A MILLIMAN GLOBAL FIRM
Milliman
Consultants and Actuaries

1120 South 101st Street, Suite 400
Omaha, NE 68124-1088
Phone: (402) 393-9400
Fax: (402) 393-1037
www.milliman.com

July 15, 2004

Board of Trustees
Wichita Police and Fire Retirement System
City Hall -12th Floor
455 N. Main Street
Wichita, KS 67202-1678

Dear Members of the Board:

It is a pleasure to submit this report of our investigation of the experience of the Wichita Police and Fire Retirement System for the period beginning December 31, 1998 and ending December 31, 2003.

The results of the experience study are the basis for recommended changes in the actuarial assumptions for the valuation performed as of December 31, 2004.

We hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board (ASB) and the Code of Professional Conduct and Qualification Standards for Public Statements of Actuarial Opinion of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and No. 35 (Selection of Demographic and Other Non-economic Assumptions for Measuring Pension Obligations).

This report has been prepared for the Members of the Board. Actuarial computations and recommendations presented in this report are for purposes of determining the assumptions used for funding the System. Determinations for purposes other than this may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. Other users of this report are cautioned not to rely on the information contained herein if their purpose for its use is not consistent with the purpose for which the report was prepared. Any distribution of this report must be in its entirety including this cover letter, unless prior written consent from Milliman USA, Inc. is obtained.

We would like to express our appreciation to Barbara Ketteman, Pension Manager, and to members of her staff, who gave substantial assistance in supplying the data on which this report is based. We have relied upon this data as it was provided to us without audit.

I look forward to reviewing the results of the study with you at the Board meeting on Wednesday July 21, 2004.

I, Patrice A. Beckham, F.S.A., am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Brent A. Banister, F.S.A., am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully Submitted,

MILLIMAN USA, INC.

Patrice Beckham

Patrice A. Beckham, F.S.A.
Consulting Actuary

Brent A. Banister

Brent A. Banister, F.S.A.
Actuary

Enclosure

Five Year Experience Study
For Five Year Period Ending December 31, 2003

Wichita Police and Fire
Retirement System

July 2004

Prepared by:

Milliman USA, Inc.
1120 South 101st Street, Suite 400
Omaha, NE 68124

TABLE OF CONTENTS

Letter of Transmittal

Section

1.	Introduction	Page 1
2.	Executive Summary	Page 2
3.	Actuarial Methods	Page 4
4.	Economic Assumptions	Page 9
5.	Demographic Assumptions	Page 18
6.	Mortality	Page 20
7.	Retirement	Page 22
8.	Disability	Page 25
9.	Termination of Employment	Page 26
10.	Merit Salary Scale	Page 29
11.	Miscellaneous Assumptions	Page 31

APPENDICES

A – Current Assumptions

B – Proposed Assumptions

Section 1

Introduction

The purpose of an actuarial valuation is to provide a timely best estimate of the ultimate costs of a retirement system. Actuarial valuations of the Wichita Police and Fire Retirement System (WPF) are prepared annually to determine the actuarial contribution rate to fund the System on an actuarial reserve basis, i.e. the current assets plus future contributions, along with investment earnings will be sufficient to provide the benefits promised by the System. The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, termination of employment, retirement age and salary changes to estimate the obligations of the System.

The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have accurately predicted actual emerging experience. This information, along with the professional judgement of System personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to realize that actual experience is reported short term while assumptions are intended to be long term estimates of experience.

At the request of the Board of Trustees, Milliman USA, Inc. performed a study of the experience of the Wichita Police and Fire Retirement System, during the period December 31, 1998 through December 31, 2003. This report presents the results and recommendations of our study, which if approved, will be implemented in the December 31, 2004 Actuarial Valuation of the System.

These assumptions have been developed in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the applicable Standards of Practice adopted by the Actuarial Standards Board of the American Academy of Actuaries.

SCOPE OF THIS REPORT

The actuarial valuation utilizes various actuarial methods and two different types of assumptions; economic and demographic. Economic assumptions are related to the general economy and its impact on WPF. Demographic assumptions are based on the emergence of the specific experience of WPF members.

All of the actuarial methods and assumptions that will be used in the December 31, 2004 Actuarial Valuation have been reviewed in this Study. The remainder of this report is divided as follows:

SECTION 2 EXECUTIVE SUMMARY
SECTION 3 ACTUARIAL METHODS
SECTION 4 ECONOMIC ASSUMPTIONS
SECTION 5 DEMOGRAPHIC ASSUMPTIONS
SECTION 6 MORTALITY
SECTION 7 RETIREMENT
SECTION 8 DISABILITY
SECTION 9 TERMINATION OF EMPLOYMENT
SECTION 10 MERIT SALARY SCALE
SECTION 11 MISCELLANEOUS ASSUMPTIONS

Section 2

Executive Summary

The set of assumptions recommended in this report are proposed for use in the December 31, 2004 Actuarial Valuation of the System.

This is the first Experience Study Milliman USA, Inc. has performed for the System. The setting of assumptions is as much art as science. It involves subjective judgement, especially for economic assumptions. A great deal of the final recommendations of assumptions rests with the actuarial judgement of the actuary. With the change in actuaries, it can be expected that a number of changes in assumptions may occur. While there are a number of changes, the change in the mortality assumption is the only major change.

A brief summary of the results of our findings/recommendations is shown below:

Economic Assumptions

- Inflation Assumption: 4.0% (down from 4.50%)
- Investment Return: 7.75% (no change)
- General Wage Increase: 4.50% (down from 4.75%)

Demographic Assumptions

The following changes are recommended:

- Change the mortality assumption to the RP–2000 Generational Mortality Tables
- Change the salary increase assumption from an age based table to a service based table. In general, the recommended rates produce higher salary increases than results from the current rates.
- Change the forfeiture of vested benefit assumption to a service - based assumption.
- Lower the load for the impact of unused sick leave on retirement liability from 5% to 4%.
- Lower the assumed increase in benefit amounts for inactive vesteds from 5.5% to 4.5%.

Financial Impact

The estimated financial impact of these changes, based on results of the December 31, 2003 actuarial valuation, is summarized below. While we would expect the percentage impact of the assumption changes on the normal cost and actuarial liability to be similar, the actual impact on the December 31, 2004 valuation may differ as a result of changes in the membership. Furthermore, actuarial gain or loss on the assets and liabilities may affect the December 31, 2004 valuation results.

	Current	Proposed	Percentage Change
Actuarial Liability	$350.4	$366.4	4.6%
Actuarial Value of Assets	374.1	374.1	0.0%
Unfunded Actuarial Liability/(Surplus)	(23.7)	(7.7)	(67.5)%
Normal Cost Rate	24.1%	25.3%	5.0%
Amortization of Surplus	(3.4)	(1.1)	(67.6)%
Total Contribution Rate	20.7%	24.2%	16.9%
• Member Financed	7.1	7.1	0.0%
• City Financed	13.6%	17.1%	25.7%

Section 3

Actuarial Methods

ACTUARIAL COST METHOD

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed; i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries **will** influence the incidence of costs by their choice of methods and assumptions.

The valuation or determination of the present value of all future benefits to be paid by the System reflects the assumptions that best seem to describe anticipated future experience. The choice of a funding method does not impact the determination of the present value of future benefits. The funding method, determines only the incidence of cost. In other words, the purpose of the funding method is to allocate the present value of future benefits determination into annual costs. In order to do this allocation, it is necessary for the funding method to "break down" the present value of future benefits into two components: (1) that which is attributable to the past (2) and that which is attributable to the future. The excess of that portion attributable to the past over the plan assets is then amortized over a period of years. Actuarial terminology calls the part attributable to the past the "past service liability" or the "actuarial liability". The portion of the present value of future benefits allocated to the future is commonly known as "the present value of future normal costs", with the specific piece of it allocated to the current year being called "the normal cost". The difference between the plan assets and actuarial liability is called the "unfunded actuarial liability".

