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Actuarial Analysis of the
State Police Retirement
System of New Jersey

New Jersey State Legislature, Trenton Div of Program Analysis

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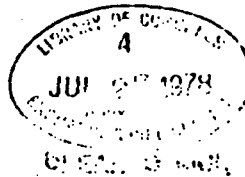
The purpose of the analysis is to provide the Legislature and SPRS managers with information about future costs, funding obligations and cash flow of the pension system. The SPRS analysis is part of an ongoing OFA effort to report to the Legislature on various aspects of the State's public pension systems.

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**ACTUARIAL ANALYSIS OF THE
STATE POLICE RETIREMENT SYSTEM
OF NEW JERSEY**

**NEW JERSEY STATE LEGISLATURE
OFFICE OF FISCAL AFFAIRS
DIVISION OF PROGRAM ANALYSIS**

JUNE 1978

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The Office of Fiscal Affairs reports to the Legislature through the Law Revision and Legislative Services Commission, currently chaired by Senator Joseph P. Merlino.

The Law Revision and Legislative Services Commission authorized the release and publication of this program analysis in June, 1978.

ACTUARIAL ANALYSIS OF THE
STATE POLICE RETIREMENT SYSTEM
OF NEW JERSEY

New Jersey State Legislature
Office of Fiscal Affairs
Division of Program Analysis

June 1978



New Jersey State Legislature
OFFICE OF FISCAL AFFAIRS

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MEMORANDUM TO: Members of the Law Revision and Legislative
Services Commission

The Office of Fiscal Affairs submits the attached Actuarial Analysis of the State Police Retirement System of New Jersey prepared pursuant to N.J.S.A. 52:11-47e. The report was prepared by OFA's Division of Program Analysis, directed by William R. Schmidt.

This actuarial analysis is part of an ongoing OFA project to report to the Legislature on various aspects of the State's public employee pension systems.

Thomas L. Bertone
Acting Director
Office of Fiscal Affairs

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FOREWORD

This actuarial analysis of the State Police Retirement System of New Jersey (SPRS) was conducted by the Office of Fiscal Affairs under authorization from the Law Revision and Legislative Services Commission of the New Jersey Legislature. The purpose of the analysis is to provide the Legislature and SPRS managers with information about future costs, funding obligations and cash flow of the pension system. The SPRS analysis is part of an ongoing OFA effort to report to the Legislature on various aspects of the State's public pension systems.

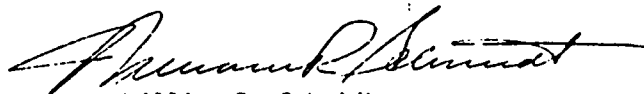
Preliminary work for this study was begun in early 1977; however, work was delayed several times by the need to redirect OFA staff and consultant resources to other projects. The long-range actuarial forecasts which form the basis for the study were produced during July of 1977, using the most recent actuarial data available to OFA at the time. These data were current as of June 30, 1976.

This report was prepared by OFA's Division of Program Analysis. Staff analysts assigned to the SPRS study were Alan Kooney and Eleanor Hanoka Seel. Gloria Hendrickson and Patricia Bogdziewicz typed the report and prepared it for publication. Actuarial forecasts and technical analysis were provided by Winklevoss & Associates, Inc., Philadelphia, Pennsylvania.

Under the program analysis procedures of the Office of Fiscal Affairs, the Board of Trustees of the State Police Retirement System and the State Department of the Treasury were given the opportunity to review and comment upon a draft copy of this report. These comments are included in an Appendix to the report.

OFA would like to acknowledge the cooperation and assistance of the Division of Pensions, Department of the Treasury, in having the necessary data tapes transmitted for this study.

April, 1978



William R. Schmidt
Director
Division of Program Analysis

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Purpose of the Study (Introduction)

This actuarial analysis of the State Police Retirement System of New Jersey (SPRS) was undertaken to provide the Legislature and SPRS managers with information about the future costs, funding obligations and cash flow of the pension system. The analysis is not intended to substitute for the annual actuarial valuations of SPRS that certify in detail the following year's pension costs and required contributions. However, the actuarial forecasts presented in this study offer several insights not provided by a conventional actuarial valuation. These include the following:

- The forecasts take into account the financial implications of future new entrants and overall system growth. A conventional valuation is concerned only with the benefits of current plan members.
- Long-range trends in pension costs and funding levels are shown. A conventional valuation certifies costs and other financial information for one year at a time.
- Future annual costs and assets-to-liabilities ratios are based upon all benefits accruing to SPRS members, including post-retirement cost-of-living (COL) adjustments not treated in the annual report of the SPRS actuary.

Description of SPRS (Chapter 1)

The State Police Retirement System is one of seven pension plans administered by the State of New Jersey for State and local public employees. SPRS was created in 1965 to replace the State Police Retirement and Benevolent Fund and to assume all of the assets, liabilities and membership of the former fund. SPRS is maintained on an actuarial reserve basis with costs shared between SPRS members and the State.

Membership in SPRS is limited to and compulsory for all full-time officers, non-commissioned officers and troopers of the Division of State Police. As of June 30, 1976, there were 1,730 active and 486 retired members of SPRS.

SPRS is administered by a five-member Board of Trustees, whose duties generally consist of oversight responsibilities, including the adoption of rules and regulations. Day-to-day administration is carried out by the Division of Pensions, while the Division of Investment is responsible for managing and investing the assets of the system. The State Treasurer designates a medical review board and a system actuary.

Actuarial Procedures (Chapter 2)

OFA analyzed the long-term financial status of SPRS by means of 50-year actuarial forecasts of the system. The forecasts were generated from a detailed computer model of SPRS developed by OFA's actuarial consultants. The forecasts simulate the SPRS population characteristics and financial transactions occurring during each year of the forecast period. Three forecasts were run as part of this study, using different combinations of actuarial assumptions and funding approaches.

In constructing these long-range forecasts, various actuarial features of SPRS were reviewed.

1. Actuarial Assumptions. The role of the pension actuary is to determine what amounts of money must be set aside in a pension fund at the present time so that all future pension benefits can be paid as they come due. To do this, the actuary must make numerous assumptions about the future experience of the pension plan and its participants. Typical actuarial assumptions cover such factors as retirement and disability rates, mortality rates, employee termination rates, interest rates and salary growth projections.

OFA developed its own "best-estimate" actuarial assumptions for SPRS for use in this study. In doing so, OFA reviewed and evaluated the actuarial assumptions currently used by the SPRS actuary in preparing annual valuations of the system. Many of these assumptions were judged to be appropriate and were adopted by OFA as best-estimate assumptions. New salary and interest rate assumptions were developed since they were felt to predict future plan

experience in a more realistic manner. In addition, several new best-estimate assumptions were established for forecasting purposes which are not required in the actuary's annual valuation.

To compare long-range cost and funding trends, OFA ran separate 50-year forecasts, one based on the SPRS actuary's assumptions and one on OFA's best-estimate assumptions.

2. Funding Policy. SPRS, like all of the State's major public-employee retirement systems, is an advance or reserve-funded pension plan; that is, regular contributions are made (by the State and by employees) to a pension reserve fund over the working lives of plan members. These contributions, together with investment earnings on the assets in the reserve fund, are designed to accumulate so that at the time of each worker's retirement there are sufficient reserves available to pay that worker's pension benefits over his remaining lifetime. One of the advantages of advance funding is that the investment income on accumulated plan assets significantly reduces the level of contributions that would otherwise be required to pay for pension benefits.

One exception to the advance funding of SPRS benefits is the annual post-retirement cost-of-living (COL) benefit adjustment, which increases the level of benefits in relation to changes in the Consumer Price Index. COL benefits are financed on a current disbursement, or pay-as-you-go basis. Neither the liability nor the costs associated with the COL provision are currently recognized in the annual valuations of the system performed by the SPRS actuary.

The financial forecasts contained in this study compare the long-term implications of continuing to finance COL benefits on a pay-as-you-go basis to the costs of advance funding these benefits in the same manner as other SPRS benefits.

3. Liability Measures. The study uses two measures of liability to assess the funded status of SPRS. Both liability measures are based on the value of accrued benefits at any specified time. One measure, entitled plan termination liability (PTL), shows the obligation of SPRS if it were to terminate in a given year. Under the PTL, the accrued benefits of active employees are calculated by applying the SPRS benefit formula to each employee's current salary and years of service as of the hypothetical termination date.

The other liability measure used in the study is the plan continuation liability (PCL). Under the PCL, benefit accruals for active employees include an allowance for anticipated future salary increases.

Both the plan termination and the plan continuation measures have been calculated to include the liability associated with future COL benefit increases.

Results of the SPRS Financial Forecasts (Chapter 3)

Tables S-1, S-2, and S-3 summarize the results of the 50-year financial forecasts of SPRS. For each forecast, the tables show future employer contributions (expressed in dollars and as a percentage of total payroll) and funded levels (assets as a percentage of both PTL and PCL). All forecasts were prepared using the June 30, 1976 actuarial valuation of SPRS as a data base.

1. Forecast Under SPRS Actuary's Assumptions. Table S-1 shows future employer contributions and funded levels for SPRS in a forecast which uses the SPRS actuary's current actuarial assumptions to perform the annual valuations in each year of the forecast.

Table S-1: Financial Summary of SPRS Under SPRS Actuary's Assumptions

Year	Total Employer Contributions*		Funded Level	
	Dollars (Millions)	% of Pay	Assets as % of PTL	Assets as % of PCL
1976	6.8	30.1	109	90
1981	10.0	29.6	106	92
1991	19.6	29.0	107	94
2001	36.1	30.6	101	91
2026	139.4	34.3	95	87

*Includes normal and supplemental liability contributions plus pay-as-you-go COL payments.

2. Forecast Under OFA Best-Estimate Assumptions. Table S-2 shows the identical information as Table S-1 except that the annual valuations during the forecast period are performed using OFA's best-estimate assumptions.

Table S-2: Financial Summary of SPRS Under OFA Best-Estimate Assumptions				
Year	Total Employer Contributions*		Funded Level	
	Dollars (Millions)	% of Pay	Assets as % of PTL	Assets as % of PCL
1976	8.4	37.0	109	90
1981	11.5	33.8	113	97
1991	21.3	31.5	120	105
2001	36.9	31.3	114	103
2026	133.2	32.7	109	100

*Includes normal and supplemental liability contributions plus pay-as-you-go COL payments.

3. Best-Estimate Forecast with Full Advance Funding of All Costs. In Table S-3, SPRS finances are projected on the assumption that the COL provision is advance-funded along with all other employer costs.

Table S-3: Financial Summary of SPRS Under OFA Best-Estimate Assumptions with Advance Funding of COL Benefits				
Year	Total Employer Contributions		Funded Level	
	Dollars (Millions)	% of Pay	Assets as % of PTL	Assets as % of PCL
1976	11.0	48.5	109	90
1981	14.5	42.6	124	107
1991	18.4	38.7	137	119
2001	38.8	33.0	139	126
2026	121.5	29.9	134	123

Conclusions and Recommendations (Chapter 4)

1. Overall Assessment. The long-range financial forecasts presented in this study show that SPRS is a well-funded pension system as measured by the system's actuarial cost method and either the SPRS actuary's assumptions or OFA's best-estimate assumptions. In the unlikely event of plan termination, assets on hand are sufficient to cover all of the benefits accrued to date by retired and active employees; on the more realistic plan continuation basis, assets are equal to approximately 90 percent of accrued benefit liabilities. These funded levels compare favorably to many other pension plans of equal age, whether public or private, and especially to most uniformed services plans.

2. Actuarial Assumptions. During the period from July 1, 1975 to June 30, 1976 there were considerable deviations between certain of the SPRS actuary's assumed decrement rates (such as deaths among active and retired members, terminations and retirements) and the actual experience of the plan. While such actuarial deviations may be expected when the experience investigation covers only one year and deals with a relatively small group of plan members, continual deviations in one direction should become a cause for concern since they may misrepresent ongoing pension cost calculations.

OFA recommends that the SPRS actuary review the cumulative experience of the plan over at least three years in assessing the accuracy of decrement assumptions, and that these assumptions be adjusted accordingly should the experience of the plan persistently deviate in one direction. (Recommendation No.1)

The economic assumptions (salary and interest rates) currently used by the SPRS actuary generate lower annual costs than OFA's best-estimate assumptions adopted for use in this study. Although the short-term results of using the current assumptions are favorable (i.e., smaller employer contributions), the long-term effect is a lower and gradually deteriorating funded level. However, since this deterioration will not occur for another 25 to 35 years, OFA does not believe that a change in the current economic assumptions is warranted on strict financial grounds alone.

The general approach taken by the SPRS actuary is one which understates both salary and interest rates in relation to what may actually be expected to occur in future years. The actuary attempts to balance the degree of

understatement in both assumptions so that they produce offsetting characteristics in terms of pension costs. This is a fairly common actuarial practice that has become more noticeable as the effects of prolonged inflation show up in salary levels and interest rates. The practice is open to challenge on several grounds, including the potential inaccuracy of the balancing procedure at different absolute salary and interest levels.

From a legislative perspective, the use of implicit offsetting assumptions presents a problem in that non-actuaries find it virtually impossible to evaluate the appropriateness of the assumptions. This can make it extremely difficult for the Legislature to properly evaluate the fiscal impact of major pension legislation.

