Connecticut State Teachers'
Retirement System

# PRELIMINARY RESULTS
of the
5 Year Experience Study
Covering the Period
July 1, 2001 through June 30, 2005

GRS

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June 21, 2006

The Board of Trustees
Connecticut State Teachers' Retirement System
21 Grand Street
Hartford, Connecticut 06106

**Re: Preliminary Report of Five Year Experience Study and Assumption Review**

Dear Members of the Board:

The results of the 5 year preliminary ***actuarial investigation of experience*** of the Connecticut State Teachers' Retirement System are presented in this report. The investigation was conducted for the purpose of reviewing the actuarial assumptions used to value the actuarial liabilities of the Connecticut State Teachers' Retirement System and to determine the annual State contribution amount.

The investigation was based upon the member census data and the asset information furnished by your Administrator and Staff annually to enable us to prepare the regular biennial actuarial valuations of the System as well as supplemental valuations to determine the impact of proposed plan changes. From these annual data submissions we were able to extract information concerning members who died, withdrew, became disabled or retired during the last 5 years.

The investigation covered the 5 year period from ***July 1, 2001 to June 30, 2005***, and was carried out using generally accepted actuarial principles and techniques.

**We believe that the proposed actuarial assumptions that are the result of this investigation represent reasonable estimates of future experience of the Connecticut State Teachers' Retirement System.**

Respectfully submitted,

Larry Langer, ASA, EA, MAAA

Brian F. Dunn, ASA, EA, MAAA

LL/BFD:dm

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# SECTION A

## Introduction and Overview

# 2001-2005 Experience Study
## Introduction and Overview

Each year, member census data and asset information regarding the Connecticut State Teachers' Retirement System (CSTRS) is provided to Gabriel, Roeder, Smith & Company in order to perform biennial valuations to determine the State's annual contribution amount and to perform supplemental valuations, as needed, to determine the impact of proposed changes to the Retirement System. A critical element in preparing these actuarial valuations is the assumptions that must be made regarding the future experience of the System with regard to the following risk areas:

- Rates of **termination** of active members.
- Rates of **disability** among active members.
- Rates of **retirement** among active members.
- Rates of **mortality** among active members, retirees, and beneficiaries.
- Patterns of **salary increases** to active members.
- Long-term rates of **investment return** to be generated by the assets of the System.

Assumptions should be carefully chosen and continually monitored. An unrealistic set of assumptions can lead to:

- Understated costs resulting in either an inability to pay benefits when due, or sharp increases in required contributions at some point in the future;
- Overstated costs resulting in either benefit levels that are kept below the level that could be supported by the computed rate, or an unnecessarily large burden on the current generation of members and taxpayers.

A single set of assumptions will not be suitable indefinitely. Relevant circumstances change, and our understanding of these circumstances (whether or not they are changing) also changes. The set of assumptions is then adjusted to reflect basic experience trends -- but not random year-to-year fluctuations. Actuarial assumptions were last revised with the Retirement Board's approval preceding the June 30, 2002 regular actuarial valuation.

# 2001-2005 Experience Study
## Summary of Findings – Decrement Assumptions

**Termination Experience.** Termination during the period studied were greater than assumed. The proposed rates were adjusted to bring them closer to actual experience during the period. Details are reported in Section C.

**Disability Experience** was very close to the assumed rates for females. Males experienced fewer disabilities than assumed, particularly at later ages. The proposed male rates were adjusted to bring them closer to recent experience. Details are reported in section D.

**Retirement Experience** was studied separately for early, proratable and unreduced (normal) retirement. The number of retirements (all classifications) was higher than assumed for males during the period. The number of unreduced retirements for females was about the same as assumed, while there were a lower number of proratable retirements and a higher number of early retirements. The proposed rates were adjusted to bring them closer to recent experience. Details are reported in Section E.

**Retired Life Mortality** was found to be less than expected for both males and females. The proposed rates were adjusted to bring them closer to recent experience and to include a small margin for future increases in life expectancy. Details are reported in Section F.

**Active Member Mortality Rates** were not explicitly studied. It is often very difficult to differentiate, in the data, between deaths and other terminations. This may be due to the fact that members with impaired health often leave active employment before death occurs (e.g., some become non-vested terminations or disability retirees). The proposed mortality rates are based on the same mortality table as is recommended for retired life mortality. In aggregate, the tables include a small margin for future increases in life expectancy. Details are reported in Section F.

# SUMMARY OF DECREMENT EXPERIENCE
## 2001 - 2005

| Decrement Risk Area | Actual | Expected | | |
|---|---|---|---|---|
| | | Present | Proposed | Change |
| *Termination - Total* | 8,601 | 6,751 | 7,622 | 871 |
| *Disability* | 203 | 247 | 241 | (6) |
| *Unreduced (Normal) Retirement* | 4,156 | 3,961 | 4,096 | 135 |
| *Proratable Retirement* | 315 | 333 | 307 | (26) |
| *Early Retirement* | 3,283 | 2,739 | 3,075 | 336 |
| *Mortality - Retired Members and Beneficiaries* | | | | |
| Male | 640 | 786 | 623 | (163) |
| Female | 1,549 | 1,591 | 1,491 | (100) |

The table above shows the number of people who left the active or retired population for various reasons during the study period. Results are shown for both the actual number in each risk area and the expected number. The actual numbers are the result of a year-to-year comparative analysis of the valuation data. The expected numbers are shown for both the current assumptions and the proposed assumptions. The change column is the difference between what was expected based on the current assumptions during the study period and what the expected number would have been had the proposed assumptions been in place during that period.

# 2001-2005 Experience Study
## Summary of Findings – Economic Assumptions

Economic assumptions include long-term rates of investment return and wage inflation (the across-the-board portion of salary increases). Unlike demographic activities, economic activities do not lend themselves to analysis solely on the basis of internal historical patterns because both salary increases and investment return are more affected by external forces: namely inflation, general productivity changes and changes in financial markets. Estimates of economic activities are generally selected on the basis of the long-term expectations in an inflation-free environment and then both are increased by some provision for long-term inflation.

If inflation and/or productivity increases are higher than expected, actual rates of salary increase and investment return are likely to exceed the assumed rates. Salaries increasing faster than expected produce unexpected liabilities. Investment return exceeding the assumed rates (whether due to manager performance, change in the mix of assets, or general inflation) results in unanticipated assets. To the extent that inflation, productivity, and other factors have about the same effect on both sides of the balance sheet, these additional assets and liabilities can offset one another over the long-term.

Current economic assumptions for CSTRS are as follows:

| | |
|---|---|
| Investment Return | 8.50% |
| Wage Inflation | 4.00 |
| Spread | 4.50% |

**Wage Inflation.** The long-term rate of increase in National Average Earnings since 1950 is higher than the current CSTRS assumption (see schedule on page A-7). It is expected that, in the long run, salary increases in all parts of the country will be close to the national averages. However, few economists are forecasting a repeat of the high inflation rates experienced in the 1970s. No specific **price inflation** assumption is used in the valuation. However, the data on page A-7 suggests that wages have risen faster than prices in recent times.

# 2001-2005 Experience Study
## Summary of Findings – Economic Assumptions

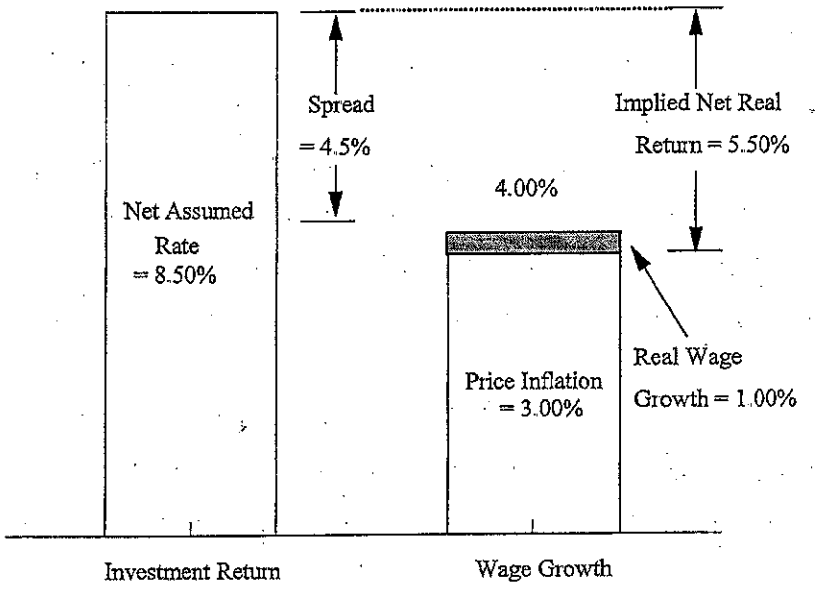
**Pay Increase Rates (merit and longevity portion)** were on average slightly lower than assumed, particularly when service is higher than 10 years. The recommended adjustments that were made are small in aggregate. Details are reported in section G.

**Investment Return and Spread.** The CSTRS target asset mix is about 70% in equities and similar risk level investments. The investment policy target asset allocation is shown below. Gross real market returns (the difference between recognized investment return and wage inflation without provision for expenses) for balanced portfolios have averaged approximately 5% over the last 56 years ending in 2005 (see schedule on page A-7). Only hindsight will tell whether that experience represents a return to much lower earnings levels, or whether it is a temporary effect that will be reversed in due time.

The current net real return assumption is 4.50% (8.50% nominal less 4.00% assumed wage inflation). This 4.50% spread is reasonable. It would also be reasonable to set the spread at 4.0% in conjunction with this experience study. We tested a net real return assumption of 4.0% for the ensuing five year period. Adding a 4.0% spread to an underlying wage inflation rate of 4.0% would produce a nominal rate of net investment return of 8.0%. Adding a 4.0% spread to an underlying wage inflation rate of 4.5% would maintain the current nominal rate of net investment return of 8.5%. To assist the Board in considering these alternatives, we have shown the related contribution rates on page B-1.

# 2001-2005 EXPERIENCE STUDY
## SUMMARY OF FINDINGS – ECONOMIC ASSUMPTIONS

The relationship between economic assumptions based on the current 4.5% spread is illustrated below:




The Retirement Board may find it helpful to review the following results of the 2004 National Education Association Survey, Characteristics of Large Public Education Pension Plans, 2004.

| | Median Actuarial Assumptions |
|---|---|
| Investment Return | 8.00% |
| General Inflation | 3.50% |

The 2004 survey obtained results from 78 public retirement systems; covering teachers, school employees, and general employees. These plans cover 9.7 million active plan members and 4.2 million retiree/beneficiaries.