Two key points should be noted. First, there is no single "correct" funding method. Second, the allocation of the present value of future benefits and hence cost to the past for amortization and to the future for annual normal cost payments is not necessarily in a one-to-one relationship with service credits earned in the past and future service credits to be earned.

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. A brief summary of the main cost methods is included below.

- <u>Entry-Age-Normal Cost Method</u>

  The rationale of the entry age normal (EAN) funding method is that the cost of each member's benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member's annual salary is referred to as the normal cost and is that portion of the total cost of the employee's benefit which is allocated to the current year. The portion of the present value of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years including the current year. The entry age normal actuarial liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded

actuarial liability, the value of plan assets is subtracted from the entry age normal actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as predicted by the actuarial assumptions in each year. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore the contribution rate.

- Projected Unit Credit

The projected unit credit (PUC) funding method defines the actuarial liability to be the value of the employee's accrued benefit based upon his service as of the valuation date and his estimated final average earnings at the time he retires or otherwise exits. The normal cost is the present value of benefits accruing during the year with projected salary increases. The unfunded actuarial liability is determined by subtracting the actuarial value of assets from the actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

As with the entry age normal funding method, the actuarial gains and losses that accrue each year modify the unfunded actuarial liability and the payment thereon.

- Aggregate

This cost method does not develop individual normal costs, but calculates a normal cost rate for the entire plan. The total value of future normal costs is found by subtracting the actuarial value of assets from the present value of future benefits. This amount is then spread as a level percentage of future payroll for the entire group. Gain/losses are included in the present value of future benefits and thereby incorporated into the normal cost percentage for future years. The basic premise of the aggregate cost method is to develop a normal cost which, from the valuation date forward, will fund the whole unfunded portion of the plan's future benefits as a level percentage of payroll.

This method does not differentiate between past service costs and current costs. Therefore, no actuarial liability exists under the aggregate cost method and actuarial gains and losses are not directly calculated as in the other cost methods.

- Frozen Entry Age

The frozen entry age cost method is a blend of the entry age normal and aggregate cost methods. The unfunded actuarial liability is initially determined using the entry age normal funding method. Each year the unfunded actuarial liability (UAL) is set equal to the expected unfunded actuarial liability. Actuarial gains and losses are not reflected in the amount of the unfunded actuarial liability, but rather are reflected in the normal cost. The frozen actuarial liability is changed only to reflect plan amendments and changes in the actuarial assumptions. The amortization payments for the current and all future years are fixed at the time the unfunded actuarial liability is determined. The normal cost is developed similarly to that under the aggregate cost method. The present value of all future benefits is determined and then reduced by the valuation assets and the unfunded frozen actuarial liability. The resulting amount is then spread as a level percentage of future payroll.

WPF currently uses the Entry Age Normal actuarial cost method. This method develops a normal cost rate which tends to be stable and less volatile. It is used by about 85% of all public sector plans. **We recommend that WPF continue using the Entry Age Normal method.**

ACTUARIAL VALUE OF ASSETS

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value is often used to smooth out the volatility in the market value. This is because most plan sponsors would rather have annual costs remain smooth, as percentage of payroll or in actual dollars, rather than a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. For example, GASB requirements, basic actuarial principles promulgated by the American Academy of Actuaries, and the Internal Revenue Code and its associated regulations on the private employer side require any methodology used in assessing the value of assets to:

- Take into account fair market value,
- Produce a result which is not consistently above or below the fair market value, and
- Not be less than 80% of the actual market value nor more than 120% of the actual market value (private sector only).

These rules or principles prevent the asset valuation methodology from being used to distort annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a funding method or actuarial assumptions, the asset valuation method does not affect the cost of the plan; it only impacts the incidence of cost.

WPF values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition to smooth out fluctuations in the total return achieved by the fund from year to year. This philosophy is consistent with the long-term nature of a retirement system. Under this method, the actuarial value of the assets is the expected value of assets plus 25% of the difference between market value and expected value. The expected value is last year's actuarial value and subsequent cash flows into and out of the fund accumulated with interest at the actuarial assumed rate of return. This is equivalent to using a weighted average of 75% of the expected value and 25% of actual market value. This methodology was first adopted by the Board in conjunction with the December 31, 2002 valuation.

There are other smoothing methods that would also be acceptable. The one limitation of the current method is it is more difficult to explain in that each year's gain or loss is not fully recognized at the end of the four year period. However, the method provides an appropriate level of smoothing and was recently changed. **We recommend no change to the asset valuation method at this time.**

AMORTIZATION OF UAL

As described above, actuarial liabilities are the portion of the actuarial present value of future benefits that are not included in future normal costs. Thus it represents the liability that, in theory, should have been funded through historical normal costs. Unfunded actuarial liabilities (UAL) exist when actuarial liabilities exceed plan assets. These deficiencies can result from (i) plan improvements that have not been completely paid for, (ii) experience not being as favorable as expected, (iii) assumption changes that increase liabilities or (iv) contributions less than the actuarial rate. If the actuarial value of assets (AVA) exceeds the actuarial liability (AL), "surplus" exists.

There are a variety of different methods that can be used to amortize the UAL/surplus. Each results in a different payment stream and therefore has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization amount increases, and
- The number of components of UAL with separate amortization bases.

Statement No. 25 of the Governmental Accounting Standards Board (GASB) sets parameters for all of these characteristics. The maximum period permitted is 30 years (there is a transition rule which permits this period to temporarily be greater than 30 but not over 40). The annual amortization amount can be a level dollar amount or a level percentage of payroll. The UAL may be amortized as one amount or components may be amortized separately.

All non-public pension plans, pursuant to the Internal Revenue Code, must use level dollar amortization to pay off their unfunded actuarial liability for purposes of IRS minimum and maximum funding. This is similar to the method in which a home owner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on a predetermined number of years, until the liability is extinguished. This results in the liability steadily decreasing while the payments, though remaining level in dollar terms, in all probability decrease as a percentage of payroll. (Even if a plan sponsor's population is not growing or even slightly diminishing, inflationary increases will usually be sufficient to increase the aggregate payroll).

The rationale behind the level percentage of payroll amortization method is that since normal costs are calculated to be a constant percentage of pay, unfunded actuarial liabilities should be paid off in the same manner. When this method of amortizing the unfunded actuarial liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method but the payments increase at a fixed rate so that ultimately the annual payment far exceeds the level dollar payment. Hopefully, total payroll is increasing as rapidly so that the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial liability meaning that even if there are no experience losses, the unfunded actuarial liability will grow. If the plan sponsor is paying off the unfunded liability over a long period, such as 30 years, it is possible that the unfunded liability will grow for nearly 20 years, gradually reduce so that in the 25th year the unfunded liability is equal to the initial unfunded liability, and still be completely paid off by the 30th year. The increasing unfunded liability may be troubling to various interested parties, but should not be worrisome unless the remaining UAL is actually increasing as a percentage of total covered payroll.

The amortization period can be either fixed or open. If it a fixed or closed amortization period, the period declines each year. Alternatively if the amortization period is an open or rolling period, the amortization period does not decline but is reset each year.

Use of the level percentage of payroll amortization has its advantages and disadvantages. From a budgetary standpoint, it makes sense to develop UAL contribution rates that are level as a percentage of payroll. However, this approach clearly results in slower funding of the UAL.

Currently, WPF has surplus assets (actuarial value of assets is greater than actuarial liability). The surplus is amortized as a level percent of payroll over a rolling 20 year period. By resetting the amortization period to 20 years at each valuation date, the amortization "credit" is declining as a percent of payroll. This approach is a conservative approach to using the surplus. Conversely, if the system had an unfunded liability rather than a surplus, this method would delay paying off the liability. **We recommend no change to the current amortization methodology as long as surplus exists.**

Section 4

Economic Assumptions

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations* provides guidance to actuaries giving advice on the selection of economic assumptions for measuring obligations under defined benefit plans, such as WPF. Because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one "right answer", the standard calls for the actuary to develop a best estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this standard. Furthermore, with respect to any particular valuation, each economic assumption should be consistent with all other economic assumptions over the measurement period.