Since the salary and interest rate assumptions in particular have an extremely important influence on pension costs,

OFA recommends that the use of explicit best-estimate assumptions be considered by the State Treasurer and the SPRS actuary. (Recommendation No. 2)

To implement the above recommendation,

OFA recommends that the Legislature consider amending or repealing the provision of N.J.S.A. 53:5A-3(p) which limits the "regular interest" rate assumption to 105 percent of the actual percentage rate of earnings on investments. (Recommendation No. 3)

This section of the SPRS law is designed to insure that SPRS is conservatively funded by not allowing the anticipated income from the investment of pension fund assets to be overstated. However, in operation the SPRS actuary balances any conservatism in the interest rate assumption by constructing an artificially low salary level assumption, thereby cancelling out the law's intended effect.

3. SPRS Funding Policy. Presently, all benefits provided by SPRS are advance-funded, with the exception of COL adjustments. These are financed on a pay-as-you-go basis through annual appropriations.

Under the current financing policy and actuarial assumptions, "full funding" (i.e., the complete amortization of the system's unfunded supplemental liability) will not be achieved on a plan continuation basis if COL benefits are included in the system's liabilities but not advance-funded. The achievement of full funding is an implicit goal of SPRS and of the

Legislature, since the Act governing SPRS (N.J.S.A. 53:5A) includes the provision for the 40-year unfunded liability amortization. Although the funded level of SPRS is quite favorable (90 percent) even without advance COL funding, the Legislature may wish to consider a policy to advance-fund the COL provision in light of this implicit goal.

As shown in the forecasts, full funding is achieved using OFA's best-estimate assumptions, even under the current financing policy. Therefore, this combination might be recommended if there were assurances that future COL benefit increases would not exceed their assumed value in this study, which is 2.4 percent (60 percent of a 4 percent inflation assumption). Without these assurances, and in view of the fact that either the inflation rate or the percentage of the Consumer Price Index used to calculate COL benefit levels may increase in future years, we cannot recommend the long-term continuation of pay-as-you-go financing for COL benefits.

The forecasts also show that full funding is achieved when the COL provision is advance-funded, but at the expense of quite burdensome employer contributions in initial years. Moreover, total advance funding at the rate shown actually builds up "redundant" assets (assets in excess of the PCL) rather quickly and maintains them throughout the forecast period.

It should be noted that there are ways to move toward full advance funding which produce a "flatter" funding pattern than illustrated in this study and which retain the implicit goal of reaching a 100 percent funded level. A funding schedule can be established that "phases in" advance-funded COL contributions so that full funding is reached later than shown here but with less immediate financial stress. Another possibility would be to amortize the remaining supplemental liability of the system as a level percentage of payroll rather than as a level dollar amount.

There are persuasive arguments in favor of the advance funding of pension benefits and they apply equally well to post-retirement COL adjustments. Among the financial advantages are the investment income generated on pension fund assets built up by regular contributions and the discipline imposed by requiring that a portion of the costs of any benefit liberalizations be paid immediately. In addition, there is an equity advantage to advance funding, in that it changes the costs of pension benefits to the present generation of taxpayers who presumably are receiving the services of those earning the benefits.

The Pension Adjustment Act (N.J.S.A. 43:3B) does not mandate the annual appropriation of funds for the purpose of providing COL benefit adjustments to retired employees. Despite this, the Legislature has chosen to appropriate the amount necessary each year to pay for these increased benefits and, in addition, has recently raised the COL benefit level. Should the Legislature interpret its commitment with respect to COL benefit payments as an ongoing and continual one, then

OFA recommends that the Legislature consider the advantages of adopting a policy which supports the advance funding of all SPRS pension benefits, including cost-of-living increases, on a schedule that is financially practicable. (Recommendation No. 4)

4. Measuring Plan Liabilities.

a. Method -- Since 1976 the SPRS actuary has been including in the annual valuation report a "Funded Status" statement that compares the book value of assets to an accrued liability measure similar to the PCL used in this study. The actuary has further broken down the liability value (and the level of funding calculation) into a separate category for vested accrued benefits. This breakdown provides additional information on the status of the plan's benefit security, particularly as it covers those SPRS members who have already earned the right to a retirement pension.

b. Cost of Living (COL) Increases -- A basic concept of accounting for pension costs is that they be assigned to the period during which benefits are earned. COL benefits, since they are computed as a percentage of the retirement allowance, are earned over an employee's active career. The same factors (e.g., benefit liberalizations, salary increases) responsible for raising regular pension benefits are also responsible for raising future COL obligations. This relationship is not explicitly recognized under the current COL financing policy, with the result that the overall impact of plan changes is always understated, as are the total liabilities associated with providing retirement benefits to SPRS members.

Should the Legislature elect to advance-fund COL benefits, the costs associated with providing these benefits would automatically be treated as

liabilities of the pension system. In addition,

OFA recommends, should the Legislature decide not to advance-fund COL benefits, that the SPRS actuary periodically calculate the system's liabilities to include the liability associated with COL benefits, so as to portray more accurately the total costs of all pension obligations currently being accrued, even though payment of a portion of these costs is being deferred to the future. (Recommendation No. 5)

Since almost all pension benefit changes carry a corollary fiscal impact associated with higher COL payments,

OFA recommends that fiscal notes and cost estimates on pension-related bills, whether prepared by the Division of Pensions or by OFA, include an estimate of the additional COL costs likely to result from the provisions of the bill. (Recommendation No. 6)

INTRODUCTION: PURPOSE OF THIS STUDY

This actuarial analysis of the State Police Retirement System (SPRS) of New Jersey was undertaken to provide the Legislature and SPRS managers with information about the future costs, funding obligations and cash flow of the pension system. Financial trends that may reasonably be anticipated under the State's current financing policy as well as under selected alternative policies are illustrated with long-range actuarial forecasts of SPRS.

The type of analysis presented in this study offers several insights that are not provided by a conventional actuarial valuation. One important difference is that a conventional valuation, such as the SPRS actuary prepares annually, is concerned only with the accrued and prospective benefits of current plan members. There is no recognition given in the present to the possible financial implications of future new entrants or overall system growth. The forecasts developed in this analysis give explicit recognition to these factors.

A second feature of these forecasts is that they give policy makers an idea of the incidence of costs likely to fall on taxpayers in future years under the pension plan's current financing method. In this respect, the forecasts may assist policy makers in evaluating whether the system's unfolding financial experience is coinciding with expectations. The forecasts also aid in evaluating the long-range effects of proposed pension benefit changes.

Finally, the forecasts presented in this analysis portray the future annual costs and assets-to-liabilities ratio associated with all benefits accruing to SPRS members, including post-retirement cost-of-living adjustments not treated in the annual valuation report of the SPRS actuary. This last point is discussed in greater detail in Chapter 2.

Having noted these features, it is equally important to recognize the limitations of this type of long-range actuarial analysis. The limitations are those inherent in any projection of future events; namely, the likelihood that the future will not unfold precisely as the analysis specifies. In fact, it is almost inevitable that it will not do so, despite the care taken to make these projections as realistic as possible. Such unforeseen but possible future occurrences as a declining SPRS membership, prolonged severe inflationary pressures or significant plan benefit changes--to name but a few--would each necessitate a reevaluation of the system's financial status. However, the uncertainty of the future is not in itself a cogent argument against developing these forecasts but rather an argument for doing them more frequently.

It should also be made clear that the actuarial forecasts presented in this study are not meant to substitute for the annual actuarial valuations of SPRS that certify in detail the following year's costs and required contributions. The value of these long-range forecasts lies not in any claims of perfectly accurate dollar value predictions for a particular year but in the overall financial trends and patterns that emerge over the forecast period. As such, these forecasts are meant to complement the regular actuarial valuation process.

CHAPTER 1: DESCRIPTION OF THE STATE POLICE RETIREMENT SYSTEM OF NEW JERSEY

Background

The New Jersey State Police force was created in 1921 as a separate department of the State government. Since 1948 the State Police force has operated as a Division of the Department of Law and Public Safety.

Legislation passed in 1925 established the State Police Retirement and Benevolent Fund, "providing a pension for retired or disabled members of the state police or their families or orphans" ¹ During the same year, the State Police contracted with a private insurance carrier for a contributory group life insurance policy to supplement pension plan benefits. This policy was to serve as a model for later group insurance programs provided in most State retirement systems. ²

The State Police Retirement and Benevolent Fund was not financed on an actuarially determined basis. Member contributions to the fund were supplemented by a designated percentage of State taxes collected on automobile insurance policies issued to New Jersey residents by out-of-state companies. This financing practice, when combined with the generous retirement and survivors' benefits provided by the pension plan, led to the accumulation of large unfunded financial liabilities.

In 1965, the State Police Retirement System (SPRS) was established to replace the State Police Retirement and Benevolent Fund and to assume all of the assets, liabilities and membership of the former fund. ³ SPRS is maintained on an actuarial reserve basis with costs shared between SPRS members and the State. The law governing SPRS has been amended several times since 1965 to adjust benefits, financing arrangements and administrative procedures.

Membership

Membership in SPRS is limited to and compulsory for all full-time officers, non-commissioned officers and troopers of the Division of State Police. As of June 30, 1976, there were 1,730 active and 486 retired members of SPRS.⁴

Administration

SPRS is administered by a five-member Board of Trustees consisting of the State Treasurer, two private-citizen members appointed by the Governor and two active members of the retirement system appointed by the Superintendent of State Police. All appointed members serve indefinite terms of office. A representative from the State Division of Pensions serves as secretary to the Board.

The powers and duties of the Board of Trustees are spelled out in N.J.S.A. 53:5A-30 and generally consist of oversight responsibilities related to the operation of the system, including the adoption of administrative rules and regulations, so long as those rules and regulations are consistent with those adopted by the other State pension funds. The State Treasurer is the legal custodian of SPRS assets; under his direction the day-to-day administration of SPRS is conducted by the Division of Pensions, while the Division of Investment is responsible for managing and investing the assets of the system.

The State Treasurer also designates a medical review board and a system actuary. The current actuary for SPRS is Stone, Young & Co., Consulting Actuaries.

Benefit Provisions

When SPRS replaced the State Police Retirement and Benevolent Fund on July 1, 1965 certain benefit provisions were changed for all members newly employed on or after that date. Members who had been enrolled in the former fund, whether retired or active, were allowed to retain their benefit eligibility under the old plan. The current SPRS benefit structure therefore distinguishes between pre- and post-July 1, 1965 members where necessary.

Table 1-1 is a summary of the major benefit provisions available to members of SPRS. A more complete description of these benefits is contained in Appendix B of this report.

TABLE 1-1

SPRS BENEFIT PROVISIONS

1. Retirement Age and Allowance

- A. Enrolled before July 1, 1965--Members may retire at age 50 after 20 years of service. They must retire at age 55 after 25 years of service.

Annual retirement allowance-- $\frac{1}{2}$ final compensation (see note at end of table) plus 1% x final compensation for each year of service over 25.

- B. Enrolled on or after July 1, 1965--Regular retirement at age 55. Employment beyond age 55 only at request of Superintendent of State Police. Early (special) retirement with 25 years of service, but allowance reduced for each month under age 55. Deferred retirement after 15 years service, payable at age 55.

Annual retirement allowance-- 2% x final compensation x years of service up to 25 plus 1% x final compensation x years of service over 25.

2. Ordinary Disability

After four years service, annual allowance of $1\frac{1}{2}\%$ x final compensation x years of service (minimum of 40% x final compensation).

3. Accidental Disability

Annual allowance of $\frac{2}{3}$ final compensation.

4. Nonservice-Connected Death Before Retirement

- A. Enrolled before July 1, 1965--Annual pension of $\frac{1}{2}$ final compensation to dependent widow or 3 children; lesser pension for fewer children or dependent parents; plus $3\frac{1}{2}\%$ x final compensation (lump sum).

- B. Enrolled on or after July 1, 1965--Annual pension of $\frac{1}{2}$ final compensation to dependent widow and 2 children; lesser pension for fewer children (widow alone, 25%) or dependent parents; plus $3\frac{1}{2}\%$ x final compensation (lump sum).

5. Service-Connected Death Before Retirement

Annual pension of $\frac{1}{2}$ final compensation to dependent widow or three children; for fewer children or dependent parents, a lesser pension; plus $3\frac{1}{2}\%$ x final compensation (lump sum).

TABLE 1-1

SPRS BENEFIT PROVISIONS
(continued)

6. Death After Retirement

A. Enrolled before July 1, 1965--Annual pension of $\frac{1}{2}$ final compensation to widow or 3 children; lesser pension for fewer children; plus (after 10 years service) $\frac{1}{2}$ final compensation (lump sum).

B. Enrolled on or after July 1, 1965--Annual pension of $\frac{1}{2}$ final compensation to widow and 2 children; lesser pension to fewer children (widow alone, 25%); plus (after 10 years service) $\frac{1}{2}$ final compensation (lump sum).

7. Termination (Non-vested)

Return of member's contribution.

Note: Final compensation refers to the average salary plus maintenance allowance (currently \$3,000) in the last 12 months of service preceding retirement or death.

FOOTNOTES TO CHAPTER 1

1. P.L. 1925, c. 188.
2. State of New Jersey, Department of the Treasury, Division of Pensions, New Jersey Public Employee Benefit Manual, 1977 Edition, p. 366.
3. P.L. 1965, c. 89.
4. Stone, Young & Co., Consulting Actuaries, Report of the Actuarial Valuation of the State Police Retirement System as of July 1, 1976.