# HISTORICAL PATTERNS OF INVESTMENT RETURN, PAY INCREASES & INFLATION

| Calendar Year Period | Gross Market Returns | | | | | | Sample Balanced Fund* | |
|---|---|---|---|---|---|---|---|---|
| | Bonds (Long) | | Cash Equiv. (T Bills) | Stocks (S&P 500) | Price Inflation (CPI) | National Average Earnings | Total Return (I) | Spread: I - NAE |
| | U.S. Treasury | Corp. (S&P AA) | | | | | | |
| 1950-1959 | (0.1)% | 1.0 % | 1.9 % | 19.4 % | 2.2 % | 4.5 % | 12.2 % | 7.7 % |
| 1960-1969 | 1.4 % | 1.7 % | 3.9 % | 7.8 % | 2.5 % | 4.3 % | 5.7 % | 1.4 % |
| 1970-1979 | 5.5 % | 6.2 % | 6.3 % | 5.9 % | 7.4 % | 6.9 % | 6.2 % | (0.7)% |
| 1980-1989 | 12.6 % | 13.0 % | 8.9 % | 17.5 % | 5.1 % | 5.8 % | 15.7 % | 9.9 % |
| 1990-1999 | 8.8 % | 8.4 % | 4.9 % | 18.2 % | 2.9 % | 4.2 % | 14.4 % | 10.2 % |
| 2000 | 21.5 % | 12.9 % | 5.9 % | (9.1)% | 3.4 % | 5.5 % | 1.1 % | (4.4)% |
| 2001 | 3.7 % | 10.7 % | 3.8 % | (11.9)% | 1.6 % | 2.4 % | (4.6)% | (7.0)% |
| 2002 | 17.8 % | 16.3 % | 1.7 % | (22.1)% | 2.4 % | 1.0 % | (7.2)% | (8.2)% |
| 2003 | 1.5 % | 5.3 % | 1.0 % | 28.7 % | 1.9 % | 2.4 % | 18.4 % | 16.0 % |
| 2004 | 8.5 % | 8.7 % | 1.2 % | 10.9 % | 3.3 % | 4.7 % | 9.6 % | 4.9 % |
| 2005 | 7.8 % | 5.9 % | 3.0 % | 4.9 % | 3.4 % | 2.7 % | 5.5 % | 2.8 % |
| **Last 56 Years** | **6.0 %** | **6.4 %** | **4.9 %** | **11.9 %** | **3.9 %** | **4.9 %** | **9.9 %** | **5.0 %** |

| Sample Balanced Fund | |
|---|---|
| Equities | 70% |
| Bonds - Government | 21% |
| - Corporate | 8% |
| Cash Equivalents | 1% |
| | 100% |

Basic Series

Year-by-Year Total Returns (1926-2005)

For a type of investment,
Red means a REAL Return less than 3%
[(Total - Inflation) < 3%]

For Inflation,
RED means a purchasing power loss

| Year | Large Company Stocks | Small Company Stocks | Long-Term Corporate Bonds | Long-Term Government Bonds | Intermediate Term Government Bonds | U.S. Treasury Bills | Inflation * |
|---|---|---|---|---|---|---|---|
| 1926 | 11.62 | 0.28 | 7.37 | 7.77 | 5.38 | 3.27 | -1.49 |
| 1927 | 37.49 | 22.10 | 7.44 | 8.93 | 4.52 | 3.12 | -2.08 |
| 1928 | 43.61 | 39.69 | 2.84 | 0.10 | 0.92 | 3.56 | -0.97 |
| 1929 | -8.42 | -51.36 | 3.27 | 1.17 | 6.01 | 4.75 | 0.20 |
| 1930 | -24.90 | -38.15 | 7.98 | 4.66 | 6.72 | 2.41 | -6.03 |
| 1931 | -43.34 | -49.75 | -1.85 | -5.31 | -2.32 | 1.07 | -9.52 |
| 1932 | -8.19 | -5.39 | 10.32 | 16.84 | 8.81 | 0.96 | -10.30 |
| 1933 | 53.99 | 142.87 | 10.38 | -0.07 | 1.83 | 0.30 | 0.51 |
| 1934 | -1.44 | 24.22 | 13.84 | 10.03 | 9.00 | 0.16 | 2.03 |
| 1935 | 47.67 | 40.19 | 9.61 | 4.98 | 7.01 | 0.17 | 2.99 |
| 1936 | 33.92 | 64.80 | 6.74 | 7.52 | 3.06 | 0.18 | 1.21 |
| 1937 | -35.03 | -58.01 | 2.75 | 0.23 | 1.56 | 0.31 | 3.10 |
| 1938 | 31.12 | 32.80 | 6.13 | 5.53 | 6.23 | -0.02 | -2.78 |
| 1939 | -0.41 | 0.35 | 3.97 | 5.94 | 4.52 | 0.02 | -0.48 |
| 1940 | -9.78 | -5.16 | 3.39 | 6.09 | 2.96 | 0.00 | 0.96 |
| 1941 | -11.59 | -9.00 | 2.73 | 0.93 | 0.50 | 0.06 | 9.72 |
| 1942 | 20.34 | 44.51 | 2.60 | 3.22 | 1.94 | 0.27 | 9.29 |
| 1943 | 25.90 | 88.37 | 2.83 | 2.08 | 2.81 | 0.35 | 3.16 |
| 1944 | 19.75 | 53.72 | 4.73 | 2.81 | 1.80 | 0.33 | 2.11 |
| 1945 | 36.44 | 73.61 | 4.08 | 10.73 | 2.22 | 0.33 | 2.25 |
| 1946 | -8.07 | -11.63 | 1.72 | -0.10 | 1.00 | 0.35 | 18.16 |
| 1947 | 5.71 | 0.92 | -2.34 | -2.62 | 0.91 | 0.50 | 9.01 |
| 1948 | 5.50 | -2.11 | 4.14 | 3.40 | 1.85 | 0.81 | 2.71 |
| 1949 | 18.79 | 19.75 | 3.31 | 6.45 | 2.32 | 1.10 | -1.80 |
| 1950 | 31.71 | 38.75 | 2.12 | 0.06 | 0.70 | 1.20 | 5.79 |
| 1951 | 24.02 | 7.80 | -2.69 | -3.93 | 0.36 | 1.49 | 5.87 |
| 1952 | 18.37 | 3.03 | 3.52 | 1.16 | 1.63 | 1.66 | 0.88 |
| 1953 | -0.99 | -6.49 | 3.41 | 3.64 | 3.23 | 1.82 | 0.62 |
| 1954 | 52.62 | 60.58 | 5.39 | 7.19 | 2.68 | 0.86 | -0.50 |
| 1955 | 31.56 | 20.44 | 0.48 | -1.29 | -0.65 | 1.57 | 0.37 |
| 1956 | 6.56 | 4.28 | -6.81 | -5.59 | -0.42 | 2.46 | 2.86 |
| 1957 | -10.78 | -14.57 | 8.71 | 7.46 | 7.84 | 3.14 | 3.02 |
| 1958 | 43.36 | 64.89 | -2.22 | -6.09 | -1.29 | 1.54 | 1.76 |
| 1959 | 11.96 | 16.40 | -0.97 | -2.26 | -0.39 | 2.95 | 1.50 |
| 1960 | 0.47 | -3.29 | 9.07 | 13.76 | 11.76 | 2.66 | 1.48 |
| 1961 | 26.89 | 32.09 | 4.82 | 0.97 | 1.85 | 2.13 | 0.67 |
| 1962 | -8.73 | -11.90 | 7.95 | 6.89 | 5.56 | 2.73 | 1.22 |
| 1963 | 22.80 | 23.57 | 2.19 | 1.21 | 1.64 | 3.12 | 1.65 |
| 1964 | 16.48 | 23.52 | 4.77 | 3.51 | 4.04 | 3.54 | 1.19 |
| 1965 | 12.45 | 41.75 | -0.46 | 0.71 | 1.02 | 3.93 | 1.92 |
| 1966 | -10.06 | -7.01 | 0.20 | 3.65 | 4.69 | 4.76 | 3.35 |
| 1967 | 23.98 | 83.57 | -4.95 | -9.18 | 1.01 | 4.21 | 3.04 |
| 1968 | 11.06 | 35.97 | 2.57 | -0.26 | 4.54 | 5.21 | 4.72 |
| 1969 | -8.50 | -25.05 | -8.09 | -5.07 | -0.74 | 6.58 | 6.11 |
| 1970 | 4.01 | -17.43 | 18.37 | 12.11 | 16.86 | 6.52 | 5.49 |
| 1971 | 14.31 | 16.50 | 11.01 | 13.23 | 8.72 | 4.39 | 3.36 |
| 1972 | 18.98 | 4.43 | 7.26 | 5.69 | 5.16 | 3.84 | 3.41 |
| 1973 | -14.66 | -30.90 | 1.14 | -1.11 | 4.61 | 6.93 | 8.80 |
| 1974 | -26.47 | -19.95 | -3.06 | 4.35 | 5.69 | 8.00 | 12.20 |
| 1975 | 37.20 | 52.82 | 14.64 | 9.20 | 7.83 | 5.80 | 7.01 |
| 1976 | 23.84 | 57.38 | 18.65 | 16.75 | 12.87 | 5.08 | 4.81 |
| 1977 | -7.18 | 25.38 | 1.71 | -0.69 | 1.41 | 5.12 | 6.77 |
| 1978 | 6.56 | 23.46 | -0.07 | -1.18 | 3.49 | 7.18 | 9.03 |
| 1979 | 18.44 | 43.46 | -4.18 | -1.23 | 4.09 | 10.38 | 13.31 |
| 1980 | 32.42 | 39.88 | -2.62 | -3.95 | 3.91 | 11.24 | 12.40 |
| 1981 | -4.91 | 13.88 | -0.96 | 1.86 | 9.45 | 14.71 | 8.94 |
| 1982 | 21.41 | 28.01 | 43.79 | 40.36 | 29.10 | 10.54 | 3.87 |
| 1983 | 22.51 | 39.67 | 4.70 | 0.65 | 7.41 | 8.80 | 3.80 |
| 1984 | 6.27 | -6.67 | 16.39 | 15.48 | 14.02 | 9.85 | 3.95 |
| 1985 | 32.16 | 24.66 | 30.09 | 30.97 | 20.33 | 7.72 | 3.77 |
| 1986 | 18.47 | 6.85 | 19.85 | 24.53 | 15.14 | 6.16 | 1.13 |
| 1987 | 5.23 | -9.30 | -0.27 | -2.71 | 2.90 | 5.47 | 4.41 |
| 1988 | 16.81 | 22.87 | 10.70 | 9.67 | 6.10 | 6.35 | 4.42 |
| 1989 | 31.49 | 10.18 | 16.23 | 18.11 | 13.29 | 8.37 | 4.65 |
| 1990 | -3.17 | -21.56 | 6.78 | 6.18 | 9.73 | 7.81 | 6.11 |
| 1991 | 30.55 | 44.63 | 19.89 | 19.30 | 15.46 | 5.60 | 3.06 |
| 1992 | 7.67 | 23.35 | 9.39 | 8.05 | 7.19 | 3.51 | 2.90 |
| 1993 | 9.99 | 20.98 | 13.19 | 18.24 | 11.24 | 2.90 | 2.75 |
| 1994 | 1.31 | 3.11 | -5.76 | -7.77 | -5.14 | 3.90 | 2.67 |
| 1995 | 37.43 | 34.46 | 27.20 | 31.67 | 16.80 | 5.60 | 2.54 |
| 1996 | 23.07 | 17.62 | 1.40 | -0.93 | 2.10 | 5.21 | 3.32 |
| 1997 | 33.36 | 22.78 | 12.95 | 15.85 | 8.38 | 5.26 | 1.70 |
| 1998 | 28.58 | -7.31 | 10.76 | 13.06 | 10.21 | 4.86 | 1.61 |
| 1999 | 21.04 | 29.79 | -7.45 | -8.96 | -1.77 | 4.68 | 2.68 |
| 2000 | -9.11 | -3.59 | 12.87 | 21.48 | 12.59 | 5.89 | 3.39 |
| 2001 | -11.88 | 22.77 | 10.65 | 3.70 | 7.62 | 3.83 | 1.55 |
| 2002 | -22.10 | -13.28 | 16.33 | 17.84 | 12.93 | 1.65 | 2.38 |
| 2003 | 28.70 | 60.70 | 5.27 | 1.45 | 2.40 | 1.02 | 1.88 |
| 2004 | 10.87 | 18.39 | 8.72 | 8.51 | 2.25 | 1.20 | 3.26 |
| 2005 | 4.91 | 5.69 | 5.87 | 7.81 | 1.36 | 2.98 | 3.42 |

Gabriel, Roeder, Smith & Company from SBBI Yearbook * *Calculated using December to December CPI-U (1982-84=100, when available), not seasonally adjusted.*

# SECTION B

## Summary of Valuation Results

# 2001-2005 Experience Study
## Illustrative Effect on Results of the June 30, 2004 Actuarial Valuation

| | 6/30/2004 Valuation | Demographic | Alt. 1 | Alt. 2 |
|---|---|---|---|---|
| Normal Cost | 9.01% | 8.88% | 9.85% | 9.44% |
| Member Contributions | 6.00% | 6.00% | 6.00% | 6.00% |
| State Normal Cost | 3.01% | 2.88% | 3.85% | 3.44% |
| Unfunded Actuarial Accrued Liabilities | 9.49% | 10.09% | 10.92% | 9.65% |
| **State Contribution Rate** | 12.50% | 12.97% | 14.77% | 13.09% |

| | Economic Assumptions | | |
|---|---|---|---|
| **Combinations** | **Interest Rate** | **Wage Inflation** | **Spread** |
| Valuation | 8.50% | 4.00% | 4.50% |
| Demographic | 8.50% | 4.00% | 4.50% |
| Alternate 1 | 8.00% | 4.00% | 4.00% |
| Alternate 2 | 8.50% | 4.50% | 4.00% |

The valuations of alternates include the proposed decrement assumptions and the proposed merit and seniority component of the salary scale.

