required to be disclosed under GASB Statement No. 5.

In Exhibit 8 we have shown the actuarial present value of credited projected benefits in the format prescribed in GASB Statement No. 5. It can be seen that the total actuarial present value of credited projected benefits of \$64,160,481 is the same as the total actuarial liability under the projected unit credit actuarial cost method.

Exhibit 8.

Actuarial Present Value of Credited Projected Benefits

1. For members in receipt of benefits and for inactive members	\$ 42,423,903
2. For current employees	
Accumulated employee contributions	5,421,829
Employer-financed vested	10,761,199
Employer-financed nonvested	<u>5,553,550</u>
3. Total actuarial present value of credited projected benefits	\$ 64,160,481
4. Net assets available for benefits, at cost (Market value is \$ 31,623,543)	<u>\$ 30,134,856</u>
5. Unfunded actuarial present value of credited projected benefits	<u>\$ 34,025,625</u>

K. CERTIFICATION

This actuarial report has been prepared in accordance with generally accepted actuarial principles and practices and to the best of my knowledge, fairly represents the financial condition of the General Assembly Retirement System of Illinois as of June 30, 1988.

Respectfully submitted

Sandor Goldstein
Fellow of the Society of Actuaries
Enrolled Actuary No. 3402



Appendix 1

Summary of Principal Provisions

1. Participation. A person eligible for membership must participate in the system as a condition of employment unless an "Election Not to Participate" is filed within 24 months from the date of assuming office.

2. Member Contributions. All members of the system are required to contribute to the system the following percentage of their salaries:

Retirement Annuity	8.5%
Automatic Annuity Increase	1.0
Survivor's Annuity	<u>2.0</u>
Total	<u>11.5%</u>

3. Retirement Annuity-Eligibility. A member who has at least 8 years of creditable service is entitled to a retirement annuity upon attainment of age 55. A member with at least 4 years but less than 8 years of service is entitled to a retirement annuity upon attainment of age 62.

A member with at least 8 years of service who becomes disabled while in service is entitled to a retirement annuity regardless of age.

4. Retirement Annuity-Amount. The retirement annuity is determined according to the following formula based upon the member's final rate of salary:

- 3.0% for each of the first 4 years of service, plus
- 3.5% for each of the next 2 years of service, plus
- 4.0% for each of the next 2 years of service, plus
- 4.5% for each of the next 4 years of service, plus
- 5.0% for each year of service in excess of 12

The maximum retirement annuity payable is 85% of the final rate of salary.

5. Automatic Increase In Retirement Annuity. Annual automatic increases of 3% of the originally granted retirement annuity are provided. The initial increase is effective in the month of January of the year next following the year in which the first anniversary of retirement occurs, but in no event prior to attainment of age 60.

6. Survivor's Annuity - Eligibility. A surviving spouse without children is eligible for survivor benefits at age 50 or over provided marriage to the member had been in effect for at least 1 year immediately prior to the member's death.

A surviving spouse with unmarried eligible children of the member is eligible for a survivor's annuity benefit at any age provided the above marriage requirements have been met. When all children are disqualified because of death, marriage or attainment of age 18, the spouse's benefit is suspended if



the spouse is under age 50 until the attainment of such age.

An unmarried child of the member under the age of 18 may qualify for the survivor's annuity if there is not surviving spouse or if the spouse remarries prior to attainment of age 55 or dies.

If the member dies in service, the member must have at least 2 years of service credit for survivor's annuity eligibility. If death occurs after termination of service but before retirement, the deceased member must have at least 8 years of service credit for survivor's annuity eligibility.

7. Survivor's Annuity - Amount. (a) A surviving spouse is entitled to a survivor's annuity of $66 \frac{2}{3}\%$ of the amount of retirement annuity to which the member was entitled on the date of death, without regard to whether the member had attained age 55 as of the time of death, subject to a minimum payment of 10% of salary.

(b) If a surviving spouse has in his or her care eligible children of the member, the survivor's annuity shall be the greater of the following: (1) $66 \frac{2}{3}\%$ of the amount of retirement annuity to which the member was entitled on the date of death, or (2) 30% of the member's salary increased by 10% of salary on account of each eligible child. If only unmarried children survive, each such child shall be entitled to an annuity of 20% of salary, subject to a maximum total payment for all children of 50% of salary.

(c) Upon the death of a member after termination of service, or upon the death of an annuitant, the maximum total payment to a surviving spouse and eligible children, or eligible children alone if there is no surviving spouse, shall be 75% of the retirement annuity to which the member or annuitant was entitled.

8. Refund Of Contributions. Upon termination of service, a member is entitled to a refund of his total contributions without interest.

If unmarried at the time of retirement, a member is entitled to a refund of his or her contributions for the survivor's annuity.



Appendix 2

Glossary of Terms used in Report

1. Actuarial Present Value. The value of an amount or series of amounts payable at various times, determined as of a given date by the application of a particular set of actuarial assumptions.
2. Actuarial Cost Method or Funding Method. A procedure for determining the actuarial present value of pension plan benefits and for determining an actuarially equivalent allocation of such value to time periods, usually in the form of a normal cost and an actuarial accrued liability.
3. Normal Cost. That portion of the actuarial present value of pension plan benefits which is allocated to a valuation year by the actuarial cost method.
4. Actuarial Liability or Accrued Liability. That portion, as determined by a particular actuarial cost method, of the actuarial present value of pension benefits which is not provided for by future normal costs.
5. Actuarial Value of Assets. The value assigned by the actuary to the assets of the pension plan for purposes of an actuarial valuation.
6. Unfunded Actuarial Liability. The excess of the actuarial liability over the actuarial value of assets.
7. Entry Age Actuarial Cost Method. A cost method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided at a valuation date by the actuarial present value of future normal costs is called the actuarial liability.
8. Projected Unit Credit Actuarial Cost Method. A cost method under which the actuarial liability is the actuarial present value of that portion of an employee's projected benefit that is attributable to service to date on the basis of future compensation projected to retirement. The normal cost represents the actuarial present value of the employee's projected benefit that is attributable to service in the current year, again based on future compensation projected to retirement.
9. Actuarial Assumptions. Assumptions as to future events affecting pension costs.
10. Actuarial Valuation. The determination, as of a valuation date, of the normal cost, actuarial liability, actuarial value of assets, and related actuarial present values for a pension plan.
11. Vested Benefits. Benefits that are not contingent on an employee's future service.