CHAPTER 2: ACTUARIAL PROCEDURES USED IN THE ANALYSIS OF SPRS

As stated in the introduction to this report, the purpose of conducting this actuarial analysis is to provide the Legislature and those responsible for managing SPRS with information about the system's long-range financial outlook. The framework for the analysis is a scenario of SPRS for the 50-year period 1976-2026. The scenario was constructed with the aid of a detailed computer model of SPRS developed by OFA's actuarial consultants, Winklevoss & Associates, Inc. By generating 50 consecutive actuarial valuations, the model is designed to simulate the SPRS population and financial transactions occurring during each year of the forecast period according to predetermined actuarial assumptions. These assumptions are discussed in the following sections.

Role of Actuarial Assumptions

An employee covered by a defined benefit pension plan such as SPRS earns pension benefit credits for each unit (usually a year) of eligible employment. At retirement, the accumulated value of these credits becomes payable by the plan sponsor according to one of several payment options available to the employee.

For the pension system as a whole, the accumulated value of all past, present and expected future benefit credits earned by its members represents a liability to the system in the form of future pension payment obligations that are being created. It is the responsibility of the pension system actuary to estimate the magnitude of these obligations, when they will become due, and to establish a schedule of regular employer (and, in New Jersey, employee) contributions into a pension reserve fund so that the assets of the fund are built up to where they are sufficient, together with future contributions, to meet projected system liabilities.

To project pension costs and fund those costs on a regular basis the actuary must make certain assumptions about the future experience of the plan and its participants. When appropriate, past experience of the particular plan or a similar one can be used to formulate assumptions about the future. However, it is not always possible or desirable to use past experience solely as a guide. In such instances the actuary must make his assumptions based upon the best evidence and indicators available to him. Although it is extremely unlikely that actuarial assumptions will ever perfectly predict future plan experience, the degree to which they are realistic has an important bearing on how adequately a pension system is funding its liabilities.

The selection of actuarial assumptions for SPRS was therefore a significant part of developing the long-range financial forecasts which are presented in the following chapter. OFA and its consultants reviewed all of the assumptions currently used by the SPRS actuary in preparing annual valuations of the system. Many of these assumptions were judged to be appropriate for use in this analysis and were adopted. In other instances, different values were selected where they were felt to be more realistic in their depiction of plan experience. In addition, several new assumptions were established for forecasting purposes which are not required in the actuary's regular annual valuation.

The assumptions used in this analysis to construct the 50-year SPRS scenario are labeled "best-estimate" assumptions to contrast them where necessary with the SPRS actuary's valuation assumptions. Best-estimate assumptions were used in all of the long-range forecasts to determine the future characteristics of the plan. However, as an experiment, one forecast was run which retained the SPRS actuary's assumptions to perform the annual valuations in each year of the forecast.

Specific Assumptions

Numerous actuarial assumptions must be made to value a pension plan's assets and liabilities. Basically, assumptions are needed for any factor or probability that could have an impact upon the plan's financial balance. Table 2-1 sets forth the major assumptions used in this study. The first column of Table 2-1 specifies the type of actuarial assumption. The second

TABLE 2-1
ACTUARIAL ASSUMPTIONS FOR SPRS

<u>Type of Assumption</u>	<u>Assumptions Used by SPRS Actuary</u>	<u>OFA Best-Estimate Assumptions</u>
A. Decrement Assumptions		
1. Mortality Rates	Mortality Rates as given in Appendix Tables A-1, A-2, A-3	Same as SPRS actuary's assumptions
2. Disability Rates	Disability Rates as given in Appendix Table A-4	Same as SPRS actuary's assumptions
3. Termination (Withdrawal) Rates	Termination Rates as given in Appendix Table A-5	Same as SPRS actuary's assumptions
4. Retirement Rates	Retirement Rates as given in Appendix Table A-6	Same as SPRS actuary's assumptions
B. Increment Assumptions		
1. Population Growth Rate	Assumption not needed*	3% annual growth in 1976, scaling down to 0% (no growth) in 2001.
2. Entry Age Rates	Assumption not needed*	Rates derived from 1976 SPRS census data, given in Appendix Table A-7.
C. Economic Assumptions		
1. Inflation Rate	Not explicitly stated	4% per year
2. Salary Increase Rate	5% per year under age 30 4% per year ages 30 to 49 3% per year ages 50 and over	Promotional scale derived from 1976 SPRS census data, as given in Appendix Table A-9, <u>plus</u> 4% inflation and 1% real wage increase per year.
3. Future Entry Age Salaries	Assumption not needed*	Derived from 1976 SPRS census data, as given in Appendix Table A-8.
4. Interest Rate (Return on Investment)	6% per year	7% per year

*Assumptions not needed because valuation performed on a current fixed population group.

column lists the assumptions currently used by the SPRS actuary in performing the annual valuation of SPRS. The third column lists the best-estimate assumptions adopted by OFA and its actuarial consultants. For those assumptions which are tabular in nature, reference is made to the appropriate table in Appendix A.

The assumptions are grouped into three categories which broadly describe their functions. Decrement assumptions are those which estimate the probabilities of various kinds of reductions in the active and retired SPRS population. They include mortality, disability, termination and retirement rates. These rates are usually presented in the form of actuarial probability tables.

The decrement assumptions used for SPRS were last reviewed by the system actuary in 1976 when they were checked against the plan's experience during the previous year. The actuary's review showed that there were, in some instances, considerable deviations between the assumed and actual experience rates. In particular, mortality rates, termination (withdrawal) rates and retirement rates among active employees were lower than the actuary's assumed rates, while mortality rates among retired employees were higher than assumed.

Such actuarial deviations may be expected when the experience investigation covers only one year and deals with a relatively small group of plan members (1,763 actives and 486 non-actives). Moreover, pension costs are not highly sensitive to changes in decrement assumptions, particularly when so few people are involved. These factors tend to reduce the significance of any potential cost implications arising from deviations between these assumptions and experience. As will be stressed in Chapter 4, however, the SPRS actuary is urged to investigate the future cumulative experience of the plan over at least three years in assessing decrement rates and to adjust those rates accordingly if the experience of the plan persistently deviates in one direction.

For purposes of this study, OFA has adopted the SPRS actuary's decrement assumptions as best-estimate assumptions and has presented the data in this report based on those assumptions.

Increment assumptions are developed for actuarial forecasting to simulate additions to SPRS membership. As Table 2-1 indicates, these assumptions are not used in a conventional actuarial valuation since a conventional valuation is based only on the population existing as of the valuation date.

The growth rate, which refers to the growth in the number of active employees, was specified for purposes of this research as 3 percent for the first year of the simulation, with this percentage scaling downward linearly to a zero growth rate after 25 years. This increases the active SPRS membership from 1,730 in 1976 to an eventual level of 2,545 members. The projection is designed to simulate a SPRS population that has recently experienced moderate growth but which is expected to experience a gradual decline in growth until a stable labor force size is reached in 2001. The ages at which newly-hired employees enter active service during the simulation were derived from the recent experience of the plan through 1976.

The economic assumptions outlined in Table 2-1 are extremely important since pension costs are highly sensitive to variations in assumed inflation, salary and interest rates.

The SPRS actuary's inflation assumption is uncertain because it is not explicitly stated, although it presumably is a component of both the salary and interest assumptions. OFA's best-estimate inflation assumption rate (representing the assumed rise in the Consumer Price Index) is set at an annual rate of 4 percent. While this rate may appear to be low in terms of the experience of our economy in recent years, it is believed to represent a reasonable rate for the long-run average inflation rate in our economy. It is also the rate used in the 1976 OASDI [Social Security] Board of Trustees Annual Report for their "intermediate projection" of that system's liabilities.¹

The SPRS actuary's annual salary increase rates vary according to age group: 5 percent below age 30, 4 percent between ages 30 and 49, and 3 percent for ages 50 and above. OFA's best-estimate assumption was developed by first projecting annual across-the-board wage increases of 5 percent (composed of the 4 percent inflation factor and a 1 percent real wage or productivity gain component) and then adding, for each plan member, an annual percentage representing the employee's assumed career promotional advancement at various ages. (In New Jersey this component comprises actual job

title promotions over an employee's working career plus the effect of regular merit or longevity increments.) The promotional scale, which is shown in Appendix Table A-9, was derived from the current year salary differences of active employees in different stages of their careers. The rates vary between 2.8 percent and 2.0 percent, depending on promotional and merit raise opportunities at different ages. Over the entire range of active ages (20 to 55) the promotional rate averages roughly 2.2 percent per year.

Taking into account all of the salary components discussed above, OFA's best-estimate salary increase rates exceed those of the SPRS actuary by approximately 3 percentage points per year.

In addition to the salary progression of active employees, it is also necessary to make an assumption as to the salaries of newly-hired employees during the forecast period. The new-entrant salary scale (Appendix Table A-8), which determines the salary differences for each entry age, was derived from the recent experience of the plan. For any given entry age, the assumed entry age salary is increased annually by 5 percent (the combined inflation and wage productivity rates) for future years.

The interest rate assumption refers to the rate of return earned on the investment of pension system assets. The current interest rate used by the SPRS actuary for annual valuations of the plan is 6 percent. This rate is not established by the actuary, but by the State Treasurer in consultation with the Directors of the Divisions of Pensions and Investment. N.J.S.A. 53:5A-3(p) limits the interest rate assumption to 105 percent of the actual "percentage rate of earnings on investments."

OFA's best-estimate interest assumption used in this study for SPRS is 7 percent. The assumed yield of 7 percent corresponds roughly to a 4 percent inflation rate and an assumed 3 percent inflation-free rate of return on long-term corporate bonds.² The actual average rate of return on SPRS assets was 6.83 percent for fiscal year 1976.

Actuarial Cost Method For SPRS

SPRS, like all of the State's major public-employee retirement systems, is an advance or reserve-funded pension plan; this is, regular contributions are made (by the State and by employees) to a pension reserve fund over the working lives of plan members.³ These contributions, together with

Investment earnings on the assets in the reserve fund, are designed to accumulate so that at the time of each worker's retirement there are sufficient reserves available to pay that worker's pension benefits as they come due over his remaining lifetime. As will be shown in the following chapter, one of the advantages of advance funding is that the investment income on accumulated plan assets significantly reduces the level of contributions that would otherwise be required to pay for pension benefits.

In an advance-funded system, the function of an actuarial cost method is to apportion or allocate the costs of pension credits being earned by workers to specific time periods and to establish a schedule of regular contributions to meet these costs. Depending on the funding goals of the system, there are various acceptable ways to account for these costs and, hence, there are various actuarial cost methods that may be used.

The actuarial cost method used by the State for SPRS is known as either the Aggregate Projected Benefit Cost Method with Supplemental Liability or as the Entry Age Normal Cost Method with Frozen Initial Liability.⁴ Costs (and contributions) under this method have two components: a normal cost and a supplemental or accrued liability cost. The normal cost is determined as the amount which

- (1) if contributed each year as a level percentage of salary,
- (2) on behalf of each employee from the time he started earning pension benefit credits,

and (3) assuming no changes are made in the benefit provisions of the plan,

would (4) accumulate assets equivalent to each employee's expected pension by his retirement date.⁵

The conditions stated above raise several points. First, the normal cost will remain a constant level percentage of salary only if all of the actuary's assumptions about the future are borne out. Should experience unfold differently than predicted--and in almost all cases it will to some degree--the resulting actuarial gains (favorable) and losses (unfavorable) are factored into the normal cost and spread over future years. Thus the normal cost will tend to fluctuate from year to year; however, the spreading mechanism for gains and losses should help keep the fluctuations from being severe.

The second point is that the conditions which define the normal cost also define the supplemental or accrued liability cost. A supplemental liability can arise for many reasons but in general results when the value of normal contributions made in the past is insufficient to cover the value of benefits earned or credited in the past. Such a situation may occur if the benefit provisions of the plan are liberalized. When this happens the new benefit level "costs more" per each year of service, including those years when lower contributions were made based on the old benefit level. A similar situation arises when a group of employees are allowed to transfer their membership from one pension system to another system with more generous benefits and are given credit in the new system for all prior service.

In the case of SPRS, the supplemental liabilities of the system are not due to either of the above examples but rather to the fact that when SPRS was established in 1965 it assumed all of the unfunded financial liabilities of its predecessor, the State Police Retirement and Benevolent Fund. Under the cost method used with SPRS, these unfunded liabilities are supplemental in the sense that they are not amortized as part of future normal costs but as a separate "layer" of liability corresponding to past service credits already earned. The unfunded supplemental liability of SPRS was last recalculated in 1971 and is being amortized over a period of 40 years in level dollar amounts. Each year's amortization payment, or supplemental cost, represents interest on the amount yet to be amortized as well as a principal payment.

One exception to the advance funding of SPRS benefits is the annual post-retirement cost-of-living (COL) benefit adjustment, which increases the level of benefits in relation to changes in the Consumer Price Index.⁶ COL benefits are financed on a current disbursement, or pay-as-you-go basis. Neither the liability nor the costs associated with the COL provision are currently recognized in the annual valuations of the system performed by the SPRS actuary.

The financial forecasts contained in Chapter 3 compare the long-term implications of continuing to finance COL benefits on a pay-as-you-go basis to the costs of advance funding these benefits in the same manner as other SPRS benefits.

Liability Measures

An important purpose of this analysis is to show how, using specified actuarial assumptions, the assets of SPRS may be expected to grow in the future in relation to the plan's liabilities. One of the difficulties in making a meaningful statement about the funded level of a pension plan is that the liability value against which assets are usually measured is uniquely determined by the actuarial cost method in use. The result is that even with a given level of assets, the funded level of a plan would look better or worse depending upon which cost method was selected for the comparison. Conversely, two plans which are alike in every respect except for their actuarial cost method could both be "fully funded" with different amounts of accumulated assets.