# SECTION C

## Termination Experience

# TERMINATION EXPERIENCE

A termination occurs when a member separates from active status in the Retirement System for a reason other than disability, death, or retirement. At the time of separation from active status the member may be either vested or non-vested. Termination experience was measured by years of service for those terminating with up to 10 years of service and by age for those terminating with more than 10 years service.

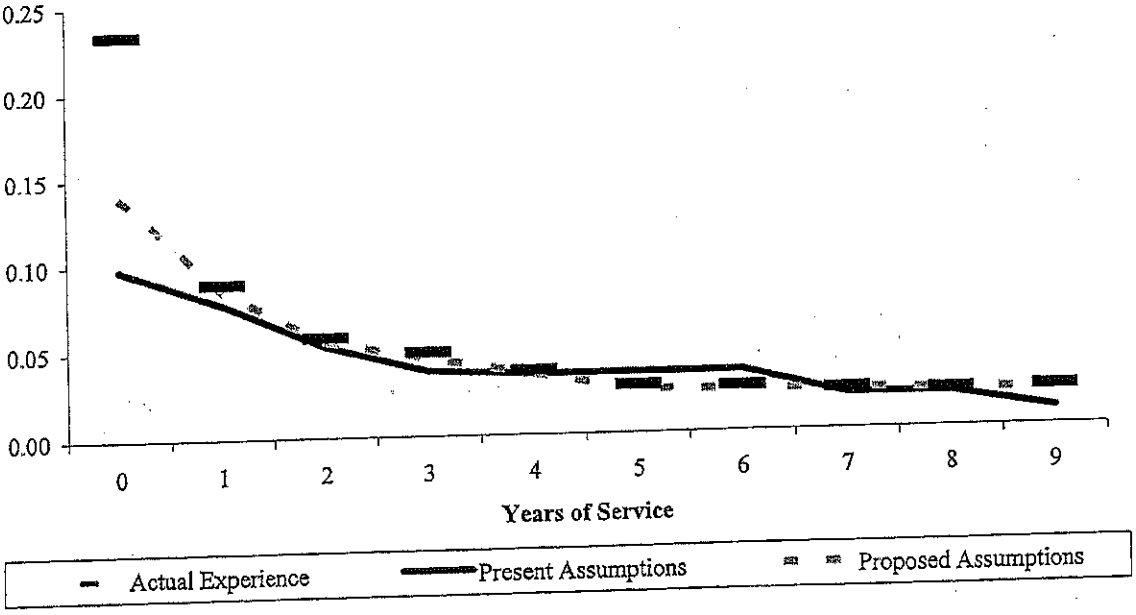
For the purpose of applying termination rates in the valuation, the rates used are from a service-based table for an initial period of employment. After the initial period, the rates are selected from the age-based table. The ten-year period for the service-based table provides a model for the termination assumption as this period corresponds to the service requirement for vesting. This service-based versus age-based assumption may be more simply stated by saying that the likelihood of termination is more closely related to service prior to vesting and age after vesting.

# TERMINATION EXPERIENCE
# MALE MEMBERS WITH UP TO 10 YEARS OF SERVICE

There were 1,506 actual terminations of male plan members with up to 10 years of service compared to 1,224 anticipated based on the current assumption during the five year period under review. We propose that more terminations be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| Service | Terminations | Exposure | Rates | | | Expected Terminations | |
|---|---|---|---|---|---|---|---|
| | | | Crude | Present | Proposed | Present | Proposed |
| 0 | 304 | 1,300 | 0.2338 | 0.0975 | 0.1400 | 127 | 182 |
| 1 | 395 | 4,428 | 0.0892 | 0.0775 | 0.0850 | 343 | 376 |
| 2 | 233 | 4,037 | 0.0577 | 0.0525 | 0.0550 | 212 | 222 |
| 3 | 179 | 3,684 | 0.0486 | 0.0375 | 0.0450 | 138 | 166 |
| 4 | 125 | 3,380 | 0.0370 | 0.0350 | 0.0350 | 118 | 118 |
| 5 | 80 | 2,922 | 0.0274 | 0.0350 | 0.0250 | 102 | 73 |
| 6 | 65 | 2,528 | 0.0257 | 0.0350 | 0.0240 | 88 | 61 |
| 7 | 51 | 2,182 | 0.0234 | 0.0200 | 0.0230 | 44 | 50 |
| 8 | 40 | 1,830 | 0.0219 | 0.0200 | 0.0220 | 37 | 40 |
| 9 | 34 | 1,513 | 0.0225 | 0.0100 | 0.0210 | 15 | 32 |
| Totals | 1,506 | 27,804 | 0.0542 | 0.0440 | 0.0475 | 1,224 | 1,320 |
| Ref | | | | 266 | 407 | | |

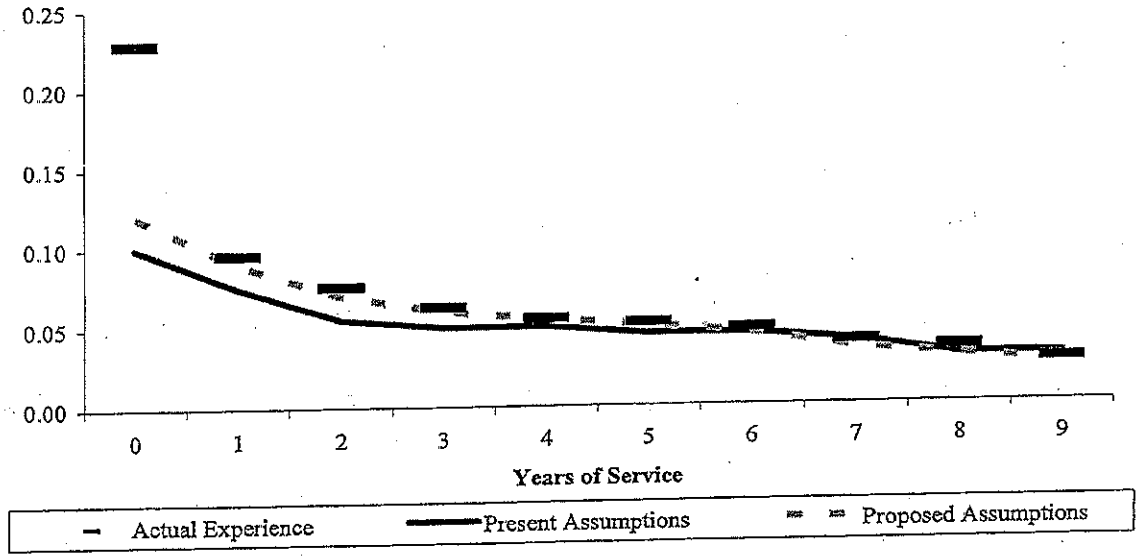


# TERMINATION EXPERIENCE
# FEMALE MEMBERS WITH UP TO 10 YEARS OF SERVICE

There were 5,821 actual terminations of female plan members with up to 10 years of service compared to 4,523 anticipated based on the current assumption during the five year period under review. We propose that more terminations be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Terminations | |
|---|---|---|---|---|---|---|---|
| Service | Terminations | Exposure | Crude | Present | Proposed | Present | Proposed |
| 0 | 808 | 3,537 | 0.2284 | 0.1000 | 0.1200 | 354 | 424 |
| 1 | 1,312 | 13,669 | 0.0960 | 0.0750 | 0.0900 | 1,025 | 1,230 |
| 2 | 963 | 12,680 | 0.0759 | 0.0550 | 0.0700 | 697 | 888 |
| 3 | 720 | 11,498 | 0.0626 | 0.0500 | 0.0600 | 575 | 690 |
| 4 | 564 | 10,269 | 0.0549 | 0.0500 | 0.0550 | 513 | 565 |
| 5 | 472 | 9,090 | 0.0519 | 0.0450 | 0.0500 | 409 | 455 |
| 6 | 372 | 7,782 | 0.0478 | 0.0450 | 0.0450 | 350 | 350 |
| 7 | 263 | 6,665 | 0.0395 | 0.0400 | 0.0350 | 267 | 233 |
| 8 | 207 | 5,840 | 0.0354 | 0.0300 | 0.0300 | 175 | 175 |
| 9 | 140 | 5,272 | 0.0266 | 0.0300 | 0.0250 | 158 | 132 |
| Totals | 5,821 | 86,302 | 0.0674 | 0.0524 | 0.0596 | 4,523 | 5,142 |
| Ref | | | | 267 | 408 | | |

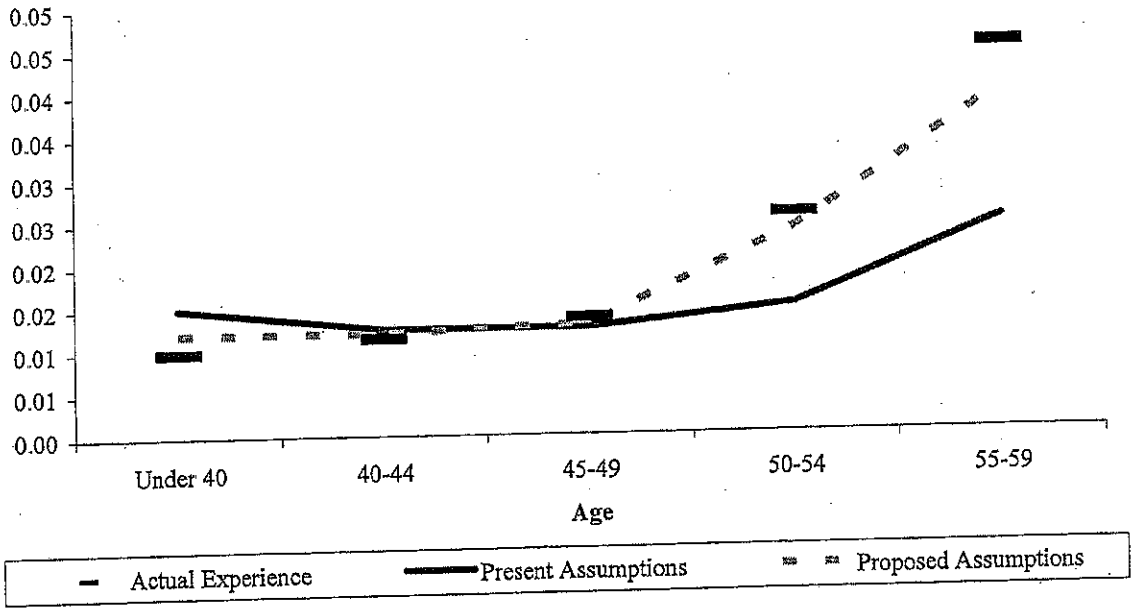


# TERMINATION EXPERIENCE
# MALE MEMBERS WITH 10 OR MORE YEARS OF SERVICE

There were 254 actual terminations of male plan members with 10 or more years of service compared to 199 anticipated based on the current assumption during the five year period under review. We propose that more terminations be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Terminations | |
|---|---|---|---|---|---|---|---|
| Age | Terminations | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 40 | 17 | 1,720 | 0.0099 | 0.0150 | 0.0120 | 26 | 21 |
| 40-44 | 33 | 2,888 | 0.0114 | 0.0125 | 0.0120 | 36 | 35 |
| 45-49 | 59 | 4,327 | 0.0136 | 0.0125 | 0.0130 | 54 | 56 |
| 50-54 | 91 | 3,541 | 0.0257 | 0.0150 | 0.0240 | 53 | 85 |
| 55-59 | 54 | 1,189 | 0.0454 | 0.0250 | 0.0400 | 30 | 48 |
| Totals | 254 | 13,665 | 0.0186 | 0.0146 | 0.0179 | 199 | 245 |
| Ref | | | | 492 | 735 | | |