An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experiences. The actuary may change assumptions frequently in certain situations, even if the best-estimate range has not changed materially, and less frequently in other situations. Even if assumptions are not changed, the actuary needs to be satisfied that each of the economic assumptions selected for a particular measurement complies with the Actuarial Standard of Practice No. 27.

The remaining section of this report will address the relevant types of economic assumptions used in the actuarial valuation to determine the obligations of WPF. In our opinion, the economic assumptions recommended in this report have been developed in accordance with ASOP No. 27. Based on our review and this study, we believe the recommended economic assumptions reflect a reasonable set of assumptions. The following table summarizes the economic assumptions:

	Current Assumptions	Recommended Assumptions
A. Consumer Price Inflation	4.50%	4.00%
B. Investment Return	7.75%	7.75%
C. Payroll Growth	4.75%	4.50%

CONSUMER PRICE INFLATION

Use in the Valuation: Future price inflation has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return and general wage growth.

The long-term relationship between price inflation and investment return has long been recognized by economists. The basic principle is that the investor demands a more or less level "real return" – the excess of actual investment return over price inflation. If inflation rates are expected to be high, investment return rates are also expected to be high, while low inflation rates will result in lower expected investment returns, at least in the long run.

The effect of price inflation is more direct on wages than on investment return. An individual's wages are affected by:

(1) Promotion and longevity
(2) Productivity
(3) Price inflation

For actuarial purposes, productivity and price inflation are often combined into a single assumption for salaries: the rate of increase in the general wage level of the membership or the wage growth assumption. Our actuarial assumption for salary increases includes both the effects of promotion and longevity (called the merit scale) and the effects of increases in the general wage level.

The long term inflation rate cannot be predicted with a significant degree of confidence. This uncertainty would present severe problems in funding a retirement plan were it not for the fact that the effects of inflation on investment return and salary level are, in part, offsetting at least for active members. Salaries increasing faster than expected produce unexpected liabilities. Investment returns which exceed the assumed rate result in unanticipated assets. Although not directly equal in amount, it is expected that to a large degree these additional assets and liabilities will offset one another over the long term.

The current assumption for inflation is 4.5% per year.

Historical Perspective: For our analysis, we used the national Consumer Price Index, US City Average, All Urban Consumers (CPI-U) as published by the Bureau of Labor Statistics. The compounded annual inflation rate for the period from December 1924 through December 2003 is 3.0%.

Although economic activities in general, and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and long term trends are a factor to be considered in developing the inflation assumption.

There are numerous ways to review historical data, with significantly differing results. The tables below show the compounded annual inflation rate for various ten-year periods, and for longer periods ended in December of 2003.

Decade	CPI
1993-2003	2.4%
1983-1993	3.7%
1973-1983	8.2%
1963-1973	4.1%
1953-1963	1.4%

Period	CPI
1993-2003	2.4%
1983-2003	3.0%
1973-2003	4.7%
1963-2003	4.6%
1953-2003	3.9%
1933-2003	3.8%

Forecasts of Inflation: Since the U.S. Treasury started issuing inflation indexed bonds, it is possible to determine the approximate rate of inflation anticipated by the financial markets by comparing the yields on inflation indexed bonds with traditional fixed government bonds. Current market prices suggest investors expect inflation to be about 2.5% over the next ten years.

Although most economists forecast inflation lower than the current assumption of 4.5%, they are generally looking at a shorter period than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the March 2004 report, the annual increase in the CPI over the next 30 years was 2.8%, under the intermediate cost assumptions. The lower cost assumption used 1.8% and the high cost used 3.8%.

Reasonable Range and Recommendation: We believe that a range between 2.5% and 4.5% is reasonable for an actuarial valuation of a retirement system. We recommend that the long-term assumed inflation rate be lowered from 4.50% to 4.0% per year.

Consumer Price Inflation	
Current Assumption	4.5%
Reasonable Range	2.5% - 4.5%
Recommended Assumption	4.0%

INVESTMENT RETURN

Use In The Valuation: The investment return assumption is one of the primary determinants in the allocation of the expected cost of the System's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. The valuation interest rate should represent the long-term rate of return on the actuarial value of assets, considering the fund's asset allocation policy, expected long term real rates of return on the specific asset classes, the underlying inflation rate, and investment and administrative expenses.

The current assumption for investment return is 7.75% per year, net of all investment-related and administrative expenses. The 7.75% rate of return is referred to as the nominal rate of return and is composed of two components. The first component is inflation. Any excess return over inflation is referred to as the real rate of return. The current set of economic assumptions (those used in the December 31, 2003 valuation report) implied a 3.25% real rate of return (7.75% less 4.50% inflation). This approach of dividing the nominal return into the real return and inflation piece is called the "building block" method.

The Actuarial Standards Board Statement on selecting economic assumptions, referred to earlier, lists specific factors that can be considered in constructing the best-estimate investment return range and/or selecting an investment return assumption within the range. Such factors are:

1. **The purpose of the measurement.** The measurement of obligations for an ongoing plan will differ from those of a terminating or frozen plan. An ongoing plan such as WPF may reflect a longer time horizon and a more diversified investment portfolio.

   For a governmental plan, benefit security is tied to the funding agency's ability to provide the required funding. Since all governmental funding sources are ultimately some type of tax, the funding of the retirement system is dependent on the ability to increase or decrease allocated tax revenues to the system. Given the normal processes, it is much easier to lower the required funding allocations than to increase it, as it is easy enough to either lower the tax income or reallocate it to another need. A primary funding goal of most governmental plans is a stable contribution rate so that the budgeting and allocation of tax revenues are not subject to a great deal of fluctuations.

   It is reasonable, when setting actuarial assumptions for a governmental plan to consider the impact not only on its membership, but on the taxpayers, and the agency's ability to provide sufficient income to maintain and secure a stable funding for the benefit security of the membership. This is sometimes reflected in a more conservative approach, as experience gains are more easily absorbed into the funding than are experience losses which may result in a required increase in funding.

2. **Investment policy.** This usually refers to the plan's current asset allocation, the types of securities the system is eligible to invest in, and the target allocation, if different. It may also reflect the investment philosophy regarding risk tolerance and social investing.

3. **Reinvestment Risk**. This should reflect the reinvestment of moneys not immediately required to pay plan benefits.

4. **Investment Volatility.** If a system is required to liquidate assets at depressed values to meet benefit obligations, a higher risk is present. Also some assets carry a higher default risk. We do not believe this is a significant factor for WPF.

5. **Investment Manager Performance.** Few investment managers consistently out perform the market. Those who consistently under perform may be replaced. Based on the excellent investment advice provided to WPF by its consultants, we do not believe this is a significant factor to consider for WPF.

6. **Investment Expenses.** Investment returns are assumed both with and without expenses. Actual expenses are measured periodically and taken into account when setting the WPF investment assumption.

7. **Cash Flow Timing.** The expected stream of contributions and benefit payments may affect the liquidity of a plan's investment opportunities. Currently, benefit payments exceed contributions. This is likely to continue in the foreseeable future and the difference will grow. The impact of this item may become more significant over time.

8. **Benefit Volatility.** This is a consideration for small plans, plans with full lump sum payment options and supplemental benefits. The concern with these factors is a need to liquidate securities at depressed values. We do not expect benefit volatility to be a factor in considering the WPF investment return assumption.

Historical Perspective: One of the inherent problems with analyzing historical data is that the results can look significantly different depending on the time frame used if the year-to-year results vary widely. For example, the unusually high equity returns in the 1990's have had a remarkable impact on rolling ten-year period returns. Furthermore, the approach we used to predict inflation does not necessarily reflect current expectations for the capital markets. Even though history provides a valuable perspective for setting this assumption, the economy of the past is not necessarily the economy of the future.