It should, therefore, be useful to assess a plan's funded status by using a liability measure that has meaning in its own right regardless of the cost method in use. Two such measures are offered in this study. The first, entitled plan termination liability (PTL), shows the obligation of SPRS if it were to terminate in any given year. The PTL is equal to the present value of benefits due to retired employees plus the present value of benefits earned to date by active employees. The accrued benefits of active employees are calculated by applying the SPRS retirement benefit formula to each employee's current salary and years of service as of the hypothetical termination date.

The only actuarial assumptions needed in the PTL calculation are an interest assumption (for continued earnings on assets accumulated prior to the termination date) and a mortality assumption for beneficiaries and dependents (since only death will prevent the plan member from receiving his retirement benefits, provided sufficient assets exist). Actuarial assumptions concerning future probabilities for the active work force (e.g., salary progression, membership growth, disability rates) are irrelevant in the context of an assumed plan termination.

To avoid misunderstanding, it should be made clear that the calculation of plan termination liability in no way suggests or implies that SPRS will in fact terminate at some future date. The PTL measure simply provides a meaningful standard for assessing the plan's funded status over time.

The other liability measure used in this study is the plan continuation liability (PCL). For retired employees, the PCL is identical to the PTL and represents the present value of benefits currently due. For active employees, the PCL is based on a different way of calculating benefit accruals. In this case, future salary increases are accounted for by first projecting each employee's anticipated benefit to retirement and then taking a fraction of this benefit, the numerator of which is the sum of the employee's salary to date and the denominator of which is the sum of the employee's expected career salary. There are other technical differences between the PTL and the PCL, such as the inclusion of ancillary benefits (e.g., active service death, accidental and ordinary disability) in the PCL and the use of all actuarial assumptions but these are less important than the general notion that this liability is based on the concept of continuing the plan.

Both liability measures illustrated--PTL and PCL--are appropriate targets for measuring the funding progress of a pension plan. The PTL may be regarded as a minimum target level, even for a public plan that is assumed to have a "perpetual" existence. The PCL, which may reflect more accurately the ongoing nature of a public plan, is usually (although not always) larger than the PTL since it incorporates an element of future salary increases.

In calculating the liability values used in this study an important departure has been made from the current treatment of liabilities by the SPRS actuary. Both the plan termination and the plan continuation measures include the liability associated with future COL benefit increases. OFA is aware that this is not presently done for any of New Jersey's State-administered pension systems and that, in addition, there is a difference of opinion within the actuarial profession concerning this practice.

The argument against including the COL provision in the liability computation is usually based on the assertion that in the event of plan termination the payment of these additional benefits might not be a legally enforceable obligation, especially if they are still being appropriated on a pay-as-you-go basis.

In the strictest sense this assertion is probably correct, since the Pension Adjustment Act does not require that these appropriations be made in any year, even without the threat of plan termination. However, OFA finds no

reason to believe that the Legislature's commitment to finance the State's share of these COL benefits is of a lesser degree or "enforceability" than the commitment to finance any other retirement benefits of the State's pension systems. Since the Pension Increase Program was first enacted in 1958, it has been significantly modified to cover all retiring employees and eligible survivors. Moreover, the benefit adjustment has been automatically linked to changes in the Consumer Price Index and the COL benefit level has recently been increased from 50 percent to 60 percent of the change in the CPI.⁷ Thus, the Legislature has certainly demonstrated a strong commitment to the principle of maintaining retirement benefits at a level sufficient to offset some of the effects of inflation.

Given this situation and the sizeable financial impact of future COL payments (as shown in Tables 3-1, 3-2 and 3-3), it would seem logical to treat these obligations as liabilities of the pension system, regardless of how they are funded.⁸ The fact is that every benefit or membership liberalization (or inflation-induced salary increase) which raises "regular" pension costs also raises future COL obligations. By recognizing this relationship explicitly, total pension liabilities are portrayed more realistically.

FOOTNOTES TO CHAPTER 2

1. Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, 1976 Annual Report, p. 79.
2. See Federal Reserve Bank of St. Louis, Review 48 (August, 1966) and Review 51 (December, 1969). Also, Robert Tilove, Public Employee Pension Funds (New York, Columbia University Press, 1976), p. 141.
3. There is one retirement benefit provided to SPRS members that is not advance funded. This is the cost-of-living (COL) adjustment made to retirement benefits to offset some of the effects of inflation. The COL provision is discussed in more detail later in this chapter.
4. Unfortunately, the actuarial profession has not been able to agree upon standard pension terminology. The expression "Aggregate Projected Benefit Cost Method with Supplemental Liability" is preferred by the Pension Research Council while other pension managers and actuaries use the latter expression or some variation of it.
5. SPRS members and their beneficiaries who were formerly enrolled in the State Police Retirement and Benevolent Fund until that fund was succeeded by SPRS on July 1, 1965, receive different benefits than SPRS members who became enrolled after July 1, 1965. The SPRS actuary calculates separate normal costs for both groups, which are then combined into a single total normal cost contribution.
6. H.J.S.A. 43:38, the Pension Adjustment Act (P.L. 1958, c. 143), as amended.
7. P.L. 1977, c. 305.
8. The same conclusion was recently reached by the New Jersey Commission on Government Costs and Tax Policy appointed by the Governor pursuant to Executive Order No. 55 of 1977. On page xvii of their Summary Recommendations and Subcommittee Reports, the Commission recommends that "cost-of-living increases be considered in the annual actuarial calculation rather than making annual appropriations."

CHAPTER 3: FINANCIAL FORECASTS OF SPRS

This chapter presents three long-range financial forecasts of SPRS under combinations of actuarial assumptions previously discussed. The first forecast uses the SPRS actuary's assumptions to perform the annual valuations during the 50-year forecast period. The second forecast uses OFA's best-estimate assumptions. The third forecast also uses best-estimate assumptions but is predicated upon full advance funding of the annual COL benefit increases.

Forecast Under SPRS Actuary's Assumptions

Table 3-1 shows the results of a 50-year financial forecast of SPRS which uses the SPRS actuary's current actuarial assumptions to perform the annual valuations. The first valuation year of the forecast is fiscal year 1976 and the last year is fiscal year 2026.¹ The numerical data presented in the table are given annually during the first ten years and on a quinquennial basis thereafter.

The population growth assumption, which scales down from 3 percent annually to zero after 25 years, increases the original group of active employees from 1,730 to an ultimate number of 2,545 by the year 2001. Total payroll rises both because of the growth in the number of active employees and because of the annual rise in employees' salaries. The payroll in 1976 (excluding maintenance allowances) totals \$23 million and escalates to \$118 million by 2001 and to over \$400 million by the year 2026. These dollar values are of little importance by themselves since they are expressed in terms of future inflated dollars; however, they are useful for measuring the trend in pension costs.

Table 3-1 shows that advance-funded employer contributions to SPRS are \$6.3 million in 1976 and are expected to nearly double by 1986. From 1986 to

TABLE 3-1

FINANCIAL FORECAST OF SPRS UNDER SPRS ACTUARIAL ASSUMPTIONS

(Dollars in Thousands)

Year	Number-Active Members	Payroll *	Employer Contributions					Employee Contributions		Investment Earnings	Benefit Payments		Assets	Plan Termination Liability (PTL)		Plan Continuation Liability (PCL)		
			Funded Portion	Pay-as-you-go Portion		Total	\$	% of Pay	\$		% of Pay	\$		% of Pay	\$	% Assets PTL	\$	% Assets PCL
			\$	% of Pay	% of Pay	% of Pay												
1976	1,730	22,664	6,316	27.9	502	2.2	30.1	1,656	7.3	5,572	3,874	17.1	83,318	76,122	109	93,041	90	
1977	1,781	24,653	6,828	27.7	538	2.2	29.9	1,803	7.3	6,272	3,673	14.9	92,987	86,640	107	102,711	91	
1978	1,833	26,856	7,415	27.6	588	2.2	29.8	1,960	7.3	7,036	3,976	14.8	104,218	97,073	107	114,485	91	
1979	1,884	29,148	8,032	27.6	639	2.2	29.7	2,123	7.3	7,865	4,435	15.2	116,653	108,921	107	127,679	91	
1980	1,934	31,510	8,656	27.5	689	2.2	29.7	2,292	7.3	8,770	5,028	16.0	130,239	121,984	107	142,113	92	
1981	1,982	33,973	9,299	27.4	748	2.2	29.6	2,462	7.2	9,710	5,974	17.6	144,929	136,194	106	157,758	92	
1982	2,030	36,384	9,877	27.1	806	2.2	29.4	2,637	7.2	10,733	6,928	19.0	160,425	150,600	107	173,744	92	
1983	2,076	38,968	10,489	26.9	885	2.3	29.2	2,818	7.2	11,773	8,164	20.9	176,745	165,711	107	190,601	93	
1984	2,121	41,542	11,053	26.6	973	2.3	28.9	3,009	7.2	12,894	9,262	22.3	193,662	180,595	107	207,483	93	
1985	2,164	44,443	11,702	26.3	1,090	2.5	28.8	3,219	7.2	14,062	10,358	23.3	211,356	196,146	108	225,271	94	
1986	2,206	47,528	12,395	26.1	1,226	2.6	28.7	3,445	7.2	15,309	11,348	23.9	229,987	212,338	108	243,932	94	
1991	2,383	67,542	17,401	25.8	2,166	3.2	29.0	4,895	7.2	23,326	15,335	22.7	347,790	324,138	107	369,627	94	
1996	2,500	91,896	23,975	26.1	3,387	3.7	29.8	6,597	7.2	34,659	25,557	27.8	521,222	509,115	102	567,616	92	
2001	2,545	117,874	30,656	26.0	5,458	4.6	30.6	8,447	7.2	48,179	41,448	35.2	729,932	723,533	101	800,464	91	
2006	2,545	151,688	39,593	26.1	8,786	5.8	31.9	12,904	7.2	64,623	56,128	37.0	978,487	968,913	101	1,074,196	91	
2011	2,545	197,501	50,763	25.7	12,870	6.5	32.2	14,192	7.2	87,039	73,851	37.4	1,316,643	1,324,736	99	1,460,464	90	
2016	2,545	250,906	65,354	26.0	17,876	7.1	33.2	17,986	7.2	114,386	104,525	41.7	1,739,003	1,787,416	97	1,955,624	89	
2021	2,545	316,366	82,672	26.0	24,748	7.8	33.7	22,845	7.2	146,566	139,693	43.9	2,238,792	2,326,534	96	2,538,639	88	
2026	2,545	406,884	105,997	26.1	33,407	8.2	34.3	29,134	7.2	187,707	180,489	44.4	2,861,276	3,008,572	95	3,275,061	87	

*Excludes maintenance allowance.

Note: The number of active employees and their aggregate payroll are certified as of June 30 (the valuation date) in the year listed. Contributions, earnings, payments, assets and assets-to-liability percentages reflect the financial experience of the plan for the year beginning July 1.

Source: Winkelmann & Associates, Inc., from 1976 SPRS valuation data.

the end of the forecast period, employer contributions are expected to increase almost ninefold to over \$100 million. However, employer contributions as a percentage of payroll are fairly stable throughout the 50-year forecast period, beginning at 27.9 percent in 1976, decreasing to 26.1 percent after 10 years, and remaining almost level thereafter.

The total of all employer obligations to SPRS equals the regular advance-funded employer contributions plus the pay-as-you-go costs of the COL provision. When these two costs are added together, total costs decrease from 30.1 percent of salary in 1976 to a low of 28.7 percent after 10 years and then increase to a high of 34.3 percent by the year 2026, as the continually rising pay-as-you-go COL payments consume a larger proportion of total costs.

Aggregate employee contributions to the plan remain fairly level as a percentage of salary, averaging about 7.2 percent over the forecast period. These data indicate that employees are funding less than one-fifth of the total cost of SPRS. To avoid confusion it should be stated that the statutory employee contribution rate of 7 percent of current salary was used in this study to determine the dollar value of employee contributions. The contribution rate appears slightly higher than 7 percent in Tables 3-1, 3-2 and 3-3 only because it is related to the beginning of year payroll figures listed in the third column of each table.

Investment earnings from SPRS assets help to offset a substantial portion of the total SPRS costs. In 1976 earnings are nearly as large as advance-funded employer contributions and over three times larger than employee contributions. After 10 years they are expected to exceed employer contributions by about 25 percent and represent almost five times employee contributions in that year. As assets continue to grow during the forecast, the expected investment earnings are eventually 75 percent greater than employer costs and six times larger than employee contributions.

The benefit payments from SPRS, which include such items as retirement and disability benefits, survivor benefits, insurance settlements and the return of employee contributions, total \$3.9 million in 1976 or 17.1 percent of payroll. By the end of the forecast period, these payments are expected to increase to \$180 million, an amount equal to 44.4 percent of payroll. If

SPRS were not advance-funded, but rather financed entirely on a pay-as-you-go basis, total costs (benefit payments plus COL costs) would escalate to almost 53 percent of payroll by the year 2026. In fact, however, total employer contributions are expected to be only about two-thirds of this amount -- a favorable consequence of the accumulation of assets under advance funding.

The dollar value of plan assets, as shown in Table 3-1, is \$83 million in 1976 and is expected to reach \$230 million by 1986. From this point in time to the end of the forecast period, assets are expected to increase to almost \$2.9 billion.