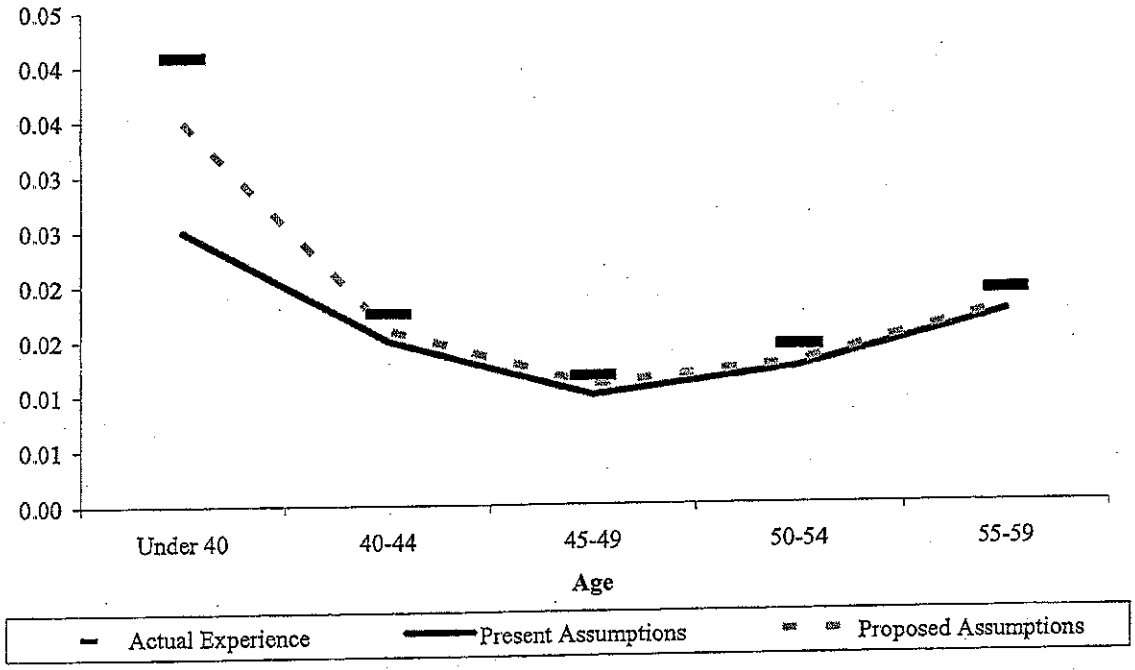


# TERMINATIONS EXPERIENCE
# FEMALE MEMBERS WITH 10 OR MORE YEARS OF SERVICE

There were 1,020 actual terminations of female plan members with 10 or more years of service compared to 805 anticipated based on the current assumption during the five year period under review. We propose that more terminations be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Terminations | |
|---|---|---|---|---|---|---|---|
| Age | Terminations | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 40 | 305 | 7,452 | 0.0409 | 0.0250 | 0.0350 | 186 | 261 |
| 40-44 | 167 | 9,512 | 0.0176 | 0.0150 | 0.0160 | 143 | 152 |
| 45-49 | 166 | 14,136 | 0.0117 | 0.0100 | 0.0110 | 141 | 155 |
| 50-54 | 224 | 15,471 | 0.0145 | 0.0125 | 0.0130 | 193 | 201 |
| 55-59 | 158 | 8,121 | 0.0195 | 0.0175 | 0.0180 | 142 | 146 |
| Totals | 1,020 | 54,692 | 0.0186 | 0.0147 | 0.0167 | 805 | 915 |
| Ref | | | | 493 | 736 | | |



# SECTION D

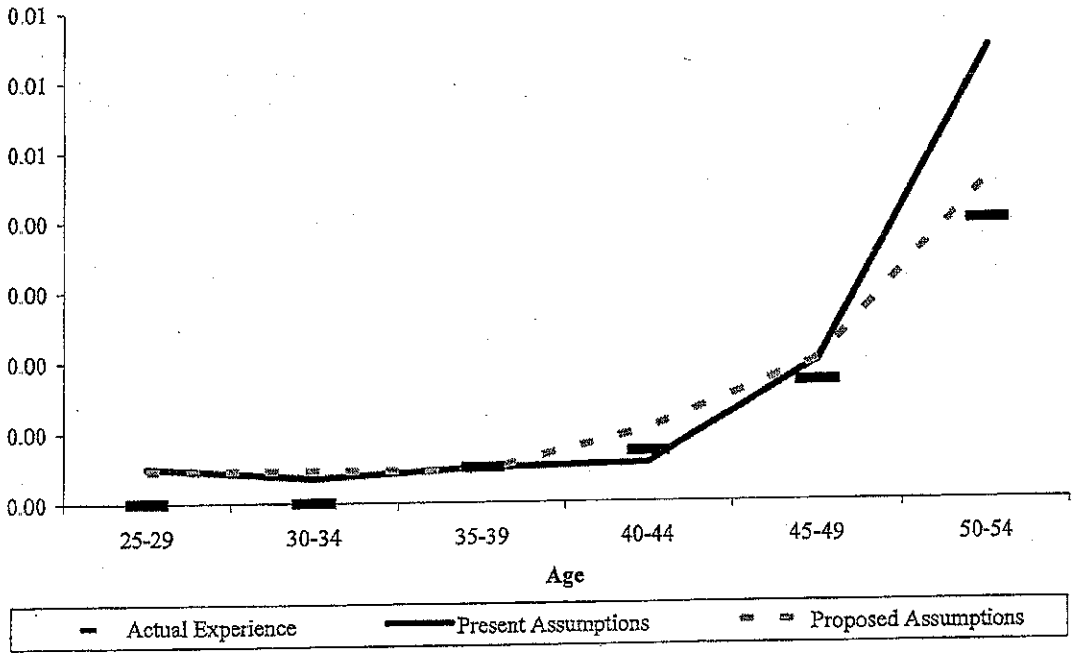
## Disability Experience

# DISABILITY EXPERIENCE
# MALE MEMBERS WITH 5 OR MORE YEARS OF SERVICE

There were 51 disability retirements for male members with 5 or more years of service compared to 73 anticipated based on the current assumption during the five year period under review. We propose that fewer disability retirements be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Disabilities | |
|---|---|---|---|---|---|---|---|
| Age | Disabilities | Exposure | Crude | Present | Proposed | Present | Proposed |
| 25-29 | 0 | 622 | 0.0000 | 0.0005 | 0.0005 | 0 | 0 |
| 30-34 | 0 | 3,684 | 0.0000 | 0.0003 | 0.0005 | 1 | 2 |
| 35-39 | 2 | 4,012 | 0.0005 | 0.0005 | 0.0005 | 2 | 2 |
| 40-44 | 3 | 4,201 | 0.0007 | 0.0005 | 0.0010 | 2 | 4 |
| 45-49 | 11 | 6,440 | 0.0017 | 0.0020 | 0.0020 | 13 | 13 |
| 50-54 | 18 | 4,487 | 0.0040 | 0.0065 | 0.0046 | 29 | 21 |
| 55 and over | 17 | 2,612 | 0.0065 | 0.0100 | 0.0095 | 26 | 25 |
| Totals | 51 | 26,058 | 0.0020 | 0.0028 | 0.0026 | 73 | 67 |
| Ref | | | | 134x0.5 | 312x0 65 | | |

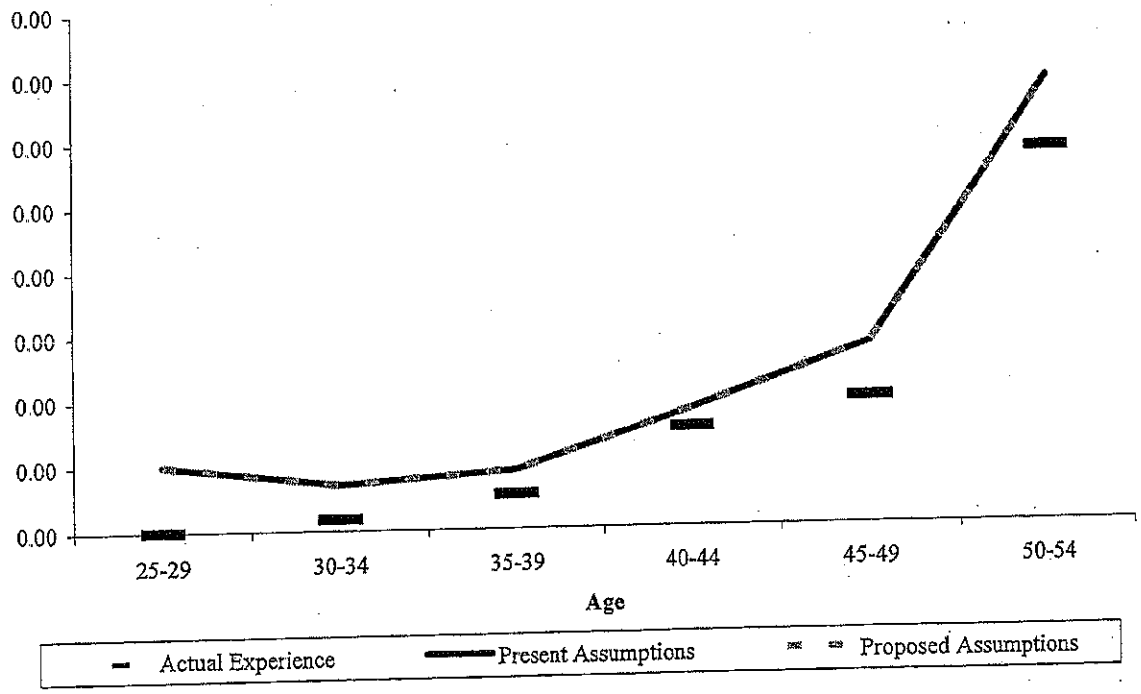


# DISABILITY EXPERIENCE
# FEMALE MEMBERS WITH 5 OR MORE YEARS OF SERVICE

There were 152 disability retirements for female members with 5 or more years of service compared to 174 anticipated based on the current assumption during the five year period under review. We propose that no change in disability retirements be assumed for future valuations as summarized below.

## Summary of Experience and Proposed Assumption

| | | | Rates | | | Disabilities | |
|---|---|---|---|---|---|---|---|
| Age | Disabilities | Exposure | Crude | Present | Proposed | Present | Proposed |
| 25-29 | 0 | 2,575 | 0.0000 | 0.0005 | 0.0005 | 1 | 1 |
| 30-34 | 1 | 11,524 | 0.0001 | 0.0003 | 0.0003 | 4 | 4 |
| 35-39 | 3 | 11,437 | 0.0003 | 0.0004 | 0.0004 | 5 | 5 |
| 40-44 | 10 | 13,141 | 0.0008 | 0.0009 | 0.0009 | 12 | 12 |
| 45-49 | 21 | 21,468 | 0.0010 | 0.0014 | 0.0014 | 30 | 30 |
| 50-54 | 58 | 19,980 | 0.0029 | 0.0034 | 0.0034 | 69 | 69 |
| 55 and over | 59 | 10,534 | 0.0056 | 0.0050 | 0.0050 | 53 | 53 |
| Totals | 152 | 90,659 | 0.0017 | 0.0019 | 0.0019 | 174 | 174 |
| Ref | | | | 135x0.5 | 135x0.5 | | |