Based on WPF's current target asset allocation and estimated real rates of return set by Milliman's investment consulting practice, the nominal rate of return (ignoring expenses) is 9.52%. This value is developed as follows:

Asset Category	Asset Allocation	Expected Real Rate of Return	Standard Deviation
Domestic Equity	47%	6.88%	3.23%
Domestic Fixed Income	28%	2.38%	0.67%
International Equity	20%	6.88%	1.37%
Real Estate	5%	5.00%	0.25%
Total	100%		5.52%
Long-term Inflation			4.00%
Expected Nominal Rate of Return			9.52%

Based on the capital market assumptions outlined above, the expected rate of return compounded over a 30 year period is 9.52%. ASOP 27 requires the actuary to develop a best estimate range for each assumption and then select the assumption from within the range. The 25th and 75th percentile results were 6.90% and 10.35% so the return is just as likely to be within the range from 6.90% to 10.35% as not.

Investment-Related and Administrative Expenses

The investment return is assumed to be net of all investment-related and administrative expenses. The table below shows the ratio of investment and administrative expenses to assets over the last five years. The expense ratio is calculated as the total expenses divided by the beginning asset balance.

($ million)	Investment Expenses	Administrative Expenses	Actl Value Assets ($M)	Invest Exp Ratio	Admin Exp Ratio
2003	$1.5	$0.3	$374.2	.40%	.08%
2002	1.5	0.3	361.7	.41	.08
2001	1.5	0.2	362.5	.41	.06
2000	1.7	0.2	354.0	.48	.06
1999	1.7	0.3	300.1	.57	.10

Based on this data, it seems reasonable to assume that investment and administrative expenses represent about 0.50% of the System's assets.

Reasonable Range and Recommendation: Based on the ASOP No. 27 guidelines, we conclude that a reasonable range for the gross investment return is from 6.90% to 10.35%. This range needs to be lowered to reflect the expenses assumed to be paid from the investment return. Given an assumed expense ratio of 50 basis points, we believe that a range between 6.40% and 9.85% is reasonable for an actuarial valuation of a retirement system with WPF asset allocation policy. The greatest single factor in the calculation of contribution rates is the return on investments. Therefore, setting the long term rate of return is critical. Because the funding of public retirement systems is ultimately based on tax revenues, it is easier to absorb favorable experience rather than unfavorable. Given the long term nature of the liabilities, the expectation of lower inflation in the short term and the significance of this assumption in the valuation process, we feel more comfortable toward the lower end of the range.

	Percentile Results		
Components of Return	**25th**	**50th**	**75th**
Gross Investment Return	6.90%	9.52%	10.35%
Assumed Expenses	0.50%	0.50%	0.50%
Net Investment Return	6.40%	9.02%	9.85%

We recommend that the net investment return assumption remain at 7.75% per year. We believe an investment return assumption of 7.75% per year is consistent with the level of inflation and real rate of return likely to occur over an extended period of time, net of expenses. The difference between the expected rate of return and the assumption represents a "risk premium", that is the portion of the return which reflects uncertainties of future experience. It provides a buffer against future adverse experience that would not exist if the assumption were set to the expected return. This risk premium amount is consistent with that used by other public retirement systems.

Investment Return	
Current Assumption	7.75%
Reasonable Range	6.40% - 9.85%
Recommended Assumption	7.75%

WAGE GROWTH

Use in the Valuation: Estimates of future salaries are based on two types of assumptions. Rates of increase in the general wage level of the membership are directly related to inflation while individual salary increases due to promotion and longevity (referred to as the merit scale) occur even in the absence of inflation. The merit scale will be reviewed with the other demographic assumptions.

As part of determining the System's funding, the payment/(credit) on the unfunded actuarial liability/(surplus) is determined, based on amortization payments developed as a level percent of payroll. The general wage increase assumption is used to project covered payroll in future years which determines the amortization payment of the UAL/(surplus).

The current wage growth assumption is 4.75% per year, 0.25% above the price inflation rate of 4.50%.

Historical Perspective: We have used statistics from the Social Security System on the National Average Wage back to 1951 (please note that 2002 is the most recent published data). This data shows a compounded annual increase from 1951 through 2002 of 4.9%. Price inflation during the same period was 3.8%.

The excess of wage growth over price inflation represents the increase in the standard of living, also called productivity growth. There has been debate on the issue of whether public sector employees will receive, over the long term, the same rewards for productivity as employees in the private sector, where productivity is more readily measurable. To our knowledge, no definitive research has been completed on this topic. Nevertheless, it is our opinion that public sector employees must be rewarded, even if there is a time lag, with the same productivity increases as those participating in the remainder of the economy.

The following table shows the compounded wage growth over the last 30 or more years, along with the comparable inflation rate for the same period. The difference represents the rate of real wage growth.

Period	Wage Growth	CPI	Real Wages
1992 – 2002	3.8%	2.5%	1.3%
1982 – 2002	4.2%	3.1%	1.1%
1972 – 2002	5.3%	4.9%	0.4%
1962 – 2002	5.3%	4.6%	0.7%
1951 - 2002	4.9%	3.8%	1.1%

Resources: Social Security National Average Wage from 1951 to 2002; Inflation as measured by the CPI-U.

Forecasts of Future Wages: The wage index we used for the historical analysis has been projected forward by the Office of the Chief Actuary of the Social Security Administration. In a report in March of 2004, the annual increase in the National Average Wage Index over the next 30 years under the intermediate cost assumptions was 3.9%. The low cost assumption was 3.4% and the high cost assumption was 4.4%. These correspond to an underlying inflation assumption of 2.8% under the intermediate cost assumptions and 1.8% for the low cost and 3.8% for the high cost assumption.

The "building block approach" uses the rate of productivity growth and adds it to the inflation assumption developed previously. For example, if the rate of real wage growth is 0.5%, the inflation assumption is 4.0%, then the expected total wage growth is 4.5%.

Reasonable Range and Recommendation: Based on our judgment, we believe that a range between 4.0% and 5.0% is reasonable for the actuarial valuation**. We recommend that the long-term assumed wage inflation rate be lowered from 4.75% to 4.50% per year.** This reflects the assumed rate of inflation of 4.0% and an assumed rate of real wage growth of 0.5%.

	Wage Growth
Current Assumption	4.75%
Reasonable Range	4.0% - 5.0%
Recommended Assumption	4.50%

The low end of the range represents our recommended price inflation assumption with no adjustment for real wage growth. The upper end of the range reflects real wages at 1.0% above our recommended inflation assumption. While recent experience on the national level would indicate that productivity growth has been increasing over the last decade, the trend has varied over time. We feel the current assumption should be lowered slightly and this assumption should be monitored closely in the future to determine if further change is appropriate.

GROWTH IN MEMBERSHIP

We propose continuing the assumption that no future growth in membership will occur. This assumption affects the amortization payment rate, which is the portion of the total contributions used to liquidate the unfunded actuarial liability. With no assumed growth in membership, future salary growth due only to general wage increases is being anticipated. If increases should occur not only because of wage increases but also because of additional members, there will be a larger pool of salaries over which contributions would be paid which would result in a shorter amortization period. The uncertainties in light of current conditions in public employment and the national economy argue against anticipating any increase in membership for funding purposes. Furthermore, GASB Statement No. 25 will not accept a growth in membership assumption as meeting its required parameters. Thus, if a growth assumption were to be used for funding purposes, a different set of calculations and results would be needed for accounting and disclosure purposes.