As is the case with the other values given in Table 3-1 absolute dollar amounts beyond a few years are less important than their relationship to some other dollar value. In the case of plan assets, the relevant standards are the liabilities of the plan. Table 3-1 includes the two liability measures previously discussed in Chapter 2. The first, plan termination liability (PTL), shows the liability associated with benefits accrued to date if the plan were to be terminated in a given year, while the second (PCL) shows an accrued liability based on continuation of the plan.

It is unusual for the PCL to exceed the PTL by as much as it does for SPRS. The reason for this difference is that the plan's generous disability benefits, which are based on final year's salary plus maintenance allowance, become unavailable if the plan were to terminate. Not only is the incidence of disability relatively high because of the nature of the occupation involved, but also the benefit received as a percentage of compensation is subject to a high minimum and, for the most part, is not related to years of credited service.

Viewing plan assets as a percentage of the PTL, the funded level of SPRS in 1976 is 109 percent, a value that remains almost steady for 15 years and then decreases gradually to a low of 95 percent by the year 2026. Funded levels based on the PCL start out at 90 percent, increase to a high of 94 percent and then decrease to 87 percent.

Forecast Under OFA Best-Estimate Assumptions

Table 3-2 shows the results of a 50-year forecast of SPRS which is identical to that shown in Table 3-1 except that the annual valuations during the forecast period are performed using OFA's best-estimate assumptions.

TABLE 3-2

FINANCIAL FORECAST OF SPRS UNDER OPA BEST-ESTIMATE ASSUMPTIONS

(Dollars in Thousands)

yr	Number Active Members	Payroll *	Employer Contributions						Employee Contributions	Invest- ment Earnings	Benefit Payments		Assets	Plan Termination Liability (PTL)		Plan Continuation Liability (PCL)	
			Funded Portion		Pay-as-you-go Portion		Total	Assets			Assets PTL	Assets PCL					
			\$	% of Pay	\$	% of Pay		\$						% of Pay	\$	% of Pay	\$
176	1,730	22,664	7,895	34.8	502	2.2	37.0	1,656	7.3	5,572	3,874	17.1	83,318	76,122	109	93,041	90
177	1,782	24,653	8,397	34.1	538	2.2	36.2	1,803	7.3	6,383	3,673	14.9	94,566	86,540	109	102,711	92
178	1,833	26,856	8,956	33.3	588	2.2	35.5	1,960	7.3	7,264	3,976	14.8	107,476	97,073	111	114,485	94
179	1,884	29,148	9,536	32.7	639	2.2	34.9	2,123	7.3	8,217	4,435	15.2	121,681	108,921	112	127,679	95
180	1,934	31,510	10,129	32.1	689	2.2	34.3	2,292	7.3	9,252	5,028	16.0	137,122	121,984	112	142,113	96
181	1,982	33,973	10,745	31.6	748	2.2	33.8	2,462	7.2	10,322	5,974	17.6	153,758	136,194	113	157,758	97
182	2,030	36,384	11,340	31.2	806	2.2	33.4	2,637	7.2	11,496	6,928	19.0	171,330	150,600	114	173,744	99
183	2,076	38,968	11,979	30.7	885	2.3	33.0	2,818	7.2	12,692	8,164	20.9	189,875	165,711	115	190,601	100
184	2,121	41,542	12,610	30.4	973	2.3	32.7	3,009	7.2	13,982	9,262	22.3	209,201	180,595	116	207,483	101
185	2,164	44,443	13,327	30.0	1,090	2.5	32.4	3,219	7.2	15,335	10,358	23.3	229,540	196,146	117	225,271	102
186	2,206	47,528	14,091	29.6	1,226	2.6	32.2	3,445	7.2	16,785	11,348	23.9	251,063	212,338	118	243,932	103
91	2,383	67,549	19,101	28.3	2,166	3.2	31.5	4,895	7.2	26,104	15,335	22.7	387,465	324,138	120	369,627	105
96	2,500	91,896	25,121	27.3	3,384	3.7	31.0	6,597	7.2	39,159	20,527	27.8	585,512	509,115	115	567,616	103
01	2,545	117,874	31,408	26.6	5,458	4.6	31.3	8,447	7.2	54,920	41,448	35.2	826,241	723,533	114	800,464	103
06	2,545	151,688	39,642	26.1	8,786	5.8	31.9	10,904	7.2	74,325	56,198	37.0	1,117,093	968,913	115	1,074,196	104
11	2,545	197,501	48,704	24.7	12,870	6.5	31.2	14,182	7.2	99,901	73,853	37.4	1,500,387	1,324,736	113	1,460,464	103
16	2,545	250,908	61,299	24.4	17,878	7.1	31.6	17,986	7.2	131,246	104,525	41.7	1,979,857	1,787,416	111	1,955,624	101
21	2,545	318,366	78,287	24.6	24,748	7.8	32.4	22,845	7.2	168,930	139,693	43.9	2,552,565	2,326,534	110	2,538,639	101
26	2,545	406,884	99,842	24.5	33,407	8.2	32.7	29,134	7.2	216,532	180,489	44.4	3,273,058	3,008,572	109	3,275,061	100

includes maintenance allowance.

te: The number of active employees and their aggregate payroll are certified as of June 30 (the valuation date) in the year listed. Contributions, earnings, payments, assets and assets-to-liability percentages reflect the financial experience of the plan for the year beginning July 1.

srce: Winklevoss & Associates, Inc., from 1976 SPRS valuation data.

Thus, the number of employees, payroll, employee contributions, COL payments, benefit payments, and liability values are the same as in Table 3-1. The values that change are employer costs, investment earnings, assets, and funded levels.

Using best-estimate assumptions, employer contributions in 1976 would have been larger (\$7.9 million) than they actually were under the SPRS actuary's current assumptions (\$6.3 million) and would remain larger through 2006, after which they become lower. Costs as a percentage of salary are 34.8 percent in 1976, scaling down to 24.5 percent by 2026. The latter percentage is slightly smaller than the 26.1 percent obtained when the SPRS actuary's assumptions are used, illustrating a basic principle of pension costs that higher contributions made initially result in lower contributions at some later date.

As a result of initially higher employer contributions, the asset buildup and, hence, the dollar investment earnings, are somewhat larger. This in turn causes the funded levels to be higher beyond the first year of the forecast period under best-estimate assumptions than under the SPRS actuary's assumptions. The PTL and PCL funded levels both follow an increasing and then decreasing pattern, ending at 109 percent and 100 percent, respectively.

Best-Estimate Forecast with Full Advance Funding of All Costs

Table 3-3 shows a 50-year forecast which is identical to that presented in Table 3-2 except for the fact that the COL provision is now assumed to be advance-funded. This assumption produces changes in employer contributions, investment earnings, assets and funded levels. In addition, the amount of benefit payments, while not changing, now includes COL payments previously listed in a separate column.

Full advance funding would have caused employer contributions to increase to 48.5 percent of payroll in 1976, a substantial increase over the previous two forecasts which showed total costs (employer contributions plus pay-as-you-go costs) of 30.1 percent and 37.0 percent. This immediate jump in contributions is a consequence of recognizing, and funding now, the liabilities associated with COL benefits which are currently being earned but

TABLE 3-3

FINANCIAL FORECAST OF SPRS UNDER OFA BEST-ESTIMATE
ASSUMPTIONS WITH ADVANCE FUNDING OF COL BENEFITS

(Dollars in Thousands)

Year	Number Active Members	Payroll*	Employer Contributions		Employee Contributions		Invest- ment Earnings	Benefit Payments		Assets	Plan Termination Liability (PTL)		Plan Continuation Liability (PCL)	
			\$	% of Pay	\$	% of Pay		\$	% of Pay		\$	% Assets PTL	\$	% Assets PCL
1976	1,730	22,664	11,003	48.5	1,656	7.3	5,537	4,377	19.3	83,318	76,122	109	93,041	90
1977	1,782	24,653	11,612	47.1	1,803	7.3	6,525	4,211	17.1	97,137	86,640	112	102,711	95
1978	1,833	26,856	12,305	45.8	1,960	7.3	7,600	4,564	17.0	112,866	97,073	116	114,485	99
1979	1,884	29,148	13,017	44.7	2,123	7.3	8,767	5,073	17.4	130,167	108,921	120	127,679	102
1980	1,934	31,510	13,735	43.6	2,292	7.3	10,035	5,717	18.1	149,001	121,984	122	142,113	105
1981	1,982	33,973	14,473	42.6	2,462	7.2	11,367	6,722	19.8	169,346	136,194	124	157,758	107
1982	2,030	36,384	15,160	41.7	2,637	7.2	12,812	7,734	21.3	190,926	150,600	127	173,784	110
1983	2,076	38,968	15,907	40.8	2,818	7.2	14,305	9,049	23.2	213,801	165,711	129	190,601	112
1984	2,121	41,542	16,628	40.0	3,009	7.2	15,915	10,235	24.6	237,782	180,595	132	207,493	115
1985	2,164	44,443	17,470	39.3	3,219	7.2	17,608	11,448	25.8	263,099	196,146	134	225,271	117
1986	2,206	47,520	18,374	38.7	3,445	7.2	19,421	12,574	26.5	289,947	212,338	137	243,932	119
1991	2,383	67,549	24,497	36.3	4,895	7.2	30,975	17,501	25.9	459,222	324,138	142	369,627	124
1996	2,500	91,896	31,653	34.4	6,597	7.2	47,210	20,942	31.5	703,911	509,115	138	567,616	124
2001	2,545	117,874	38,845	33.0	8,447	7.2	67,158	46,907	39.8	1,006,521	723,533	139	800,464	126
2006	2,545	151,688	47,502	31.3	10,904	7.2	91,044	64,984	42.8	1,364,725	968,913	141	1,074,195	127
2011	2,545	197,501	59,000	29.9	14,182	7.2	122,550	86,722	43.9	1,836,911	1,324,736	139	1,460,464	126
2016	2,545	250,908	72,926	29.1	17,986	7.2	161,063	122,402	48.8	2,423,699	1,787,416	136	1,955,624	124
2021	2,545	318,366	95,514	30.0	22,845	7.2	207,475	164,441	51.7	3,127,960	2,326,534	134	2,538,639	123
2026	2,545	406,884	121,520	29.9	29,134	7.2	266,405	213,897	52.6	4,018,932	3,008,572	134	3,275,061	123

*Excludes maintenance allowance.

Note: The number of active employees and their aggregate payroll are certified as of June 30 (the valuation date) in the year listed. Contributions, earnings, payments, assets and assets-to-liability percentages reflect the financial experience of the plan for the year beginning July 1.

Source: Winklevoss & Associates, Inc., from 1976 SPRS valuation data.

not paid for under the present pay-as-you-go policy. However, as Table 3-3 illustrates, relative costs under full advance funding decrease steadily in future years and eventually reach 29.9 percent in the year 2026. This is in contrast to total ultimate costs of 34.3 percent and 32.7 percent from the previous forecasts. Thus full advance funding is considerably more costly initially but eventually (around the year 2006) becomes less costly than the current funding policy for SPRS.

The increase in employer costs in early years causes the assets and, hence, investment earnings, to increase more rapidly than in the two previous forecasts. As a result, the PTL and PCL funded levels go as high as 142 percent and 127 percent, respectively. By the end of the forecast period, assets are approximately 134 percent of the PTL and 123 percent of the PCL.

From a budgetary standpoint, the steeply decreasing cost curve which characterizes full advance funding of all pension benefits may not be desirable since it calls for an immediate and large increase in employer contributions to SPRS. The same might be said for the rapid buildup of "redundant" assets (e.g., assets exceeding PTL and PCL) over the next five to ten years. Both situations would be alleviated somewhat by a "flatter" funding pattern than is indicated in Table 3-3. One possibility for achieving this, while retaining full advance funding of benefits, is to amortize the remaining supplemental liability of the system as a level percentage of salary (as is done with the normal cost) rather than as a level dollar amount. While this option has not been tested as a part of this study, it should be considered if a change is contemplated to advance funding of COL benefits. Since the method of amortizing the current unfunded supplemental liability is specified by law,² legislation would be required to reamortize the liability on a different basis.

FOOTNOTES TO CHAPTER 3

1. The June 30, 1976 actuarial valuation of SPRS was used as the base for all projections made in this study. This was the most recent valuation report available at the time. As noted in the tables in this chapter, the financial data listed refer to the experience of the plan in the fiscal year beginning July 1.
2. N.J.S.A. 53:5A-34(b).

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

This study has simulated the future financial status of SPRS under alternative funding conditions. The long-range financial forecasts presented in this study show that SPRS is a well-funded pension system as measured by the system's actuarial cost method and either the SPRS actuary's assumptions or OFA's best-estimate assumptions. In the unlikely event of plan termination, assets on hand are sufficient to cover all of the benefits accrued to date by retired and active employees; on the more realistic plan continuation basis, assets are equal to approximately 90 percent of accrued benefit liabilities. These funded levels compare favorably to many other pension plans of equal age, whether public or private, and especially to most uniformed services plans. Of course, the maintenance of SPRS at these or higher funded levels is dependent upon continued recognition by all concerned of any additional liabilities associated with future benefit liberalizations or possible unfavorable actuarial experience.

Specific conclusions and recommendations related to the financial status of SPRS are discussed in the following sections.