# SECTION E

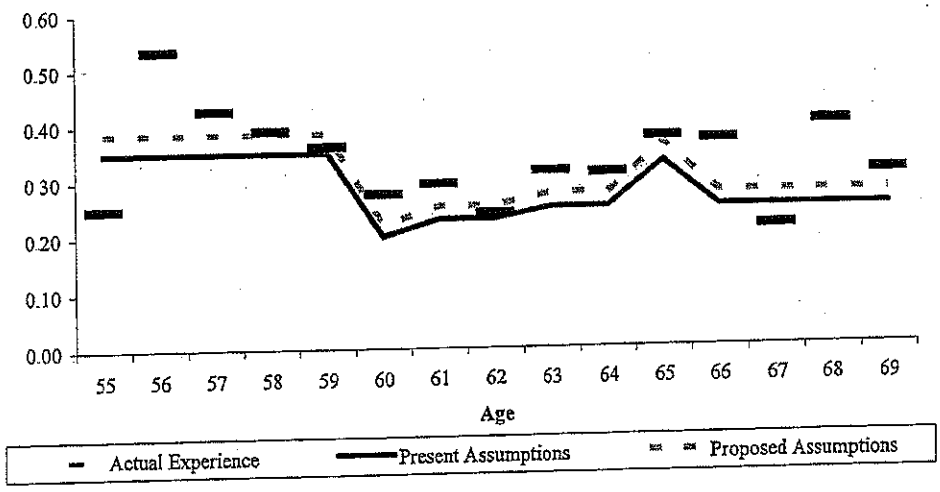
## Retirement Experience

# RETIREMENT EXPERIENCE
## MALE MEMBERS ELIGIBLE FOR UNREDUCED AGE AND SERVICE RETIREMENT

There were 1,688 unreduced age and service retirements for eligible male members compared to 1,424 anticipated based on the current assumption during the five year period under review. We propose that more unreduced age and service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 55 | 5 | 28 | 0.1786 | 0.2500 | 0.2750 | 7 | 8 |
| 55 | 3 | 12 | 0.2500 | 0.3500 | 0.3850 | 4 | 5 |
| 56 | 31 | 58 | 0.5345 | 0.3500 | 0.3850 | 20 | 22 |
| 57 | 194 | 454 | 0.4273 | 0.3500 | 0.3850 | 159 | 175 |
| 58 | 256 | 655 | 0.3908 | 0.3500 | 0.3850 | 229 | 252 |
| 59 | 225 | 622 | 0.3617 | 0.3500 | 0.3850 | 218 | 239 |
| 60 | 297 | 1,077 | 0.2758 | 0.2000 | 0.2200 | 215 | 237 |
| 61 | 202 | 688 | 0.2936 | 0.2300 | 0.2530 | 158 | 174 |
| 62 | 109 | 454 | 0.2401 | 0.2300 | 0.2530 | 104 | 115 |
| 63 | 103 | 327 | 0.3150 | 0.2500 | 0.2750 | 82 | 90 |
| 64 | 65 | 209 | 0.3110 | 0.2500 | 0.2750 | 52 | 57 |
| 65 | 51 | 136 | 0.3750 | 0.3300 | 0.3630 | 45 | 49 |
| 66 | 31 | 84 | 0.3690 | 0.2500 | 0.2750 | 21 | 23 |
| 67 | 12 | 56 | 0.2143 | 0.2500 | 0.2750 | 14 | 15 |
| 68 | 18 | 45 | 0.4000 | 0.2500 | 0.2750 | 11 | 12 |
| 69 | 9 | 29 | 0.3103 | 0.2500 | 0.2750 | 7 | 8 |
| Totals | 1,611 | 4,934 | | | | 1,346 | 1,481 |
| 70 & Over* | 77 | 78 | 0.9872 | 1.0000 | 1.0000 | 78 | 78 |
| Total | 1,688 | 5,012 | | 804x1 | 804x1.1 | 1,424 | 1,559 |



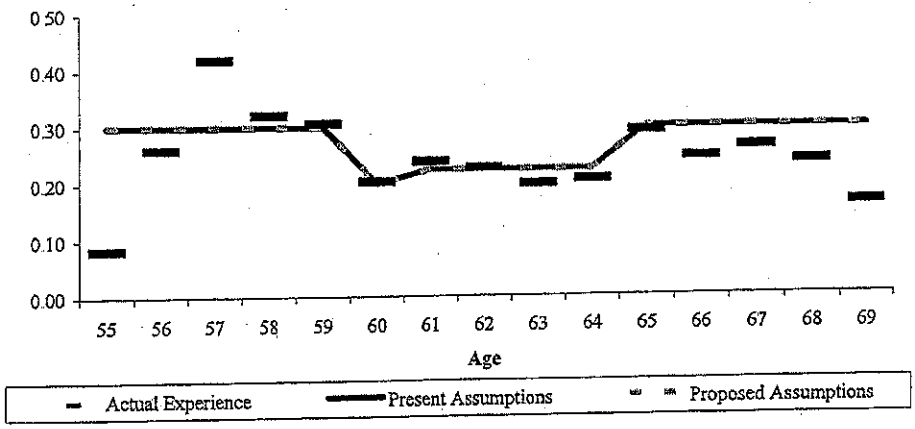

* *Present and proposed rates equal 1.000.*

# RETIREMENT EXPERIENCE
## FEMALE MEMBERS ELIGIBLE FOR UNREDUCED AGE AND SERVICE RETIREMENT

There were 2,468 unreduced age and service retirements for eligible female members compared to 2,537 anticipated based on the current assumption during the five year period under review. We propose that no change in unreduced age and service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 55 | 12 | 286 | 0.0420 | 0.1500 | 0.1500 | 43 | 43 |
| 55 | 9 | 108 | 0.0833 | 0.3000 | 0.3000 | 32 | 32 |
| 56 | 43 | 165 | 0.2606 | 0.3000 | 0.3000 | 50 | 50 |
| 57 | 329 | 782 | 0.4207 | 0.3000 | 0.3000 | 235 | 235 |
| 58 | 234 | 728 | 0.3214 | 0.3000 | 0.3000 | 218 | 218 |
| 59 | 175 | 570 | 0.3070 | 0.3000 | 0.3000 | 171 | 171 |
| 60 | 408 | 2,000 | 0.2040 | 0.2000 | 0.2000 | 400 | 400 |
| 61 | 341 | 1,427 | 0.2390 | 0.2250 | 0.2250 | 321 | 321 |
| 62 | 236 | 1,038 | 0.2274 | 0.2250 | 0.2250 | 234 | 234 |
| 63 | 149 | 750 | 0.1987 | 0.2250 | 0.2250 | 169 | 169 |
| 64 | 119 | 575 | 0.2070 | 0.2250 | 0.2250 | 129 | 129 |
| 65 | 130 | 445 | 0.2921 | 0.3000 | 0.3000 | 134 | 134 |
| 66 | 79 | 322 | 0.2453 | 0.3000 | 0.3000 | 97 | 97 |
| 67 | 64 | 243 | 0.2634 | 0.3000 | 0.3000 | 73 | 73 |
| 68 | 43 | 181 | 0.2376 | 0.3000 | 0.3000 | 54 | 54 |
| 69 | 20 | 122 | 0.1639 | 0.3000 | 0.3000 | 37 | 37 |
| Totals | 2,391 | 9,742 | | | | 2,397 | 2,397 |
| 70 & Over* | 77 | 351 | 0.2194 | 0.4000 | 0.4000 | 140 | 140 |
| Total | 2,468 | 10,093 | | 805 | 805 | 2,537 | 2,537 |



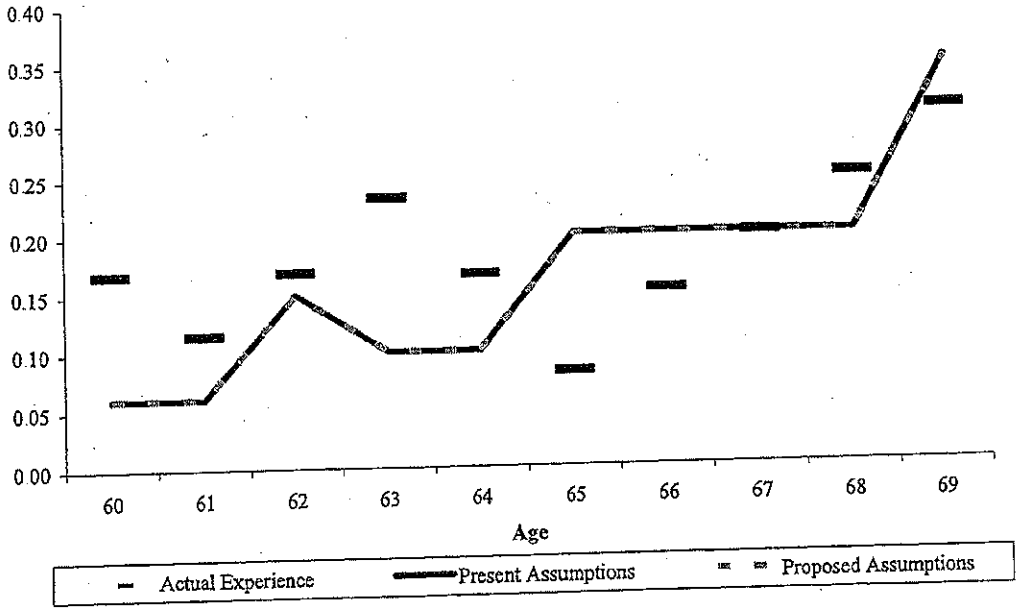

* *Present and proposed rates equal 0.4000 until age 80 when the rate becomes 1.000.*

# RETIREMENT EXPERIENCE
## MALE MEMBERS ELIGIBLE FOR PRORATABLE AGE AND SERVICE RETIREMENT

There were 86 proratable age and service retirements for eligible male members compared to 70 anticipated based on the current assumption during the five year period under review. We propose that no change in proratable age and service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| 60 | 20 | 119 | 0.1681 | 0.0600 | 0.0600 | 7 | 7 |
| 61 | 10 | 87 | 0.1149 | 0.0600 | 0.0600 | 5 | 5 |
| 62 | 13 | 77 | 0.1688 | 0.1500 | 0.1500 | 12 | 12 |
| 63 | 14 | 60 | 0.2333 | 0.1000 | 0.1000 | 6 | 6 |
| 64 | 8 | 48 | 0.1667 | 0.1000 | 0.1000 | 5 | 5 |
| 65 | 3 | 37 | 0.0811 | 0.2000 | 0.2000 | 7 | 7 |
| 66 | 5 | 33 | 0.1515 | 0.2000 | 0.2000 | 7 | 7 |
| 67 | 4 | 20 | 0.2000 | 0.2000 | 0.2000 | 4 | 4 |
| 68 | 4 | 16 | 0.2500 | 0.2000 | 0.2000 | 3 | 3 |
| 69 | 4 | 13 | 0.3077 | 0.3500 | 0.3500 | 5 | 5 |
| Totals | 85 | 510 | | | | 61 | 61 |
| 70 & Over | 1 | 26 | 0.0385 | 0.3500 | 0.3500 | 9 | 9 |
| Total | 86 | 536 | | 806 sb0 | 806 sb0 | 70 | 70 |