Section 5

Demographic Assumptions

Actuarial Standard of Practice (ASOP) No. 35 Selection of Demographic Assumptions governs the selection of demographic and other non-economic assumptions for measuring pension obligations. This standard is effective for any measurement date occurring after September 15, 2001. ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Pursuant to ASOP 35 the actuary should follow the following steps in selecting the demographic assumptions:

1. Identify the types of assumptions. Types of demographic assumptions include but are not limited to retirement, mortality, termination of employment, disability, election of optional forms of payment, administrative expenses, family composition, and treatment of missing or incomplete data. The actuary should consider the purpose and nature of the measurement, the materiality of each assumption, and the characteristics of the covered group in determining which types of assumptions should be incorporated into the actuarial model.
2. Consider the relevant assumption universe. The relevant assumption universe includes experience studies or published tables based on the experience of other representative populations, the experience of the plan sponsor, the effects of plan design, and general trends.
3. Consider the assumption format. The assumption format includes whether assumptions are based on parameters such as gender, age or service. The actuary should consider the impact the format may have on the results, the availability of relevant information, the potential to model anticipated plan experience, and the size of the covered population.
4. Select the specific assumptions. In selecting an assumption the actuary should consider the potential impact of future plan design as well as the factors listed above.
5. Evaluate the reasonableness of the selected assumption. The assumption should be expected to appropriately model the contingency being measured. The assumption should not be anticipated to produce significant actuarial gains or losses.

ASOP 35 General Considerations and Application

Each individual demographic assumption should satisfy the criteria of ASOP 35. In selecting demographic assumptions the actuary should also consider: the internal consistency between the assumptions, materiality, cost effectiveness, and the combined effect of all assumptions. At each measurement date the actuary should consider whether the selected assumptions continue to be reasonable, but the actuary is not required to do a complete assumption study at each measurement date. In our opinion, the demographic assumptions recommended in this report have been developed in accordance with ASOP 35.

Overview of Analysis

The purpose of a study of demographic experience is to compare what actually happened to the individual members of the System during the study period (December 31, 1998, through December 31, 2003) with what was expected to happen based on the actuarial assumptions. Five years is a relatively short observation period for Retirement System experience, so we have considered the results of the prior Experience Study when practical to do so.

Studies of demographic experience generally involve three steps:

- First, the number of members changing membership status, called decrements, during the study are tabulated by age, duration, sex, group, and membership class (active, retired, etc.).

- Next, the number of members expected to change status is calculated by multiplying certain membership statistics, called exposure, by the expected rates of decrement.

- Finally, the number of actual decrements are compared with the number of expected decrements. The comparison is called the actual to expected ratio (A/E Ratio), and is expressed as a percentage.

In general, if the actual experience differs significantly from the overall expected results, or if the pattern of actual decrements, or rates of decrement, by age, sex, or duration deviates significantly from the expected pattern, new assumptions are considered. Recommended revisions are normally not an exact representation of the experience during the observation period. Judgment is required to predict future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

Revised rates of decrement are tested by using them to recalculate the expected number of decrements during the study period, and the results are shown as revised A/E Ratios.

Salary adjustments, other than the economic assumption for wage inflation, are treated as demographic assumptions. However, the method of investigation needed for salaries is different from that used for the decrements.

It takes a fair amount of data to perform a credible study of demographic assumptions. Because the membership or certain subsets of the membership are relatively small, some assumptions have been selected based more on our professional judgement of reasonable future outcomes than actual experience.

Section 6

Mortality

One of the most important demographic assumptions is mortality because this assumption predicts when retirement payments will stop. The life expectancies of current and future retirees are predicated on the assumed rates of mortality at each age. It is commonly known that rates of mortality have been declining throughout this century, which means people, in general, are living longer.

Because of potential differences in mortality, different assumptions may be employed for healthy retirees, disabled retirees and active members. Therefore, experience for each group is typically studied separately.

Healthy Retirees: The valuation currently uses separate mortality assumptions for male and female members. The 1971 Group Annuity Mortality Table projected to 2000 is used with no set back for males and a 6 year setback for females. This table was chosen as a result of experience observed in the last Experience Study.

In examining the results of an experience study, if the A/E Ratio is greater than 100% the assumptions have predicted fewer deaths than actually occurred, and therefore have built in some "margin" for future mortality improvements. This is generally considered a prudent approach given past mortality experience. The observed A/E Ratios for healthy retirees are shown in the following chart.

Healthy Retirees	1998-2003 Observations		A/E Ratio	
	Actual	**Expected**	**Current**	**Proposed**
Male	44	62	71%	88%
Female	1	1	100%	105%
Totals	45	63	71%	88%

The A/E ratio of 71% indicates that there were fewer actual deaths than expected based on current assumptions. This experience indicates that the current table is overstating mortality (and thereby understating life expectancy). There is no margin for future mortality improvements. Based on this experience, we believe a change in the mortality assumption is appropriate.

Since the last experience study was completed, the Society of Actuaries has published a new set of mortality tables, known as the RP-2000 Tables. Different tables are used for Healthy Annuitants, Disabled Annuitants and Employees. They offer an alternative way to provide a margin for future mortality improvements. The table can be projected with future mortality improvements on a "generational" basis, i.e. mortality rates are set by the year in which a member reaches a particular age. We believe the RP-2000 Tables are the preferred approach for recognizing the likelihood of mortality improvements in the future. By its "generational" approach, it directly reflects expected improvements in mortality for all members. However, greater mortality improvements are predicted for younger members, which is more likely to occur. With the change to the RP-2000 Table, a "margin" (A/E ratio above 100%) is no longer required as the expected mortality improvements are built into the future mortality rates.

Given the relatively small number of exposure at each age, the results are not totally credible on their own. Therefore, we recommend we move to a more current mortality table that will increase the A/E ratio but not all the way to 100%. **We recommend the healthy retiree mortality assumption be changed to the RP-2000 Healthy Annuitant Table for males and females.** In the next experience study, actual experience will be monitored against the new assumption. If the number of actual deaths is again less than the expected, further adjustments to the mortality rates may be necessary.

Beneficiaries: The mortality of beneficiaries applies to the survivors of members who have elected a joint and survivor option. There is never complete data on the mortality experience of beneficiaries prior to the death of the member because there is no requirement that the death be reported to the System. **Therefore, we recommend the standard convention be followed and the mortality basis be set for beneficiaries to the same basis as is used for retired members.**

Disabled Members: The valuation assumes that disabled members, in general, will not live as long as retired members who met the regular service retirement eligibility. There is an insufficient number of disabled retirees to provide statistically reliable results. **To be consistent with the table used for Healthy Retirees, we recommend the RP-2000 Disabled Tables for males and females be used.**

Active Members: This assumption predicts eligibility for death benefits prior to retirement, rather than the expected lifetime for pension payments. For active member mortality, it is more conservative to set the assumption with an A/E Ratio less than 100% because active member death benefits are generally less costly than retirement benefits.

In smaller groups, such as WPF, the mortality rates for active members are often set based on the same assumption as is used for healthy retirees. Given the small probability of death and the relatively low exposure at each age, the results are not credible on their own. **Therefore, we recommend the active member mortality utilize the same basis as is used for retirees, the RP-2000 Employee Table with generational mortality improvements and age adjustments as described above.**

Section 7

Retirement

Service retirement measures the change in status from active membership directly to retirement. This assumption does not include the retirement patterns of members who terminated from active membership years prior to their retirement. That experience is studied separately.

During the study period, the Back DROP (Deferred Retirement Option Program) provision was added to the System. Under the Back DROP, the member may elect a benefit based on a retirement date up to 60 months prior to the current date. The monthly benefit is computed based on years of service and final average salary as of the selected retirement date. In addition to the monthly benefit, the DROP account available to the retiring member is the computed benefit multiplied by the number of months of Back DROP plus 5% annual compound interest. The Back DROP provision was phased-in with members eligible January 1, 2001 for one-year Back DROP, January 1, 2002 for three year Back DROP and January 1, 2003 for five year Back DROP. Based on the experience during the study period, we believe the phase-in impacted retirement rates from 2001 through 2003, probably because members were waiting for the five year Back DROP period to be implemented.