Actuarial Assumptions

During the period from July 1, 1975 to June 30, 1976 there were considerable deviations between certain of the SPRS actuary's assumed decrement rates (such as deaths among active and retired members, terminations and retirements) and the actual experience of the plan. These deviations were noted by the actuary in the 1976 SPRS valuation report. While such actuarial deviations may be expected when the experience investigation covers only one year and deals with a relatively small group of plan members, continual deviations in one direction should become a cause for concern since they may misrepresent ongoing pension cost calculations.

OFA recommends that the SPRS actuary review the cumulative experience of the plan over at least three years in assessing the accuracy of decrement assumptions, and that these assumptions be adjusted accordingly should the experience of the plan persistently deviate in one direction (Recommendation No. 1)

The economic assumptions currently used by the SPRS actuary generate lower annual costs than OFA's best-estimate assumptions selected for use in this study. Although the short-term results of using the current assumptions are favorable (i.e., smaller employer contributions), the long-term effect is a lower and gradually deteriorating funded level. However, since this deterioration will not occur for another 25 to 35 years, OFA does not believe that a change in the current economic assumptions is warranted on strict financial grounds alone.

The general approach taken by the SPRS actuary is one which understates both salary and interest rates in relation to what may actually be expected to occur in future years. The actuary attempts to balance the degree of understatement in both assumptions so that they produce offsetting characteristics in terms of pension costs. This is a fairly common actuarial practice that has become more noticeable as the effects of prolonged inflation show up in salary levels and interest rates. Actuaries have traditionally been reluctant to give explicit recognition to inflationary influences in calculating pension costs. They have preferred to "factor out" inflation by assuming that there exists, over the long run, a constant differential or "spread" (say, 2 to 3 percent) between interest rates and general salary increases, and that both components move up or down in tandem. It is held that this characteristic makes it unnecessary for the actuary to project either interest rates or general salary increases independently, at levels thought to be realistic, since the effect of the spread is to keep costs in balance regardless of the absolute values of either component.

It is possible to create the same annual cost patterns by using offsetting assumptions as by using assumptions selected individually on an explicit best-estimate basis. However, this practice is open to challenge on several grounds. Some financial analysts question the rationale of assuming--even for actuarial purposes--that there is a constant spread between interest rates and salary levels, especially in light of recent economic

experience during the 1974-75 recession. In addition, it has been demonstrated that even if the spread between interest and salary rates is held constant, the cost implications of this relationship are different depending upon the absolute values of both components.¹ For example, using a 7 percent interest rate and a 5 percent salary rate does not produce the same effect (all other things being equal) as using a 5 percent interest rate and a 3 percent salary rate, even though a 2 percent difference is maintained between the two.

An inherent and persistent problem in the use of offsetting assumptions is that non-actuaries find it virtually impossible to evaluate the appropriateness of the assumptions. When differences among actuaries center around the correct "offset" between two assumptions, rather than on how those assumptions were developed and whether they have some relation to reality, confusion among non-actuaries is unnecessarily compounded. In this atmosphere it is extremely difficult for the Legislature to properly evaluate the fiscal impact of major pension legislation.

This situation became apparent during 1977 hearings before the Assembly Municipal Government Committee on legislation that would have liberalized benefits in another uniformed services pension plan, the Police and Firemen's Retirement System (PFRS).² During these hearings, a representative of the actuarial firm retained by police and fire employee groups testified on the estimated cost of the proposed legislation. The main difference (which was considerable) between this firm's cost estimate and the one submitted by the PFRS actuary, through the Division of Pensions, centered around which salary scale assumption was more "consistent" with the 6 percent interest rate assumption specified for PFRS by the State Treasurer. Since the interest assumption itself was understated, the difference of opinion had little to do with how fast either salaries or interest rates were actually expected to rise; rather, it concerned the proper "spread" or "offset" between the two. Committee members and others present at the hearing were essentially nonparticipants in this technical process.

Since the salary and interest rate assumptions in particular have an extremely important influence on pension costs,

OFA recommends that the use of explicit best-estimate actuarial assumptions be considered by the State Treasurer and the SPRS actuary. (Recommendation No. 2)

In making this recommendation, OFA is not necessarily recommending that the specific assumption values used in this study be adopted but rather that the process used to develop those values be made clear, as illustrated in Chapter 2. Once this is done disagreements about specific assumption values (e.g., a 5 percent vs. a 7 percent interest rate) are easier to understand.

To implement the above recommendation,

OFA recommends that the Legislature consider amending or repealing the provision of N.J.S.A. 53:5A-3(p) which limits the "regular interest" rate assumption to 105 percent of the actual percentage rate of earnings on investments. (Recommendation No. 3)

This section of the SPRS law is designed to insure that SPRS is conservatively funded by not allowing the anticipated income from the investment of pension fund assets to be overstated. However, in operation the SPRS actuary balances any conservatism in the interest rate assumption by constructing an artificially low salary level assumption, thereby cancelling out the law's intended effect. What remains are two assumptions which may or may not be "in balance" but neither of which can reasonably be said to represent best estimates of future experience.

These recommendations would become even more relevant should another OFA recommendation--that the actuary periodically calculate SPRS liabilities to include the liability associated with COL benefit increases (Recommendation No. 5)--be adopted. Since COL benefits are automatically linked to changes in the Consumer Price Index, it will be necessary to give explicit recognition to the rate of inflation anticipated in future years.

SPRS Funding Policy

Presently, all benefits provided by SPRS are advance-funded, with the exception of COL adjustments. These are financed on a pay-as-you-go basis through annual appropriations.

One of the purposes of this study has been to compare the financial implications of continuing the current funding policy with one that advance-funds the COL provision along with all other benefits. The results of this comparison were presented in Chapter 3 and are summarized below.³

(1) If the Legislature chooses not to advance-fund the COL provision and the SPRS actuary's assumptions are retained, then

(a) Total employer contributions (normal, supplemental and pay-as-you-go COL) will remain almost level as a percentage of payroll, 29 to 30 percent, over the next 15 years, and will increase thereafter to 34 percent by the end of the 50-year forecast period. The total cost percentage will continue to increase indefinitely under the current financing pattern.

(b) The funded level of SPRS (assets to plan continuation liability) will increase from 90 percent to 94 percent over the next 15 years and will slowly decline thereafter. The plan's unfunded accrued liabilities will not be completely amortized during the forecast period.

(2) If the Legislature chooses not to advance-fund the COL provision and OFA's best-estimate assumptions are used, then

(a) Total employer contributions will decline as a percentage of payroll from 37 percent to 31 percent over the next 20 years, and will increase thereafter to 33 percent by the end of the forecast period. The total cost percentage will continue to increase indefinitely under the current financing pattern.

(b) The funded level of SPRS will increase from 90 to 105 percent over the next 15 years and will slowly decline thereafter. However, the PCL funded level will still be as high as 100 percent ("full funding") by 2026.

(3) If the Legislature chooses to advance-fund the COL provision and OFA's best-estimate assumptions are used, then

(a) Total employer contributions would initially be much higher than they are under the current financing policy. Costs are over 48 percent of payroll, or 60 percent higher than they now are (in dollar terms, \$4.2 million more). This is caused by the initially high costs of amortizing the large unfunded liability associated with already earned COL benefits.

However, total contributions steadily decline as a percentage of payroll and, near the end of the amortization period (around the year 2006) become lower than under the current policy. Thereafter, the annual costs under full advance funding will always be lower, and by a continually increasing amount.

(b) The funded level of SPRS will increase from 90 percent to over 100 percent over the next four years and will continue to increase to 127 percent around the year 2006. The funded level will average out at around 123 percent of plan continuation liability.

Thus, there is a tradeoff observed between the timing of pension contributions and the achievement of "full funding" in SPRS. As defined in this study, "full funding" occurs when all pension benefit credits earned to date by SPRS members have been funded; i.e., when the system's unfunded supplemental liability is completely amortized. Under the current financing policy and actuarial assumptions, full funding is not achieved when COL benefits are included in the system's liabilities but not advance-funded. The achievement of full funding is an implicit goal of SPRS and of the Legislature, since the Act governing SPRS (N.J.S.A. 53:5A) includes the provision for the 40-year unfunded liability amortization. Although the

funded level of SPRS is quite favorable (90 percent) even without advance COL funding, the Legislature may wish to consider a policy to advance-fund the COL provision in light of this implicit goal.

As shown in the forecasts, full funding is achieved using OFA's best-estimate assumptions, even under the current financing policy. Therefore, this combination might be recommended if there were assurances that future COL benefit increases would not exceed their assumed value in this study, which is 2.4 percent (60 percent of the 4 percent inflation assumption). Without these assurances, and in view of the fact that either the inflation rate or the percentage of the Consumer Price Index used to calculate COL benefit levels may increase in future years, we cannot recommend the long-term continuation of pay-as-you-go financing for COL benefits.

The forecasts also show that full funding is achieved when the COL provision is advance-funded, but at the expense of quite burdensome employer contributions in initial years. Moreover, total advance funding at the rate shown actually builds up "redundant" assets (assets in excess of the PCL) rather quickly and maintains them throughout the forecast period.

It should be noted that there are ways to move toward full advance funding which produce a "flatter" funding pattern than illustrated in this study and which retain the implicit goal of reaching a 100 percent funded level. A funding schedule can be established that "phases in" advance-funded COL contributions so that full funding is reached later than shown here but with less immediate financial stress. Another possibility would be to amortize the remaining supplemental liability of the system as a level percentage of payroll rather than as a level dollar amount.

Apart from their specific application to SPRS, the arguments in favor of advance funding are persuasive ones. From a financial standpoint, the investment income earned on pension fund assets built up by regular employer contributions can reduce the ultimate cost of benefit payments by up to 50 percent.⁴ Over the long run, the inflationary advantage of paying in tomorrow's "cheap" dollars instead of today's "expensive" ones has almost always been overcome by the yield on invested assets.

There are other more abstract advantages to advance funding. For one thing, it charges the costs of pension benefits to the present generation of taxpayers who presumably are receiving the services of those earning the

benefits. In addition, the accumulation of assets in a fund serves to reassure members of a pension plan that their promised benefits will be paid. Finally, a policy of advance funding has the important effect of forcing recognition of the true costs of a benefit change by requiring that a portion of those costs be paid immediately.

As noted in Chapter 2, the Pension Adjustment Act does not mandate the annual appropriation of funds for the purpose of providing COL benefit adjustments to retired employees. Despite this, the Legislature has chosen to appropriate the amount necessary each year to pay for these increased benefits and, in addition, has recently raised the COL benefit level. Should the Legislature interpret its commitment with respect to COL benefit payments as an ongoing and continual one, then

OFA recommends that the Legislature consider the advantages of adopting a policy which supports the advance funding of all SPRS pension benefits, including cost-of-living increases, on a schedule that is financially practicable. (Recommendation No. 4)

Measuring Plan Liabilities

1. Method -- It was noted earlier in this report that the total actuarial liability of a pension plan is determined by the actuarial cost method used to finance the plan, and that this liability value has little meaning when viewed out of context. Therefore, it was suggested that in assessing the level of employee benefit security at any point in time, more meaningful measures of liability should be considered. Two such measures were demonstrated in this study, one based on plan termination (PTL) and one on plan continuation (PCL). The rationale for both approaches is that they measure the accrued value of members' benefits earned to date, by applying the plan's benefit formula to each member's current salary and years of service.

Until recently the SPRS actuary did not include either of these values in the annual valuation report of the system. Since 1976 the actuary has been including a "Funded Status" statement that compares the book value of assets (adjusted for employer contributions receivable) to a liability measure similar to the PCL. The actuary has further broken down the liability value (and the level of funding calculation) into a separate category for vested accrued benefits. This breakdown provides additional

information on the status of the plan's benefit security, particularly as it covers those SPRS members who have already earned the right to a retirement pension.

While we would prefer that the actuary calculate and include the PTL as well as the PCL as an additional indicator of accrued benefit security, we recognize that the assumed perpetual nature of a public plan sponsor might make the concept of plan termination liability less relevant than it would be in the private sector. Based on this, and on the actuary's inclusion of the PCL in the valuation, OFA makes no recommendation on adoption of the PTL measure.

2. Cost-of-Living (COL) Increases -- A basic concept of accounting for pension costs is that they be assigned to the period during which benefits are earned. COL benefits, since they are computed as a percentage of the retirement allowance, are earned over an employee's active career. The same factors (e.g., benefit liberalizations, salary increases) responsible for raising regular pension benefits are also responsible for raising future COL obligations. This relationship is not explicitly recognized under the current COL financing policy, with the result that the overall impact of plan changes is always understated, as are the total liabilities associated with providing retirement benefits to SPRS members.

Should the Legislature elect to advance-fund COL benefits, the costs associated with providing these benefits would automatically be treated as liabilities of the pension system. In addition,

OFA recommends, should the Legislature decide not to advance fund COL benefits, that the SPRS actuary periodically calculate the system's liabilities to include the liability associated with COL benefits, so as to portray more accurately the total costs of all pension obligations currently being accrued, even though payment of a portion of these costs is being deferred to the future. (Recommendation No. 5)

Since almost all pension benefit changes carry a corollary fiscal impact associated with higher COL payments,

OFA recommends that fiscal notes and cost estimates on pension-related bills, whether prepared by the Division of Pensions or by OFA, include an estimate of the additional COL costs likely to result from the provisions of the bill. (Recommendation No. 6)

FOOTNOTES TO CHAPTER 4

1. Glenn D. Allison and Howard E. Winklevoss, "The Interrelationship Among Inflation Rates, Salary Rates, Interest Rates, and Pension Costs," Transactions of the Society of Actuaries, Volume 27, 1975, pp. 197-209.
2. Public Hearing Before the Assembly Municipal Government Committee on Assembly No. 658, Trenton, April 20, 1977.
3. The cost percentages and dollar values illustrated are, of course, projected on the basis of "all other things being equal." In this case, this means no changes in the SPRS benefit formula and a future plan experience similar to assumptions. If these conditions do not occur, the exact percentages and costs will vary, but the overall cost patterns between the two financing methods will remain as illustrated.
4. Tilove, p. 140.