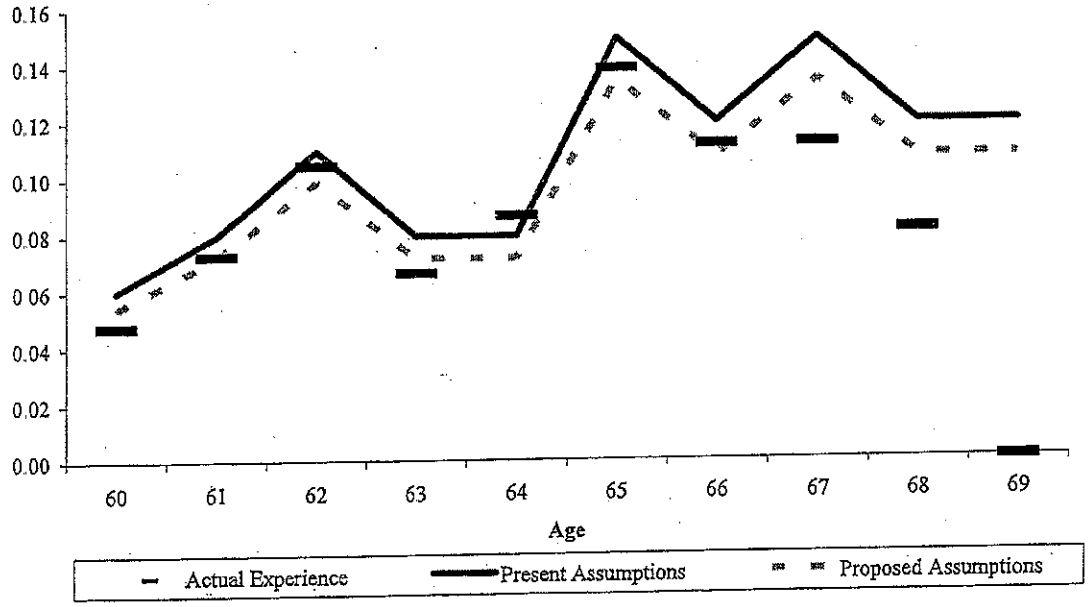

* *Proposed rates over age 70 are in Section H.*

## RETIREMENT EXPERIENCE
## FEMALE MEMBERS ELIGIBLE FOR PRORATABLE AGE & SERVICE RETIREMENT

There were 229 proratable age & service retirements for eligible female members compared to 263 anticipated based on the current assumption during the five year period under review. We propose that fewer proratable age & service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| 60 | 40 | 841 | 0.0476 | 0.0600 | 0.0540 | 50 | 45 |
| 61 | 45 | 618 | 0.0728 | 0.0800 | 0.0720 | 49 | 44 |
| 62 | 49 | 467 | 0.1049 | 0.1100 | 0.0990 | 51 | 46 |
| 63 | 21 | 315 | 0.0667 | 0.0800 | 0.0720 | 25 | 23 |
| 64 | 18 | 207 | 0.0870 | 0.0800 | 0.0720 | 17 | 15 |
| 65 | 22 | 158 | 0.1392 | 0.1500 | 0.1350 | 24 | 21 |
| 66 | 13 | 116 | 0.1121 | 0.1200 | 0.1080 | 14 | 13 |
| 67 | 9 | 80 | 0.1125 | 0.1500 | 0.1350 | 12 | 11 |
| 68 | 4 | 49 | 0.0816 | 0.1200 | 0.1080 | 6 | 5 |
| 69 | - | 34 | 0.0000 | 0.1200 | 0.1080 | 4 | 4 |
| Totals | 221 | 2,885 | | | | 252 | 227 |
| 70 & Over* | 8 | 90 | 0.0889 | 0.1200 | 0.1080 | 11 | 10 |
| Total | 229 | 2,975 | | 807x1 | 807x0.9 | 263 | 237 |



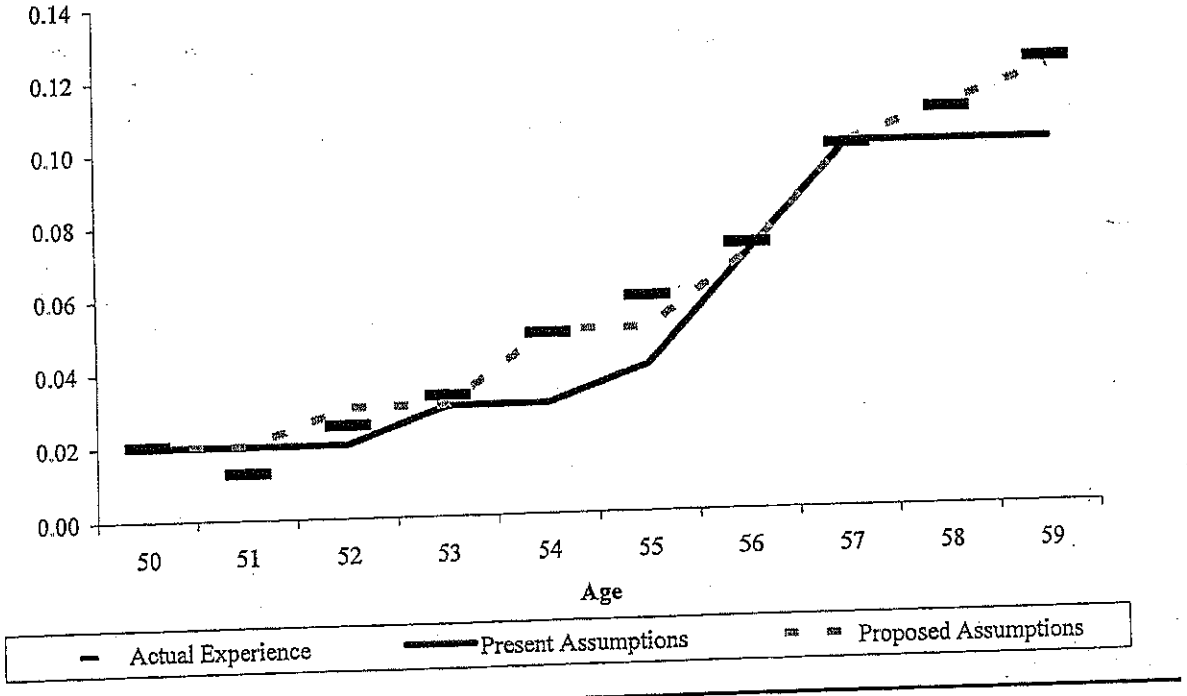

* *Proposed rates over age 70 are in Section H.*

# RETIREMENT EXPERIENCE
## MALE MEMBERS ELIGIBLE FOR EARLY AGE AND SERVICE RETIREMENT

There were 1,088 early age and service retirements for eligible male members compared to 916 anticipated based on the current assumption during the five year period under review. We propose that fewer early age and service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 50 | 61 | 993 | 0.0614 | 0.0200 | 0.0400 | 20 | 40 |
| 50 | 17 | 835 | 0.0204 | 0.0200 | 0.0200 | 17 | 17 |
| 51 | 14 | 1,102 | 0.0127 | 0.0200 | 0.0200 | 22 | 22 |
| 52 | 36 | 1,432 | 0.0251 | 0.0200 | 0.0300 | 29 | 43 |
| 53 | 59 | 1,801 | 0.0328 | 0.0300 | 0.0300 | 54 | 54 |
| 54 | 105 | 2,137 | 0.0491 | 0.0300 | 0.0500 | 64 | 107 |
| 55 | 152 | 2,588 | 0.0587 | 0.0400 | 0.0500 | 104 | 129 |
| 56 | 185 | 2,548 | 0.0726 | 0.0700 | 0.0700 | 178 | 178 |
| 57 | 198 | 1,993 | 0.0993 | 0.1000 | 0.1000 | 199 | 199 |
| 58 | 149 | 1,368 | 0.1089 | 0.1000 | 0.1100 | 137 | 150 |
| 59 | 112 | 916 | 0.1223 | 0.1000 | 0.1200 | 92 | 110 |
| Totals | 1,088 | 17,713 | | 808 | 1094 | 916 | 1,049 |

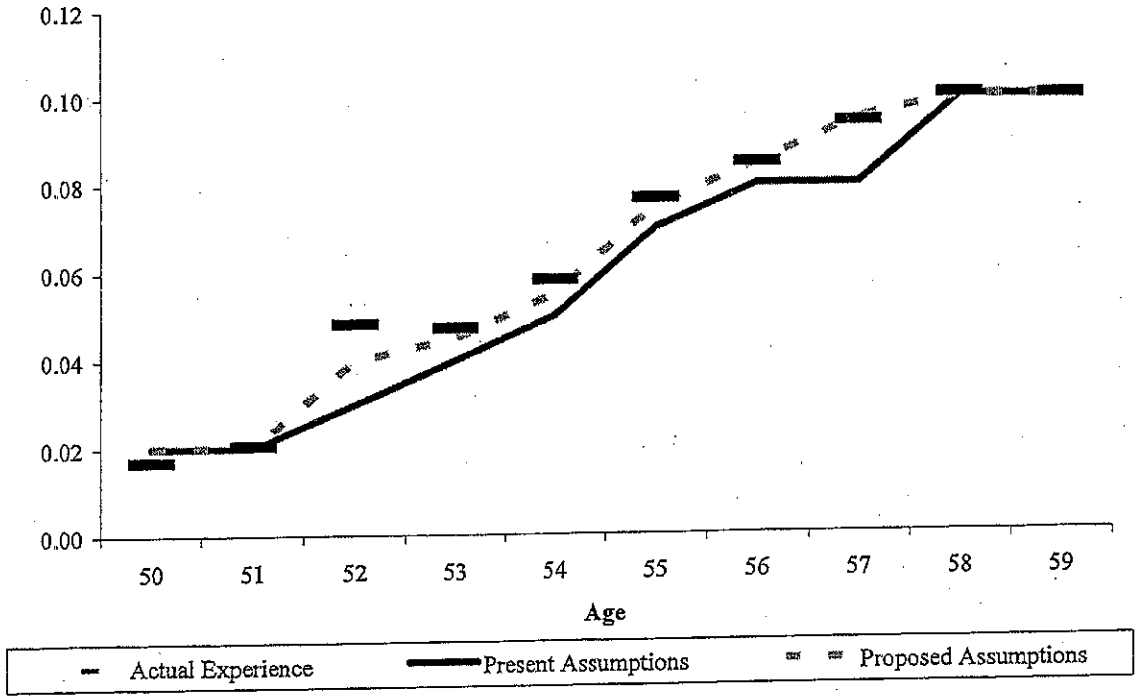


# RETIREMENT EXPERIENCE
## FEMALE MEMBERS ELIGIBLE FOR EARLY AGE AND SERVICE RETIREMENT

There were 2,195 early age and service retirements for eligible female members compared to 1,823 anticipated based on the current assumption during the five year period under review. We propose that more early age and service retirements be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected Retirements | |
|---|---|---|---|---|---|---|---|
| Age | Retirements | Exposure | Crude | Present | Proposed | Present | Proposed |
| Under 50 | 227 | 2,621 | 0.0866 | 0.0200 | 0.0400 | 52 | 105 |
| 50 | 34 | 1,995 | 0.0170 | 0.0200 | 0.0200 | 40 | 40 |
| 51 | 52 | 2,521 | 0.0206 | 0.0200 | 0.0200 | 50 | 50 |
| 52 | 144 | 2,976 | 0.0484 | 0.0300 | 0.0400 | 89 | 119 |
| 53 | 152 | 3,207 | 0.0474 | 0.0400 | 0.0450 | 128 | 144 |
| 54 | 195 | 3,348 | 0.0582 | 0.0500 | 0.0550 | 167 | 184 |
| 55 | 333 | 4,332 | 0.0769 | 0.0700 | 0.0750 | 303 | 325 |
| 56 | 343 | 4,038 | 0.0849 | 0.0800 | 0.0850 | 323 | 343 |
| 57 | 283 | 3,001 | 0.0943 | 0.0800 | 0.0950 | 240 | 285 |
| 58 | 239 | 2,380 | 0.1004 | 0.1000 | 0.1000 | 238 | 238 |
| 59 | 193 | 1,928 | 0.1001 | 0.1000 | 0.1000 | 193 | 193 |
| Totals | 2,195 | 32,347 | | 809 | 1095 | 1,823 | 2,026 |



# SECTION F

## Mortality Experience

# RETIRED LIFE MORTALITY STUDY
# 2001-2005

The retired life mortality study was performed with a file matching technique that tracks each individual record reported to the actuary year-to-year throughout the experience period. If a record is found in the valuation data in one year, and not in the following year, the person is treated as having died during the year. The study included non-disabled retirees and their beneficiaries.

Small adjustments were made to both male and female rates to provide a better fit to the experience of CSTRS and provide a small margin for future improvements in life expectancy.