The eligibility provisions for retirement and the current assumptions vary by Plan so the experience was measured and evaluated on that basis. Historically, the retirement patterns for Police and Fire have differed significantly. Consequently, different retirement rates are used for each group.

Plans A and B

The requirements for service retirement is 20 years of service, regardless of age.

The current assumption is service-based with separate rates for Police and Fire commencing at 20 years of service and running through 30 years of service. The actual and expected number of retirements for each group by year is shown below:

	Police			Fire		
Year	**Actual**	**Expected**	**A/E**	**Actual**	**Expected**	**A/E**
1999	15	12	125%	6	18	33%
2000	13	7	186%	3	19	16%
2001	4	7	57%	0	21	0%
2002	3	9	33%	0	24	0%
2003	1	9	11%	8	30	27%
Total	36	44	82%	17	112	15%

The retirement experience for Police was actually much higher than expected in 1999 and 2000 and much lower than expected in 2001 through 2003. We believe the retirement experience for 2003 may have been impacted by the fact the union contract expired and a new one was not signed during 2003. There was a possibility of some type of retroactive pay or a "signing bonus" when the contract was settled. If an active member retired and left service, they would not be eligible for either. Therefore, there was a potentially large financial incentive for members not to retire until the contract was settled. If the 2003 calendar year experience is removed from our analysis, actual experience for the Police members was exactly that expected (A/E ratio 100%).

The actual number of retirements for Fire members was much lower than expected, although looking at only the A/E ratio may miss what is actually occurring. Under the retirement assumption, 100% of the members with more than 30 years of service are assumed to retire immediately. In 1999, there were 9 Fire members with more than 30 years of service. All 9 would have been included in the expected number of retirements. Only 1 of these members retired so the other 8 carry over as potential retirements in the next year. Again, all of them are expected to retire immediately. None of them retired in 2000 plus an additional 4 members with more than 30 years of service were added to the "certain retirement" group. In 2000 none of the 12 members with more than 30 years of service retired so they again are included in the "certain retirement" group in 2001. Because most of the members of this "certain retirement" group did not retire during the study period, they were included in the expected count each year. This unduly distorted the retirement analysis and consequently the A/E ratio appears extremely low.

We believe a large part of the observed experience, especially for the Fire group, is due to the phase-in of the Back DROP. Actual experience over the next five years will be a better indicator of the impact of the Back Drop on retirement rates. Given the various issues that potentially impacted retirement experience during this period, **we recommend no change to the current assumption.**

Plan C

The requirements for a service retirement are 30 years of service, regardless of age, or 20 years of service and attainment of age 50. Because Plan C applies to members entering the System after December 31, 1978 and the eligibility requirements for service retirement are more stringent than Plan A and B, there was a small number of members eligible to retire during this period. Consequently, the credibility of the observed results is very limited.

The combined experience for calendar years 1999 through 2003 is shown below:

Plan C Retirement Experience

	Actual	Expected	A/E Ratio
Police	3	3	100%
Fire	7	5	140%
Total	10	8	125%

Given the limited credibility of experience during this study period and the fact that experience was close to that assumed, **we recommend the current retirement rates for Plan C be maintained.**

Back DROP Experience

The Back DROP provision is a relatively new provision for WPF. This is the first time that Back DROP experience will be reported in the Experience Study. In the valuation process, we assume that retiring members will elect the better of the Back DROP benefit or the regular service annuity so the actual election of Back DROP is not an assumption. The impact of Back DROP on the valuation will be whether members retire as expected by the retirement rates (discussed earlier).

The election of Back DROP for 2001 through 2003 is summarized below:

Year	Police	Fire	Total
2001	1	1	2
2002	0	1	1
2003	0	8	8
Total	1	10	11

Data is limited due to the recent implementation of the Back DROP provision and the phase-in on the number of years available. Consequently it is difficult to make any firm conclusions. However, based on the information available, it appears the Back DROP is more heavily used by the Fire group. This is similar to what we've observed in other police and fire retirement systems. We would expect to see this trend continue. The next Experience Study (2004- 2008) should provide greater insight into the use of Back DROP and its ultimate impact on retirement rates.

Inactive Vested Members

Current inactive vested members who left their contributions with the System are assumed to retire at age 55. Those who are assumed to leave in future years are assumed to retire at age 50 if they have 20 years of service. Otherwise, the assumed retirement age is 55. We reviewed the experience during the observation period and found that actual experience was close to that assumed. **We recommend the current assumption be retained for inactive vested members.**

Section 8

Disability

The size of the Retirement System, coupled with the small probability of disablement at most ages, does not permit credible derivation of age related disability rates. Nonetheless, the actual to expected ratio was calculated. The table below indicates the number of actual and expected disabilities during the study period and the resulting A/E Ratios. Separate assumptions are used for Police and Fire. In general, ratios below 100% indicate fewer disabilities than expected which would decrease the actuarial liabilities.

Disabilities	Actual	Expected	A/E Ratio
Police	14	16	88%
Fire	10	12	83%
Total	24	28	86%

Disability rates were lowered as a result of the last experience study. The resulting A/E ratios in this study are higher than those observed in the prior experience study (86% vs 58%) indicating the assumption is more closely predicting emerging experience. Given the lack of credibility in the underlying data (discussed above) and the recent change in the rates, **we recommend the current assumption be maintained.** If similar experience is observed in the next experience study, consideration will be given to lowering the rates.

Section 9

Termination of Employment (Withdrawal)

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, retirement, or disability. Rates of termination can vary by both age and years of service. In general rates of termination are highest at younger ages and in the early years of employment. WPF currently uses a set of select and ultimate withdrawal rates. A set of select rates based on years of service are used for members with under 5 years of service. A set of age based rates are used for all members with 5 or more years of service.

The number of withdrawals includes all members reported to have terminated employment. Some of these members subsequently receive refunds of contributions; some return to active membership and some leave their contributions with the System until retirement. Other assumptions address what happens to vested members after they terminate.

Different assumptions are used for Police and Fire and consequently experience is measured separately for each group. The following charts show the actual and expected number of terminations for causes other than death, retirement, or disablement, and the corresponding A/E Ratios.

POLICE

Less Than 5 Years of Service			
Service	**Actual**	**Expected**	**A/E Ratio**
Less than 1	18	9	200%
1	16	13	123%
2	11	11	100%
3	14	9	156%
4	15	7	214%
Total	74	49	151%

5 or More Years of Service			
Age	**Actual**	**Expected**	**A/E Ratio**
25 - 29	4	3	133%
30 - 34	24	12	200%
35 - 39	10	8	125%
40 - 44	4	5	80%
45 - 49	5	1	500%
50 - 54	0	0	N/A
Total	47	29	162%

FIRE

Less Than 5 Years of Service			
Service	**Actual**	**Expected**	**A/E Ratio**
Less than 1	0	2	0%
1	1	3	33%
2	3	3	100%
3	1	2	50%
4	2	2	100%
Total	7	12	58%

5 or More Years of Service			
Age	**Actual**	**Expected**	**A/E Ratio**
25 - 29	2	1	200%
30 - 34	2	2	100%
35 - 39	8	3	267%
40 - 44	4	3	133%
45 - 49	4	1	400%
50 - 54	1	0	N/A
Total	21	10	210%

Overall, actual terminations were higher than those predicted by the assumption, especially for those with more than 5 years of service. Rates were decreased rather significantly in conjunction with the last experience study. When the experience for the prior study period is aggregated with the current study period, the combined results are close to those expected. **Therefore, we recommend the current rates be maintained.** The experience in the next 5 years should help us evaluate what, if any, changes would be appropriate.

Forfeiture of Vested Benefit

Some vested members who terminate active employment elect to receive a distribution of their member account balance, thus forfeiting their vested right to their deferred vested benefit. An assumption is used to predict that election.