APPENDIX A
ACTUARIAL TABLES USED IN SPRS FORECASTS

Table A-1

SPRS

Disabled Lives Mortality Rates

Age	Rate	Age	Rate
20	.00612	62	.03155
21	.00616	63	.03402
22	.00622	64	.03672
23	.00628	65	.03969
24	.00635	66	.04291
25	.00643	67	.04644
26	.00651	68	.05029
27	.00661	69	.05450
28	.00670	70	.05909
29	.00682	71	.06410
30	.00694	72	.06956
31	.00707	73	.07554
32	.00722	74	.08199
33	.00737	75	.08906
34	.00756	76	.09673
35	.00774	77	.10507
36	.00796	78	.11413
37	.00818	79	.12398
38	.00845	80	.13458
39	.00872	81	.14614
40	.00902	82	.15861
41	.00936	83	.17203
42	.00972	84	.18655
43	.01012	85	.20220
44	.01056	86	.21901
45	.01104	87	.23688
46	.01158	88	.25628
47	.01215	89	.27672
48	.01279	90	.29873
49	.01348	91	.32191
50	.01424	92	.34604
51	.01507	93	.37318
52	.01599	94	.40000
53	.01698	95	.42636
54	.01809	96	.45946
55	.01929	97	.48750
56	.02060	98	.51220
57	.02204	99	.55000
58	.02362	100	.55556
59	.02534	101	.50000
60	.02722	102	1.00000
61	.02929		

Source: Stone, Young & Co. Consulting Actuaries.

Table A-2

SPRS

Mortality Rates for Service Retirees and Beneficiaries

Age	Male	Female	Age	Male	Female
20	.00393	.00378	66	.03631	.02630
21	.00398	.00382	67	.03942	.02848
22	.00403	.00385	68	.04283	.03086
23	.00408	.00389	69	.04654	.03347
24	.00415	.00393	70	.05060	.03631
25	.00421	.00398	71	.05503	.03942
26	.00429	.00403	72	.05986	.04189
27	.00437	.00408	73	.06513	.04747
28	.00446	.00415	74	.07088	.05060
29	.00455	.00421	75	.07714	.05503
30	.00466	.00429	76	.08395	.05986
31	.00478	.00437	77	.09136	.06513
32	.00490	.00446	78	.09943	.07088
33	.00505	.00455	79	.10818	.07714
34	.00520	.00466	80	.11768	.08395
35	.00537	.00478	81	.12799	.09137
36	.00556	.00490	82	.13915	.09943
37	.00576	.00505	83	.15121	.10818
38	.00598	.00520	84	.16426	.11768
39	.00622	.00537	85	.17833	.12799
40	.00649	.00556	86	.19348	.13913
41	.00678	.00576	87	.20978	.15121
42	.00711	.00598	88	.22728	.16426
43	.00746	.00622	89	.24600	.17833
44	.00784	.00649	90	.26601	.19349
45	.00827	.00678	91	.28737	.20977
46	.00873	.00710	92	.31008	.22729
47	.00924	.00746	93	.33403	.24601
48	.00980	.00784	94	.35953	.26601
49	.01041	.00827	95	.38616	.28735
50	.01107	.00873	96	.41432	.31009
51	.01181	.00924	97	.44369	.33404
52	.01261	.00980	98	.47406	.35947
53	.01349	.01040	99	.50484	.38617
54	.01445	.01107	100	.53906	.41426
55	.01551	.01181	101	.56780	.44374
56	.01666	.01261	102	.60784	.47368
57	.01793	.01349	103	.65000	.50588
58	.01931	.01445	104	.71429	.53968
59	.02083	.01551	105	.50000	.56897
60	.02249	.01666	106	1.00000	.60000
61	.02431	.01793	107	1.00000	.65000
62	.02630	.01931	108	1.00000	.71429
63	.02848	.02083	109	1.00000	.50000
64	.03086	.02249	110	1.00000	1.00000
65	.03346	.02431			

Source: Stone, Young & Co. Consulting Actuaries.

Table A-3

SPRS

Active Lives Mortality Rates*

Age	Ordinary	Accidental
20	.00170	.00020
21	.00180	.00020
22	.00180	.00020
23	.00180	.00020
24	.00180	.00030
25	.00180	.00040
26	.00190	.00040
27	.00190	.00040
28	.00191	.00049
29	.00190	.00051
30	.00200	.00050
31	.00220	.00050
32	.00240	.00050
33	.00259	.00050
34	.00280	.00050
35	.00300	.00050
36	.00320	.00049
37	.00340	.00050
38	.00370	.00051
39	.00401	.00050
40	.00431	.00050
41	.00451	.00049
42	.00470	.00050
43	.00490	.00060
44	.00521	.00061
45	.00550	.00060
46	.00590	.00070
47	.00630	.00089
48	.00670	.00091
49	.00720	.00091
50	.00770	.00091
51	.00820	.00091
52	.00880	.00070
53	.00950	.00049
54	.01030	.00030
55	.00000	.00000

* For members entering the plan prior to 7/1/65, no service-related deaths are assumed at ages 50 through 55

Source: Stone, Young & Co. Consulting Actuaries.

Table A-4

SPRS

Disability Rates^{*}

Age	Ordinary	Accidental
20	.00040	.00030
21	.00040	.00030
22	.00050	.00040
23	.00050	.00040
24	.00050	.00040
25	.00060	.00049
26	.00060	.00050
27	.00070	.00050
28	.00071	.00061
29	.00080	.00059
30	.00090	.00070
31	.00090	.00070
32	.00100	.00080
33	.00110	.00090
34	.00120	.00089
35	.00120	.00100
36	.00130	.00100
37	.00140	.00110
38	.00150	.00120
39	.00170	.00130
40	.00180	.00141
41	.00201	.00160
42	.00220	.00180
43	.00250	.00199
44	.00280	.00230
45	.00320	.00260
46	.00371	.00289
47	.00412	.00329
48	.00460	.00360
49	.00500	.00400
50	.00551	.00440
51	.00600	.00480
52	.00651	.00520
53	.00691	.00550
54	.00741	.00590
55	.00000	.00000

* For members entering the plan prior to 7/1/65, no disabilities are assumed at ages 50 through 55

Source: Stone, Young & Co. Consulting Actuaries.

Table A-5

SPRS

Termination (Withdrawal) Rates*

Age	Rate
20	.02660
21	.02570
22	.02480
23	.02360
24	.02270
25	.02160
26	.02090
27	.01970
28	.01861
29	.01701
30	.01470
31	.01200
32	.00991
33	.00821
34	.00699
35	.00630
36	.00580
37	.00530
38	.00480
39	.00430
40	.00391
41	.00350
42	.00311
43	.00279
44	.00250
45	.00221
46	.00200
47	.00180
48	.00160
49	.00139
50	.00120
51	.00099
52	.00089
53	.00069
54	.00039
55	.00000

* For members entering the plan prior to 7/1/65, no withdrawals are assumed at ages 50 through 55

Source: Stone, Young & Co. Consulting Actuaries.

Table A-6

SPRS

Retirement Rates for Plan Members
Entering Prior to 7/1/65*

Age	Rate
50	.298
51	.279
52	.168
53	.174
54	.182
55	1.000

*All members entering the plan after
7/1/65 are assumed to retire at age 55

Source: Stone, Young & Co. Consulting
Actuaries.

Table A-7

SPRS

Entry-Age Distribution

Age	Rate
20	.101
22	.260
24	.294
26	.172
28	.111
30	.030
32	.017
34	.010
36	.003

Source: Winklevoss & Associates,
Inc., from 1976 SPRS
Valuation data.

Table A-8

SPRS

Entry-Age Salary Scale

Age	Scale
20	1.00000
22	1.01042
24	1.02075
26	1.03091
28	1.04115
30	1.05131
32	1.06147
34	1.07163
36	1.08170

Source: Winklevoss & Associates,
Inc., from 1976 SPRS
valuation data.

Table A-9

SPRS

Best-Estimate
Promotional Salary Scale

Age	Scale
20	1.00000
21	1.02843
22	1.05676
23	1.08519
24	1.11361
25	1.14204
26	1.17037
27	1.19871
28	1.22669
29	1.25430
30	1.28156
31	1.30838
32	1.33492
33	1.36146
34	1.38819
35	1.41526
36	1.44306
37	1.47140
38	1.50072
39	1.53112
40	1.56295
41	1.59640
42	1.63173
43	1.66894
44	1.70821
45	1.74964
46	1.79295
47	1.83824
48	1.88513
49	1.93302
50	1.98180
51	2.03085
52	2.08016
53	2.12939
54	2.17853
55	2.22767

Source: Winklevoss & Associates,
Inc., from 1976 SPRS
valuation data.

Table A-10

SPRS

Actuary's Assumed Total
Rates of Salary Increase

Age	Rate
20	1.05
21	1.05
22	1.05
23	1.05
24	1.05
25	1.05
26	1.05
27	1.05
28	1.05
29	1.05
30	1.04
31	1.04
32	1.04
33	1.04
34	1.04
35	1.04
36	1.04
37	1.04
38	1.04
39	1.04
40	1.04
41	1.04
42	1.04
43	1.04
44	1.04
45	1.04
46	1.04
47	1.04
48	1.04
49	1.04
50	1.03
51	1.03
52	1.03
53	1.03
54	1.03
55	1.03

Source: Stone, Young & Co.
Consulting Actuaries.

APPENDIX B
SPRS BENEFIT PROVISIONS

APPENDIX B: SPRS BENEFIT PROVISIONS*

There are given below the provisions of the present plan which affect the actuarial calculations. This summary has been obtained from Senate Bills 219 and 414 and Assembly Bills 440 and 2381. In this summary "final compensation" means the salary plus maintenance allowance of an employee in the last twelve months of his service preceding his death, termination or retirement. "Final Salary" means the salary received by an employee in the same twelve month period.

1. Service Retirement - The provisions are different for Pre 7/1/65 members and Post 7/1/65 members.

(a) Members of the Plan on July 1, 1965 may retire after age 50 and completion of 20 years of service. They must retire after age 55 and completion of 25 years of service. The retirement allowance is 50% of final compensation plus 1% of final compensation for each year of service in excess of 25 years.

(b) Members who join the Plan after July 1, 1965 must retire at age 55. Although employment beyond age 55 may be permitted, it is assumed that all such employees will retire at age 55. The retirement allowance is 2% of final compensation times years of service up to 25 years plus 1% of final compensation times years of service in excess of 25 years.

2. Ordinary Disability - If a member has at least four years of service when he becomes disabled, he will receive a retirement allowance of 40% of final compensation plus 1½% of final compensation times years of service in excess of 26 2/3 years. If a member has less than four years of service when he becomes disabled, he will receive the withdrawal benefits described in (8) below.

*Source: Stone, Young & Co. Consulting Actuaries, Report of the Actuarial Valuation of the State Police Retirement System as of July 1, 1975.

3. Accidental Disability - If a member is disabled in the line of duty, he will receive a retirement allowance equal to two-thirds of his final compensation.
4. Ordinary Death - The provisions are different for Pre 7/1/65 members and Post 7/1/65 members.

(a) The widow of a member of the Plan on July 1, 1965 will receive a pension of 50% of final compensation. If there is no widow, one child shall receive a pension of 20% of final compensation, two children shall each receive a pension of 17½% of final compensation and three or more children shall share equally in a pension of 50% of final compensation. If there are no widow or children, one dependent parent shall receive 25% of final compensation and two dependent parents shall each receive 20% of final compensation.

(b) The widow of a member who joins the Plan after July 1, 1965 shall receive a pension of 25% of final compensation. In addition one child shall receive a pension of 15% of final compensation and two or more children shall share equally in a pension of 25% of final compensation. If there is no widow, children shall receive payments as described in (a) above. If there are no widow or children, dependent parents shall receive payments as described in (a) above.

For purposes of the Plan a "child" is an unmarried child either under the age of 18 or of any age who is disabled because of mental retardation or physical incapacity. In addition to the pensions described above certain lump sum benefits are paid through a group life insurance policy as described in (9) below.

5. Accidental Death - A pension is paid to the widow which is 50% of final compensation. If there is no widow, payments shall be made to children as described in (4a) above. If there are no widow or children, payments shall

be made to dependent parents as described in (4a) above. In addition to the pension certain lump sum benefits are paid through a group life insurance policy as described in (9) below.

6. Death After Retirement - The provisions are different for Pre 7/1/65 members and Post 7/1/65 members.

(a) If a member of the Plan on July 1, 1965 retires and then later dies, his widow will receive a pension equal to 50% of the member's final compensation. If there is no widow, one child shall receive a pension of 20% of the member's final compensation, two children shall each receive a pension of 17½% of final compensation and three or more children shall share equally in a pension of 50% of final compensation.

(b) If a member joins the Plan after July 1, 1965, retires thereafter and subsequently dies his widow shall receive a pension of 25% of final compensation. In addition one child shall receive a pension of 15% of final compensation and two or more children shall share equally in a pension of 25% of final compensation. If there is no widow, one child shall receive a pension of 20% of final compensation, two children shall each receive a pension of 17½% of final compensation and three or more children shall share equally in a pension of 50% of final compensation.