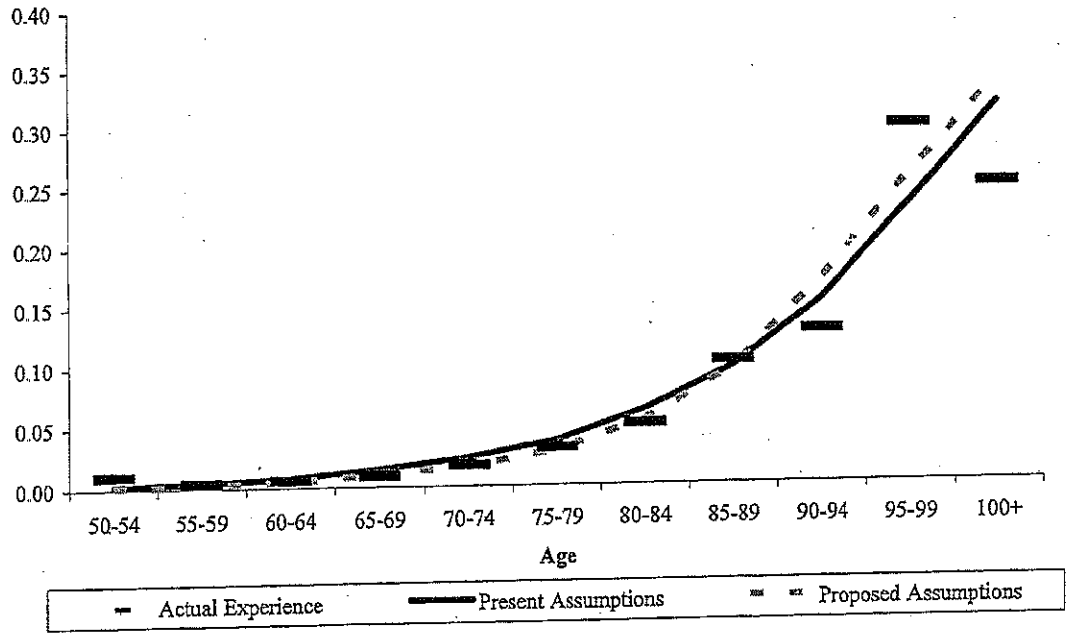
Details of the study are reported on the following pages.

# RETIRED LIFE MORTALITY
## MALE MEMBERS

There were 640 deaths among male benefit recipients compared to 786 anticipated based on the current assumption during the five year period under review. We propose that fewer deaths be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected | |
|---|---|---|---|---|---|---|---|
| Age | Deaths | Exposure | Crude | Present | Proposed | Present | Proposed |
| 50-54 | 1 | 95 | 0.0105 | 0.0026 | 0.0015 | - | - |
| 55-59 | 10 | 2,252 | 0.0044 | 0.0044 | 0.0025 | 10 | 6 |
| 60-64 | 45 | 7,300 | 0.0062 | 0.0080 | 0.0050 | 58 | 36 |
| 65-69 | 68 | 7,446 | 0.0091 | 0.0145 | 0.0097 | 108 | 73 |
| 70-74 | 124 | 7,092 | 0.0175 | 0.0237 | 0.0167 | 168 | 118 |
| 75-79 | 150 | 4,782 | 0.0314 | 0.0372 | 0.0289 | 178 | 138 |
| 80-84 | 108 | 2,132 | 0.0507 | 0.0620 | 0.0532 | 132 | 113 |
| 85-89 | 79 | 772 | 0.1023 | 0.0972 | 0.0969 | 75 | 75 |
| 90-94 | 32 | 251 | 0.1275 | 0.1529 | 0.1700 | 38 | 43 |
| 95-99 | 21 | 70 | 0.3000 | 0.2336 | 0.2575 | 16 | 18 |
| 100+ | 2 | 8 | 0.2500 | 0.3172 | 0.3381 | 3 | 3 |
| Totals | 640 | 32,200 | 0.0199 | 0.0244 | 0.0193 | 786 | 623 |
| | | | | #261x1sb2 | #456x1sb2 | | |

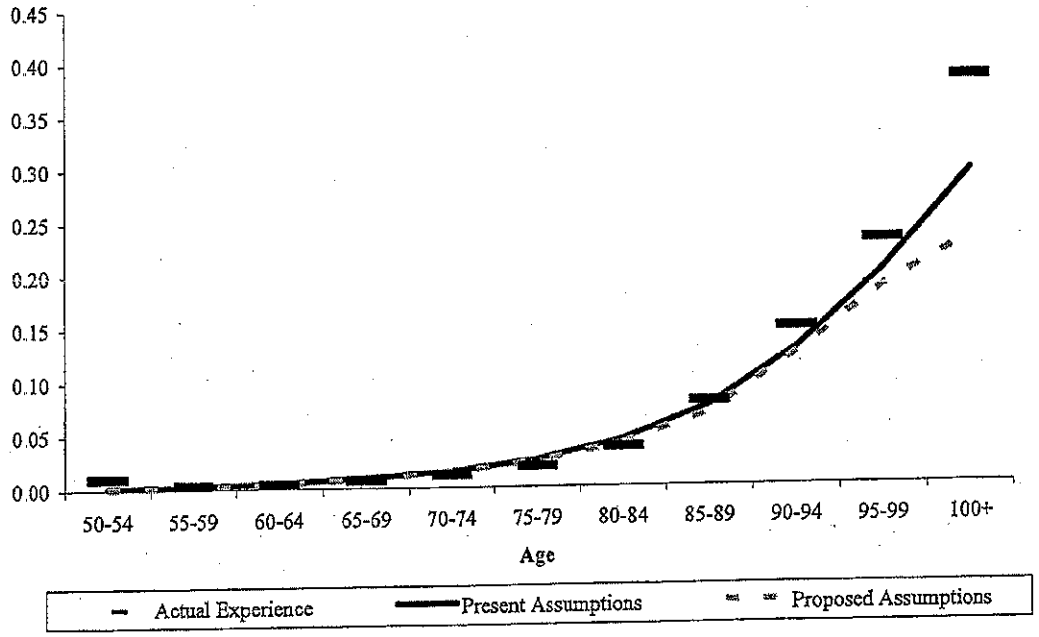


# RETIRED LIFE MORTALITY
## FEMALE MEMBERS

There were 1,549 deaths among female benefit recipients compared to 1,591 anticipated based on the current assumption during the five year period under review. We propose that fewer deaths be assumed for future valuations as summarized below.

### Summary of Experience and Proposed Assumption

| | | | Rates | | | Expected | | |
|---|---|---|---|---|---|---|---|---|
| Age | Deaths | Exposure | Crude | Present | Proposed | Present | Proposed | |
| 50-54 | 3 | 290 | 0.0103 | 0.0016 | 0.0012 | - | - | - |
| 55-59 | 13 | 3,578 | 0.0036 | 0.0026 | 0.0023 | 9 | 8 | 0.6154 |
| 60-64 | 42 | 9,690 | 0.0043 | 0.0051 | 0.0046 | 49 | 45 | 1.0714 |
| 65-69 | 85 | 11,179 | 0.0076 | 0.0097 | 0.0088 | 108 | 99 | 1.1647 |
| 70-74 | 128 | 10,735 | 0.0119 | 0.0150 | 0.0152 | 161 | 163 | 1.2734 |
| 75-79 | 159 | 8,310 | 0.0191 | 0.0253 | 0.0241 | 210 | 201 | 1.2642 |
| 80-84 | 205 | 5,566 | 0.0368 | 0.0440 | 0.0401 | 245 | 223 | 1.0878 |
| 85-89 | 291 | 3,663 | 0.0794 | 0.0753 | 0.0691 | 276 | 253 | 0.8694 |
| 90-94 | 355 | 2,379 | 0.1492 | 0.1288 | 0.1244 | 306 | 296 | 0.8338 |
| 95-99 | 199 | 859 | 0.2317 | 0.2025 | 0.1872 | 174 | 161 | 0.8090 |
| 100+ | 69 | 179 | 0.3855 | 0.2966 | 0.2330 | 53 | 42 | 0.6087 |
| Totals | 1,549 | 56,428 | 0.0275 | 0.0282 | 0.0264 | 1,591 | 1,491 | |
| | | | | #262x1sb1 | #457x1sb2 | | | |



## ACTIVE LIFE MORTALITY - MALES

| Sample Attained Ages | Future Life Expectancy (years) | | Members Dying Within Next Year | |
|---|---|---|---|---|
| | Present | Proposed | Present | Proposed |
| 25 | 59.49 | 61.45 | 0.04% | 0.02% |
| 30 | 54.63 | 56.52 | 0.06% | 0.03% |
| 35 | 49.79 | 51.60 | 0.06% | 0.04% |
| 40 | 44.94 | 46.73 | 0.07% | 0.06% |
| 45 | 40.11 | 41.88 | 0.10% | 0.08% |
| 50 | 35.34 | 37.06 | 0.16% | 0.10% |
| 55 | 30.66 | 32.26 | 0.27% | 0.15% |
| 60 | 26.14 | 27.55 | 0.47% | 0.29% |
| 65 | 21.86 | 23.03 | 0.86% | 0.57% |
| 70 | 17.95 | 18.81 | 1.49% | 1.03% |
| | #261x0.75sb2 | #456x0.75sb2 | | |

## ACTIVE LIFE MORTALITY - FEMALES

| Sample Attained Ages | Future Life Expectancy (years) | | Members Dying Within Next Year | |
|---|---|---|---|---|
| | Present | Proposed | Present | Proposed |
| 25 | 62.96 | 63.85 | 0.02% | 0.01% |
| 30 | 58.02 | 58.89 | 0.02% | 0.01% |
| 35 | 53.10 | 53.94 | 0.03% | 0.02% |
| 40 | 48.20 | 49.01 | 0.05% | 0.03% |
| 45 | 43.33 | 44.11 | 0.07% | 0.05% |
| 50 | 38.49 | 39.23 | 0.10% | 0.08% |
| 55 | 33.70 | 34.41 | 0.16% | 0.13% |
| 60 | 29.01 | 29.69 | 0.29% | 0.27% |
| 65 | 24.53 | 25.17 | 0.57% | 0.52% |
| 70 | 20.34 | 20.94 | 0.95% | 0.92% |
| | #262x0.75sb1 | #457x0.75sb2 | | |

Active member mortality rates were not explicitly studied. It is often very difficult to differentiate, in the data, between deaths and other terminations. This may be due to the fact that members with impaired health often leave active employment before death occurs (e.g., some become non-vested terminations or disability retirees). The proposed mortality rates are based on the same mortality table as is recommended for retired life mortality. In aggregate, the tables include a small margin for future increases in life expectancy.

# SECTION G

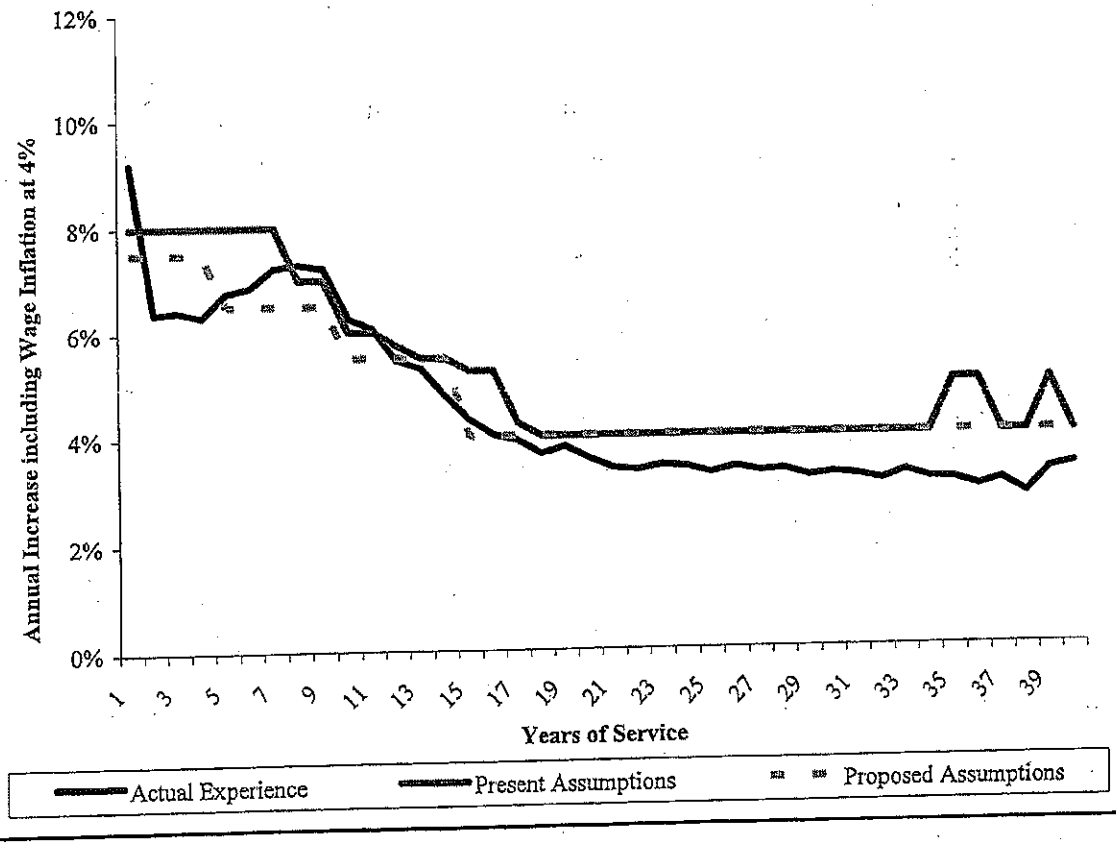
## Salary Increases

# SALARY INCREASES

The salary scale is used to project current pays for the purpose of benefit determinations. It has two components; an increase due to wage inflation and an increase due to merit and seniority. The merit and seniority component of the salary scale will produce variations in the salary scale based on years of service. The wage inflation remains constant for different years of service and will push the entire curve up or down by a uniform amount.