For WPF, a member must have 10 years of service in order to be vested. Therefore the assumption regarding forfeiture of vested benefit applies only after 10 years of service. The following summarizes the experience observed during the study period:

Years of Service	Number Terminating	Number Elected Deferred Benefit	Percentage Electing Deferred Benefit
10 - 14	13	1	8%
15 - 19	4	4	100%
20 - 24	10	10	100%

The current assumption is a percentage that is applied individually based on a graded scale beginning at 100% for the earliest vesting age to 0% at the member's minimum retirement age. This assumption is overly complex and it is difficult to monitor experience. **We recommend a service based assumption based on the observed experience be adopted as shown below:**

Years of Service	Percent Forfeiting Vested Benefit
Under 15	100%
15 or more	0%

Section 10

Merit Salary Scale

Estimates of future salaries are based on assumptions for two types of increases:

1. Increases in each individual's salary due to promotion or longevity (often called merit scale), and
2. Increases in the general wage level of the membership, which are directly related to price and wage inflation.

Earlier in this report, we recommended that the second of these rates, general wage inflation be set at 4.50% (4.0% price inflation and .5% real wage growth).

Although future salary increases are the result of two components, it is difficult if not impossible, to isolate the true salary adjustment due to inflation and productivity. Therefore, the experience study reviewed total salary increases for the period. Typically, the percentage attributable to general wage growth is eliminated in an attempt to isolate the merit scale. The general wage growth for the period is usually identified by reviewing actual salary increases by duration (years of service). Those members with a high number of years of service are assumed to have no merit scale applied. Therefore, all of their salary increase is assumed attributable to increases in the general wage level. When the WPF experience was analyzed by duration (service), the results were inconclusive and the general wage level could not be identified.

We compared individual salary increases for all members active in any two consecutive periods (e.g. 1999 and 2000, 2000 and 2001, etc.). Based on the current assumption, which is age-related, the actual salary experience over the five year period is shown below:

Age Group	Average Actual Increase	Expected Increase	Difference
20 - 24	6.0%	7.7%	(1.7)%
25 - 29	6.4%	7.6%	(1.2)%
30 - 34	6.2%	6.9%	(0.7)%
35 - 39	5.4%	5.3%	0.1%
40 - 44	5.2%	5.0%	0.2%
45 - 49	4.6%	5.0%	(0.4)%
50 - 54	4.3%	4.9%	(0.6)%
55 - 59	4.2%	4.8%	(0.6)%
Total	**5.5%**	**5.5%**	**0.0%**

Although aggregate experience was about at the expected level, there was a considerable amount of volatility in experience over the five years being studied, as shown below:

Year	Actual	Expected
1999	4.6%	5.7%
2000	4.8%	5.6%
2001	9.9%	5.3%
2002	7.0%	5.4%
2003	1.7%	5.7%
Total	5.5%	5.5%

Price inflation during the study period was 2.4% as compared to the assumption of 4.5%, so we would have expected to see actual wage increases during this period significantly lower (about 2%) than the assumed rates. However, there is very likely a lag between the occurrence of actual inflation and the time the wage increase is granted based on that experience. Thus, at any point in time, general salary increases are more likely to be impacted by the actual inflation in the past five to ten years as compared to the current year so we reviewed that data. Inflation from 1997 through 2002 was 2.3% and the change in the National Average Wage (NAW) was 3.9% during this period. Again this would have led us to expect lower actual salary increases than predicted by the assumption, although perhaps only around 0.75% based on the increases in the NAW. While it appears this occurred in 1999 and 2000, the remaining years are a mix. Increases in 2003 were very low because the union contract was not settled. Likewise in 2001, the union contract was settled and retroactive payments were made which distorts that year's experience. In looking back to the results of the last experience study, actual salary increases were much lower than expected. It is likely the higher actual wage increases in 1999 through 2002 involved some "catch up" for low wage increases in the 1994 through 1998 period.

Given the inconclusive results of the analysis by service and the variation in salary increases by year, we had in-depth discussions with the System staff about the salary experience. During those conversations, we found out that the 2000 – 2003 contract redesigned the "steps" within each job category for non-exempt employees. Increases between steps now are generally 2.5% and there are 15 steps. Given this structure, we strongly believe a service based salary assumption should be used. **We recommend the merit scale be set to 2.5% for each of the first 15 years of service and 0% thereafter.** Coupled with the general salary increase discussed earlier, the resulting total salary scale is 7.0% for years 1 to 15 and 4.50% thereafter. This assumption should be carefully analyzed in the next experience study to ascertain whether additional refinement is appropriate.

Section 11

Miscellaneous Assumptions

Sick Leave Service

Upon retirement, each month of accumulated unused sick leave is considered to be a month of service for the purpose of computing benefit amounts. Because the amount of unused sick leave cannot be determined until a member retires, an assumption is used to predict the increase in retirement benefits due to this provision. Currently, normal retirement benefits are increased by 5% to account for the inclusion of unused sick leave in calculating retirement benefits.

Our review of the increase in retirement benefits due to additional service for unused sick leave indicated an average increase over the study period of 2.5%. **We recommend the load for sick leave service be lowered to 4%.**

Marriage Assumption

The proportion of active members assumed to be married is 80%, with the male assumed to be 3 years older than the female. This assumption impacts only the valuation of pre-retirement death benefits.

Spouse information for actives is not reported in the valuation data and it is not reported for retirees unless they elect a form of payment with a beneficiary payment. Therefore there is no readily available data upon which to base this assumption. **The current assumptions are standard assumptions that are used widely by other retirement plans and we recommend they be retained.**

Indexation of Vested Deferred Pensions

The amount of pension for the deferred vested members is indexed with the increase in the National Average Wage, but not to exceed 5.5% per year. The current assumption is an annual increase of 5.5%.

Earlier we reported that the increase in the National Average Wage has varied from 3.8% to 5.3% over different decades of time. The long term experience from 1951 through 2002 was 5.0%. The current assumption of 5.5% reflects the largest possible increase in benefit amounts so it is conservative. **We recommend the assumption be lowered to 4.5%.**

APPENDIX A

Current Actuarial Assumptions

Actuarial Assumptions

The investment return rate (net of administrative expenses) used for actuarial valuation calculations was 7.75 percent a year, compounded annually. This rate consists of 4.50% in recognition of long term price inflation and a 3.25 percent a year real rate of return over price inflation. This assumption, used to equate the value of payments due at different points in time, was adopted by the Board and was first used for the December 31, 1999 valuation.

Salary increase rates used to project current pays to those upon which a benefit will be based are represented by the following table and were first used for the December 31, 1999 valuation.

Sample Ages	Annual Rate of Salary Increase for Sample Ages			
	Inflation	Productivity	Merit & Longevity	Total
20	4.50%	0.25%	3.00%	7.75%
25	4.50%	0.25%	3.00%	7.75%
30	4.50%	0.25%	2.60%	7.35%
35	4.50%	0.25%	1.10%	5.85%
40	4.50%	0.25%	0.20%	4.95%
45	4.50%	0.25%	0.20%	4.95%
50	4.50%	0.25%	0.20%	4.95%
55	4.50%	0.25%	0.10%	4.85%
60	4.50%	0.25%	-	4.75%
65	4.50%	0.25%	-	4.75%

The salary increase assumptions will produce 4.75 percent annual increases in active member payroll (the inflation rate plus the productivity rate) given a constant active member group size. This is the same payroll growth assumptions used to amortize unfunded actuarial liability.

APPENDIX A (continued)

Mortality Rates:

The mortality table was the 1971 Group Annuity Mortality Table projected to 2000, set back 0 years for men and 6 years for women. This table was first used for the December 31, 1999 valuation. Sample values follow:

Sample	Present Value of $1 Monthly for Life		Future Expectancy (Years)	
Ages	Men(1)	Women(1)	Men	Women
40	145.57	$150.34	37.5	43.3
45	140.10	146.47	32.8	38.5
50	133.28	141.31	28.3	33.7
55	124.97	134.75	24.0	29.2
60	114.79	126.77	19.9	24.8
65	102.61	116.99	16.1	20.7
70	89.12	105.20	12.7	16.8
75	75.49	91.86	9.8	13.3

(1) Single life values.