If there is no widow or children, no pension shall be paid. In addition to the pensions described above certain lump sum benefits are paid through a group life insurance policy as described in (9) below.

7. Termination Pension - A member whose service is terminated other than by death or retirement after at least 15 years of service may elect to receive either of the following:

(a) he may receive his own contributions with interest credited up to July 1, 1965, or

(b) he may receive a retirement allowance to begin at age 55 which is 2% of his final compensation times his years of service up to 25 plus 1% of his final compensation times his years of service in excess of 25.

If a member resigns after at least 25 years of service, he may elect an additional option which is a pension to begin at the time of his termination, but reduced so that it has the same actuarial value as the deferred pension in

(b) above. If a member elects the pension described in (b) and dies prior to the commencement of payments, the only death benefits paid are the lump sum death benefits described in (9d) below. If a member elects the deferred pension in (b) above or the actuarially reduced pension to commence immediately and dies after payments commence, the death benefits described in (6) and (e) and (f) of (9) are payable.

8. Withdrawal Benefits - If a member is disabled but is not eligible for a pension as described in (2) above or if a member terminates service but is not eligible for a pension as described in (7) above, he will receive his own contributions with interest credited up to July 1, 1965.

9. Lump Sum Death Benefits - There are lump sum death benefits which are provided at the present time through the purchase of group life insurance from the Prudential Insurance Company of America. The method in this Report for computing costs for these benefits is the same as for the other benefits described herein; see Part II of this Report. The method is essentially a level cost method and will result in the accumulation of reserves. Normally premiums for group life insurance increase each year as the attained age of the individual employees increase. The reserves accumulated under the cost method used in this Report will permit the payment of annual contributions by the State which are more level than if the insurance company's actual premiums had been used in the calculations. The lump sum death benefits are as follows:

- (a) 50% of the member's final compensation shall be paid upon his death after service retirement.
- (b) If a member retires on an ordinary disability pension or an accidental disability pension and subsequently dies, there shall be paid 3 1/2 times his final compensation if death occurs before the member's 55th birthday and 50% of his final compensation if death occurs on or after his 55th birthday.
- (c) If an active member dies and is eligible for benefits either as an ordinary death or an accidental death but there are no widow, children or dependent parents living, the payment shall be the member's own contributions with interest credited up to July 1, 1965. If pension payments are paid to one or more of a widow, child or dependent parent, but, upon the death of the last survivor, the total payments are less than the amount described in the preceding sentence, the excess of such amount over the total payments shall be paid. In addition to the foregoing benefits, if an active member dies, his beneficiary will receive a lump sum payment of 3 1/2 times the member's final compensation.
- (d) If a member terminates service with a vested right to a pension, elects to receive a deferred pension, and then dies before the pension begins, his own contributions with interest credited up to July 1, 1965 shall be paid.
- (e) If a member terminates service with a vested right to a pension and dies after such pension begins, an amount equal to 50% of his total compensation shall be paid.
- (f) An active member on July 1, 1965, who prior to that date was covered by the group life insurance program of the New Jersey State Police, will have paid on his death after his retirement the amount of insurance that

was available under the group life insurance program less 50% of the member's final compensation.

- (g) A retired member on July 1, 1965, who prior to that date was covered by the group life insurance program of the New Jersey State Police, will have paid on his death the amount of insurance that was available under the group life insurance program.

10. Contribution by Members - Each active member shall contribute 7% of his salary (excluding maintenance allowance). In addition, members who have retired and who are covered by the death benefits described in (f) and (g) of (9) above, will make contributions of \$7.80 per year for each \$1,000 of such death benefit coverage.

11. Employer Contributions - The State and other instrumentalities and authorities shall contribute amounts for each year which are the total of the following:

- (a) a level percentage of salary (excluding maintenance allowance) which if it had been paid from the time each member was hired until his termination of employment would, with the member's own contributions, provide his benefits and
- (b) an amount which, if it is paid each year for 40 years beginning on July 1, 1972, will provide all benefits not provided by the future payments described in (a) plus future contributions by the members plus the assets presently in the Fund.

APPENDIX C
AGENCY RESPONSE



110 Irvington Ave., South Orange, N.J. 07079 (201) 763-6600
Irvington Office: 894 Springfield Ave., Irvington, N.J. 07111 (201) 763-6600

MILTON J. WIGDER
Chairman of the Board

May 2, 1978

Mr. William R. Schmidt, Director
Division of Program Analysis
New Jersey State Legislature
Office of Fiscal Affairs
State House, Suite 232
Trenton, New Jersey 08625

Dear Mr. Schmidt:

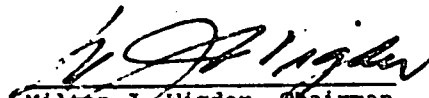
I would like to thank you for the copy of the actuarial analysis of the State Police Retirement System of New Jersey which I received from you.

I have analyzed all the information given to me and I see very little that I can add to.

I am turning this information over to Mr. Baggley, Secretary to the State Police Board of Trustees, who is well aware of the confidential nature of this report.

If there is any further information that is required, he will contact you personally.

Sincerely yours,


Milton J. Wigder, Chairman
State Police Retirement System
of New Jersey



STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY

DAVID T. BEALE
EXECUTIVE DIRECTOR

June 7, 1978

Mr. William R. Schmidt
Director
Division of Program Analysis
Office of Fiscal Affairs
State House
Trenton, New Jersey 08625

Dear Bill:

The consulting actuary for the State Police Retirement System has commented on the actuarial analysis of the system prepared by the Office of Fiscal Affairs. I attach a copy of his comments and suggest they be incorporated in the final publication.

Sincerely,

David T. Beale
David T. Beale
Executive Director

DTB:crs
Attachment

STONE, YOUNG & CO.

STONE, YOUNG & CO.
THOMAS M. YOUNG, F.C.A.
JAMES H. GIBSON, F.C.A.
FRED A. WILSON, F.C.A.
RICHARD W. RYDER, F.C.A.
ALAN L. REED, F.C.A.
RICHARD C. CELLER
DAVID P. DRYDEN, F.C.A.

NEW YORK, N.Y.
10022
OFFICE - NEW YORK, N.Y. 10022
10022

May 31, 1973

Mr. William J. Joseph, Director
Department of the Treasury
Division of Pensions
Post Office Box 2058
Trenton, New Jersey 08625

Dear Bill:

We have reviewed the Actuarial Analysis of the State Police Retirement System of New Jersey which was prepared by the Office of Fiscal Affairs and herein offer our comments.

The report states that its purpose is to provide actuarial cost forecasts in order to provide the Legislature and SPRS managers with information about future cost trends and cash flows. The report further states that such projections can offer some insights that are not provided by a conventional actuarial valuation and that a report such as this is meant only to complement the regular actuarial valuation. We agree that projections of this nature can serve a useful purpose and that they should be prepared periodically.

However, in addition to its stated purpose, the report also focuses a great deal of attention on the adequacy of actuarial assumptions and the wisdom of the State's philosophy to fund post-retirement cost-of-living adjustments on a pay-as-you-go basis.

Although we were never questioned on the subject, the report implies that Stone, Young & Co., as the actuary for the System, has intentionally understated both the interest rate and salary scale assumptions attempting to produce an offsetting effect. They suggest that a 7% annual interest rate assumption is a better estimate of future investment return than the 6% annual rate now assumed and that the assumed annual rate of salary increases should average around 7% rather than the average of about 4.2% now assumed.

First, we have not attempted to understate both assumptions so as to produce offsetting effects. We think that the assumption that assets of the System will earn an average return of 6% per year over the next 50 to 60 years is realistic and reasonable when compared to recent investment performance. That does not necessarily mean that 7% is an unreasonable assumption, but we prefer to use 6%.

Mr. William J. Joseph
Department of the Treasury

May 31, 1978
Page 2

The current salary scale assumptions were established for the July 1, 1970 valuation. With the exception of the two years ending on June 30, 1971 and June 30, 1977, the average annual salary increase since then has averaged 4.6%. For the year ending in 1971, the average increase was 20% which has to be considered atypical. Even if the average increase of 12.9% experienced for the year ended June 30, 1977 is included, the average annual increase since July 1, 1970 is only 5.75%. While it would not be unreasonable to consider some increase in the salary scale, we do not think that the 7% range is warranted.

Second, the two assumptions in question were actually set by the State, so there could not have been any manipulation on our part. It is our responsibility to be sure that the assumptions are reasonable and we think that they are.

Third, we do provide a review of experience annually, as well as every three years as recommended by the report.

Finally, we would point out that their projection of future costs (excluding the COL costs) using the existing assumptions (see Table 3-1) produces contribution requirements that decrease only slightly from 27.9% of payroll in 1976 to 26.1% of payroll in 1986 and thereafter remain quite stable at approximately 26% until the year 2026. The same projection using their assumptions (see Table 3-2) produces costs commencing at 35% of payroll in 1977, steadily decreasing to 24% in 2026. We suggest that the State is better served by a cost pattern that remains reasonably constant as a percentage of payroll than one that requires a greater percentage now than it will in the future.

Four of the recommendations contained in the report deal with the concept of advance funding, or at least determining costs for, the cost of living adjustments provided under the Pension Adjustment Act. As you are well aware, there is nothing in the legislation that established the State Police Retirement System that provides for any such cost-of-living increases. Therefore, unless we are directed by your office to provide actuarial calculations on provisions outside of the State Police Retirement System, we will continue to exclude the provisions of the Pension Adjustment Act from our cost calculations.

Sincerely yours,



ALAN L. REED, JR.

ALR:PP

PROGRAM ANALYSES PUBLISHED BY THE OFFICE OF FISCAL AFFAIRS
DIVISION OF PROGRAM ANALYSIS

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| <p>73-1 Program Analysis of the New Jersey Educational Opportunity Fund, January, 1973</p> <p>73-2 Program Analysis of Office Space for State Agencies, May, 1973</p> <p>74-1 Program Analysis of Institutional Maintenance Support Programs, Volumes I and II and Summary, February, 1974</p> <p>74-2 Program Analysis of the Southwestern New Jersey Bus Feeder Subsidy, February, 1974</p> <p>74-3 Program Analysis of Financing and Construction of Dormitories and Student Centers via the Educational Facilities Authority, June, 1974</p> <p>75-1 Program Analysis of the Administration of the New Jersey State Civil Service System, January, 1975</p> <p>75-2 Program Analysis of the New Jersey Urban Renewal Assistance Program, March, 1975</p> <p>75-3 Program Analysis of New Jersey's Seasonal Farm Labor Protection Program, May, 1975</p> <p>75-4 Program Analysis of the New Jersey State Building and Construction Program, June, 1975</p> <p>SPA-1 Special Program Analysis of Unemployment Insurance Fraud Detection and Control Activity in the New Jersey Division of Unemployment and Disability Insurance, August, 1975</p> <p>75-5 Program Analysis of the New Jersey Parole System, August, 1975</p> <p>75-6 Program Analysis of the New Jersey Green Acres Land Acquisition Program, December, 1975</p> <p>75-7 Program Analysis of Bus and Rail Subsidies Administered by the State Department of Transportation, December, 1975</p> <p>76-1 New Jersey's Contributory Public Employee Pension Programs: Program Analysis of the Public Employees' Retirement System, March, 1976</p> <p style="margin-left: 40px;">- Synopsis</p> <p style="margin-left: 40px;">- Recommendation-Implementation Program</p> <p style="margin-left: 40px;">- Summary and Recommendations</p> <p>New Jersey's Contributory Public Employee Pension Programs: Program Analysis of the Public Employees' Retirement System, March, 1976</p> <p>New Jersey's Contributory Public Employee Pension Programs: Actuarial Analysis and Pension Cost Forecast of the Teachers' Pension and Annuity Fund, March, 1976</p> | <p>SPA-2 Special Report: Review of Business Efficiency and Financial Management in the Willingboro Public Schools, July, 1976, prepared for the Task Force on Business Efficiency of the Public Schools</p> <p>SPA-3 Special Report: Review of Business Efficiency and Financial Management in the Camden Public Schools, September, 1976, prepared for the Task Force on Business Efficiency of the Public Schools</p> <p>77-1 Parental and Child Health Services, May, 1977</p> <p>77-2 Survey of Retired State Employees: A Background Paper on the Public Employees' Retirement System, May, 1977</p> <p>77-3.1 Organization of State Activities Related to Nursing Homes, June, 1977</p> <p>77-3.2 An Analysis of Medicaid Nursing Home Reimbursement: A Special Study Prepared for the Nursing Home Study Commission, December, 1977</p> <p>77-3.3 Nursing Home Bed Supply and Medicaid Reimbursement in New Jersey: Interim Report Prepared for the Nursing Home Study Commission, December, 1977</p> <p>77-4 Mental Retardation-A Comparison of Costs and Income Sources for Maintaining Similar Persons in Institutions and Group Homes, October, 1977</p> <p>77-5 Management Review: Division of Investment, Department of Treasury, December, 1977</p> <p>78-1 Actuarial Analysis of the Police and Firemen's Retirement System of New Jersey, May, 1978</p> <p>SPA-4 Modern Financial Management '78, An Update for New Jersey Public Schools: Report prepared by the Task Force on Business Efficiency of the Public Schools for which the Division of Program Analysis provided staff services, March, 1978.</p> <p>78-2 Actuarial Analysis of the State Police Retirement System of New Jersey, June, 1978.</p> |
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