The mortality assumption is used to measure the probabilities of members dying before retirement and the probabilities of each pension payment being made after retirement.

The proportion of active members assumed to be married was 80%. In each case the male was assumed to be 3 years older than the female.

The rates of retirement used to measure the probability of eligible members retiring were as follows:

Percent Retiring within Year

Plans A & B			Plan C		
Service of Member	Police	Fire	Age of Member	Police	Fire
20	28%	20%	50	35%	20%
21	28	15	51	25	15
22	26	10	52	20	10
23	15	10	53	15	10
24	12	10	54	15	10
25	15	15	55	15	10
26	15	10	56	15	10
27	15	10	57	15	15
28	15	10	58	25	25
29	15	30	59	30	30
30	100	10	60	100	100
31	100	100	Over 60	100	100

The current rates were first used for the December 31, 1999 valuation.

APPENDIX A (continued)

Rates of separation from active membership were as follows: (rates do not apply to members eligible to retire and do not include separation on account of death or disability).

Sample Ages	Years of Service	Percent Separating Within Year	
		Police	Fire
ALL	0	10.0%	8.0%
	1	8.0	6.0
	2	6.0	4.5
	3	4.0	3.0
	4	3.0	2.0
25	Over 4	3.0	1.0
30		2.4	1.0
35		1.7	1.0
40		1.2	0.9
45		1.0	0.8
50		0.9	0.7
55		0.8	0.6

These rates were first used for the December 31, 1999 valuation.

Forfeiture of Vested Benefits. The assumption is that a percentage of the actuarial present value of vested termination benefits will be forfeited by a withdrawal of accumulated contributions. This percentage is applied individually based on a graded scale beginning at 100% for the earliest vesting age to 0% at the individual's minimum retirement age.

Rates of disability were as follows:

Sample Ages	Percent Becoming Disabled Within Year	
	Police	Fire
20	0.10%	0.09%
25	0.16	0.14
30	0.33	0.30
35	0.55	0.49
40	0.77	0.68
45	0.98	0.87
50	1.20	1.06
55	1.42	1.14

These rates were first used for the December 31, 1999 valuation.

APPENDIX A (continued)

Rates of recovery from disability were assumed to be zero.

Administrative expenses were assumed to be paid from investment earnings.

Active member group size was assumed to remain constant.

Vested Deferred Pensions for Plan C were assumed to increase during the deferral period at 5.5% per year.

Miscellaneous and Technical Assumptions

Marriage Assumption:	80% of participants are assumed to be married for purposes of death benefits.
Pay Increase Timing:	Assumed to occur mid-year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Benefit Service:	Service, calculated to one-half year, is used to determine the amount of benefit payable.
Miscellaneous Loading Factors:	The calculated normal retirement benefits were increased by 5% to account for the inclusion of unused sick leave in the calculation of Average Compensation.

APPENDIX B

Proposed Actuarial Assumptions

Actuarial Assumptions

The investment return rate (net of administrative expenses) used for actuarial valuation calculations was 7.75 percent a year, compounded annually. This rate consists of 4.00% in recognition of long term price inflation and a 3.75 percent a year real rate of return over price inflation.

Salary increase rates used to project current pays to those upon which a benefit will be based are represented by the following table.

Years of Service	Annual Rate of Salary Increase for Sample Ages			
	Inflation	Productivity	Merit & Longevity	Total
1	4.00%	0.50%	2.5%	7.0%
5	4.00%	0.50%	2.5%	7.0%
10	4.00%	0.50%	2.5%	7.0%
15	4.00%	0.50%	2.5%	7.0%
20	4.00%	0.50%	0.0%	4.5%
25	4.00%	0.50%	0.0%	4.5%
30	4.00%	0.50%	0.0%	4.5%

The salary increase assumptions will produce 4.50 percent annual increases in active member payroll (the inflation rate plus the productivity rate) given a constant active member group size. This is the same payroll growth assumptions used to amortize unfunded actuarial liability.

Mortality Rates: The mortality assumption is used to measure the probabilities of members dying before retirement and the probabilities of each pension payment being made after retirement.

Healthy Retirees and Beneficiaries: RP-2000 Healthy Annuitant Table for Males and Females.
Disabled Retirees: RP-2000 Disabled Tables for males and females.
Active Members: RP-2000 Employee Table for males and females.

APPENDIX B (continued)

Sample Ages[1]	Present Value of $1 Monthly for Life		Future Life Expectancy (Years)	
	Men	Women	Men	Women
50	$138.63	$141.98	37.3	34.6
55	132.05	135.41	27.6	29.7
60	122.80	127.04	23.0	25.1
65	111.13	116.91	18.5	20.7
70	97.31	104.80	14.5	16.7
75	81.63	90.90	10.9	13.0
80	65.36	75.76	7.9	9.8
85	49.97	60.2	5.6	7.1

(1) Ages in 2000

The proportion of active members assumed to be married was 80%. In each case the male was assumed to be 3 years older than the female.

The rates of retirement used to measure the probability of eligible members retiring were as follows:

Percent Retiring within Year

Plans A & B			Plan C		
Service of Member	Police	Fire	Age of Member	Police	Fire
20	28%	20%	50	35%	20%
21	28	15	51	25	15
22	26	10	52	20	10
23	15	10	53	15	10
24	12	10	54	15	10
25	15	15	55	15	10
26	15	10	56	15	10
27	15	10	57	15	15
28	15	10	58	25	25
29	15	30	59	30	30
30	100	10	60	100	100
31	100	100	Over 60	100	100

APPENDIX B (continued)

Rates of separation from active membership were as follows: (rates do not apply to members eligible to retire and do not include separation on account of death or disability).

Sample Ages	Years of Service	Percent Separating Within Year	
		Police	Fire
ALL	0	10.0%	8.0%
	1	8.0	6.0
	2	6.0	4.5
	3	4.0	3.0
	4	3.0	2.0
25	Over 4	3.0	1.0
30		2.4	1.0
35		1.7	1.0
40		1.2	0.9
45		1.0	0.8
50		0.9	0.7
55		0.8	0.6

Forfeiture of Vested Benefit:

Years of Service	% Forfeiting
10 - 14	100
15	0

Rates of disability were as follows:

Sample Ages	Percent Becoming Disabled Within Year	
	Police	Fire
20	0.10%	0.09%
25	0.16	0.14
30	0.33	0.30
35	0.55	0.49
40	0.77	0.68
45	0.98	0.87
50	1.20	1.06
55	1.42	1.14

APPENDIX B (continued)

Rates of recovery from disability were assumed to be zero.

Administrative expenses were assumed to be paid from investment earnings.

Active member group size was assumed to remain constant.

Vested Deferred Pensions for Plan C were assumed to increase during the deferral period at 4.5% per year.

Miscellaneous and Technical Assumptions

Marriage Assumption:	80% of participants are assumed to be married for purposes of death benefits.
Pay Increase Timing:	Assumed to occur mid-year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Benefit Service:	Service, calculated to one-half year, is used to determine the amount of benefit payable.
Miscellaneous Loading Factors:	The calculated normal retirement benefits were increased by 4% to account for the inclusion of unused sick leave in the calculation of Average Compensation.

DEFINITION OF TERMS

Actuarial Accrued Liability	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as "accrued liability" or "actuarial liability."
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Accrued Service	Service credited under the system that was rendered before the date of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefits between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Experience Gain(Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.

Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.
Unfunded Actuarial Accrued Liability	The difference between actuarial accrued liability and the valuation assets. Sometimes referred to as "unfunded accrued liability" or "unfunded liability". Most retirement systems have unfunded actuarial accrued liability. They arise anytime new benefits are added and anytime an actuarial loss is realized. The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liability and make payments to finance it. Also of importance are trends in the amount or duration of payment.