In the previous experience study, we proposed (and the Board adopted) a switch from an age-based merit and seniority component to service-based. Our analysis of the data for the experience period indicates that the service-based merit and seniority increases are still appropriate. (Please note that we eliminated the 2001 experience from our salary analysis, since it was previously reported by CSTRS Staff that 2001 data included additional pay amounts reported later in the 2001 calendar year.) We made small (generally downward) adjustments in the service-based rates to more closely reflect experience over the study period.

In the graph below and in the related table on the next page, a 4% wage inflation assumption has been added to the proposed merit and seniority component of the salary scale. The resulting scale produces an average wage increase that is close to that experienced over the study period.



# SALARY INCREASES

| Service | Exposure Years | Total Change Actual | Proposed Rate Including 4.00% Wage Inflation | Proposed Rate Merit and Seniority Rate Only |
|---|---|---|---|---|
| 1 | 12,256 | 9.20% | 7.50% | 3.50% |
| 2 | 12,340 | 6.37% | 7.50% | 3.50% |
| 3 | 11,254 | 6.42% | 7.50% | 3.50% |
| 4 | 10,206 | 6.31% | 7.50% | 3.50% |
| 5 | 8,912 | 6.76% | 6.50% | 2.50% |
| 6 | 7,618 | 6.87% | 6.50% | 2.50% |
| 7 | 6,657 | 7.24% | 6.50% | 2.50% |
| 8 | 5,802 | 7.30% | 6.50% | 2.50% |
| 9 | 5,236 | 7.22% | 6.50% | 2.50% |
| 10 | 4,269 | 6.26% | 5.50% | 1.50% |
| 11 | 3,969 | 6.06% | 5.50% | 1.50% |
| 12 | 3,777 | 5.46% | 5.50% | 1.50% |
| 13 | 3,931 | 5.30% | 5.50% | 1.50% |
| 14 | 4,555 | 4.77% | 5.50% | 1.50% |
| 15 | 4,853 | 4.33% | 4.00% | 0.00% |
| 16 | 4,941 | 4.03% | 4.00% | 0.00% |
| 17 | 4,869 | 3.93% | 4.00% | 0.00% |
| 18 | 4,185 | 3.67% | 4.00% | 0.00% |
| 19 | 3,769 | 3.79% | 4.00% | 0.00% |
| 20 | 3,280 | 3.57% | 4.00% | 0.00% |
| 21 | 3,271 | 3.38% | 4.00% | 0.00% |
| 22 | 3,446 | 3.33% | 4.00% | 0.00% |
| 23 | 3,733 | 3.42% | 4.00% | 0.00% |
| 24 | 3,877 | 3.38% | 4.00% | 0.00% |
| 25 | 3,727 | 3.26% | 4.00% | 0.00% |
| 26 | 3,537 | 3.38% | 4.00% | 0.00% |
| 27 | 3,602 | 3.28% | 4.00% | 0.00% |
| 28 | 3,809 | 3.32% | 4.00% | 0.00% |
| 29 | 4,105 | 3.18% | 4.00% | 0.00% |
| 30 | 4,063 | 3.23% | 4.00% | 0.00% |
| 31 | 4,001 | 3.20% | 4.00% | 0.00% |
| 32 | 3,837 | 3.09% | 4.00% | 0.00% |
| 33 | 3,336 | 3.25% | 4.00% | 0.00% |
| 34 | 2,614 | 3.12% | 4.00% | 0.00% |
| 35 | 1,395 | 3.10% | 4.00% | 0.00% |
| 36 | 839 | 2.96% | 4.00% | 0.00% |
| 37 | 455 | 3.07% | 4.00% | 0.00% |
| 38 | 242 | 2.81% | 4.00% | 0.00% |
| 39 | 160 | 3.27% | 4.00% | 0.00% |
| 40 | 81 | 3.36% | 4.00% | 0.00% |
| Weighted Average Rate, All Years | | **5.31%** | **5.53%** | 4 |

# SECTION H

## Detailed Listing of Proposed Assumptions

# PROPOSED SERVICE BASED AND AGE BASED TERMINATIONS RATES

| % of Active Participants Withdrawing | | | | | |
|---|---|---|---|---|---|
| Service-Based Terminations | | | Age-Based Termination | | |
| Service | Male | Female | Age | Male | Female |
| 0-1 | 0.1400 | 0.1200 | 25 | 0.0120 | 0.0350 |
| 1-2 | 0.0850 | 0.0900 | 26 | 0.0120 | 0.0350 |
| 2-3 | 0.0550 | 0.0700 | 27 | 0.0120 | 0.0350 |
| 3-4 | 0.0450 | 0.0600 | 28 | 0.0120 | 0.0350 |
| 4-5 | 0.0350 | 0.0550 | 29 | 0.0120 | 0.0350 |
| 5-6 | 0.0250 | 0.0500 | 30 | 0.0120 | 0.0350 |
| 6-7 | 0.0240 | 0.0450 | 31 | 0.0120 | 0.0350 |
| 7-8 | 0.0230 | 0.0350 | 32 | 0.0120 | 0.0350 |
| 8-9 | 0.0220 | 0.0300 | 33 | 0.0120 | 0.0350 |
| 9-10 | 0.0210 | 0.0250 | 34 | 0.0120 | 0.0350 |
| | | | 35 | 0.0120 | 0.0350 |
| | | | 36 | 0.0120 | 0.0350 |
| | | | 37 | 0.0120 | 0.0350 |
| | | | 38 | 0.0120 | 0.0310 |
| | | | 39 | 0.0120 | 0.0270 |
| | | | 40 | 0.0120 | 0.0230 |
| | | | 41 | 0.0120 | 0.0190 |
| | | | 42 | 0.0120 | 0.0160 |
| | | | 43 | 0.0122 | 0.0150 |
| | | | 44 | 0.0124 | 0.0140 |
| | | | 45 | 0.0126 | 0.0130 |
| | | | 46 | 0.0128 | 0.0120 |
| | | | 47 | 0.0130 | 0.0110 |
| | | | 48 | 0.0152 | 0.0115 |
| | | | 49 | 0.0174 | 0.0120 |
| | | | 50 | 0.0196 | 0.0125 |
| | | | 51 | 0.0218 | 0.0130 |
| | | | 52 | 0.0240 | 0.0130 |
| | | | 53 | 0.0272 | 0.0140 |
| | | | 54 | 0.0304 | 0.0150 |
| | | | 55 | 0.0336 | 0.0160 |
| | | | 56 | 0.0368 | 0.0170 |
| | | | 57 | 0.0400 | 0.0180 |
| | | | 58 | 0.0400 | 0.0180 |
| | | | 59 | 0.0400 | 0.0190 |
| Sw | 407 | 408 | Wx | 735 | 736 |

# PROPOSED DISABILITY RATES

| Age | % of Active Participants Becoming Disabled | |
|---|---|---|
| | Male | Female |
| 20 | 0 0455% | 0.0500% |
| 21 | 0.0455% | 0.0500% |
| 22 | 0.0455% | 0.0500% |
| 23 | 0.0455% | 0.0500% |
| 24 | 0.0455% | 0.0500% |
| 25 | 0.0455% | 0.0500% |
| 26 | 0.0455% | 0.0500% |
| 27 | 0.0455% | 0.0500% |
| 28 | 0.0455% | 0.0470% |
| 29 | 0 0455% | 0.0440% |
| 30 | 0.0455% | 0.0410% |
| 31 | 0.0455% | 0.0380% |
| 32 | 0.0455% | 0.0350% |
| 33 | 0.0455% | 0.0370% |
| 34 | 0.0455% | 0.0390% |
| 35 | 0.0455% | 0.0410% |
| 36 | 0.0455% | 0.0430% |
| 37 | 0.0455% | 0.0450% |
| 38 | 0.0520% | 0.0540% |
| 39 | 0.0650% | 0.0630% |
| 40 | 0 0715% | 0.0720% |
| 41 | 0.0845% | 0.0810% |
| 42 | 0.1040% | 0.0900% |
| 43 | 0.1170% | 0.1000% |
| 44 | 0 1430% | 0.1100% |
| 45 | 0.1625% | 0.1200% |
| 46 | 0.1820% | 0.1300% |
| 47 | 0.2015% | 0.1400% |
| 48 | 0.2340% | 0.1810% |
| 49 | 0 2730% | 0.2220% |
| 50 | 0.3250% | 0.2630% |
| 51 | 0.3900% | 0.3040% |
| 52 | 0.4615% | 0.3450% |
| 53 | 0.5330% | 0.3760% |
| 54 | 0.6175% | 0.4070% |
| 55 | 0.7150% | 0.4380% |
| 56 | 0.8320% | 0.4690% |
| 57 | 0.9490% | 0.5000% |
| 58 | 1.0790% | 0.5000% |
| 59 | 1.2805% | 0.5000% |
| 60 | 1.2805% | 0.5000% |
| Ref | 312 | 135 |
| Mult | 0.65 | 0.5 |

# PROPOSED RETIREMENT RATES

| | % of Active Participants Retiring | | | | | |
|---|---|---|---|---|---|---|
| | Unreduced | | Proratable | | Reduced | |
| Age | Male | Female | Male | Female | Male | Female |
| 50 | 27.50% | 15.00% | | | 2.00% | 2.00% |
| 51 | 27.50% | 15.00% | | | 2.00% | 2.00% |
| 52 | 27.50% | 15.00% | | | 3.00% | 4.00% |
| 53 | 27.50% | 15.00% | | | 3.00% | 4.50% |
| 54 | 27.50% | 15.00% | | | 5.00% | 5.50% |
| 55 | 38.50% | 30.00% | | | 5.00% | 7.50% |
| 56 | 38.50% | 30.00% | | | 7.00% | 8.50% |
| 57 | 38.50% | 30.00% | | | 10.00% | 9.50% |
| 58 | 38.50% | 30.00% | | | 11.00% | 10.00% |
| 59 | 38.50% | 30.00% | | | 12.00% | 10.00% |
| 60 | 22.00% | 20.00% | 6.00% | 5.40% | | |
| 61 | 25.30% | 22.50% | 6.00% | 7.20% | | |
| 62 | 25.30% | 22.50% | 15.00% | 9.90% | | |
| 63 | 27.50% | 22.50% | 10.00% | 7.20% | | |
| 64 | 27.50% | 22.50% | 10.00% | 7.20% | | |
| 65 | 36.30% | 30.00% | 20.00% | 13.50% | | |
| 66 | 27.50% | 30.00% | 20.00% | 10.80% | | |
| 67 | 27.50% | 30.00% | 20.00% | 13.50% | | |
| 68 | 27.50% | 30.00% | 20.00% | 10.80% | | |
| 69 | 27.50% | 30.00% | 35.00% | 10.80% | | |
| 70 | 100.00% | 40.00% | 35.00% | 10.80% | | |
| 71 | 100.00% | 40.00% | 35.00% | 10.80% | | |
| 72 | 100.00% | 40.00% | 35.00% | 10.80% | | |
| 73 | 100.00% | 40.00% | 35.00% | 10.80% | | |
| 74 | 100.00% | 40.00% | 35.00% | 18.00% | | |
| 75 | 100.00% | 40.00% | 40.00% | 18.00% | | |
| 76 | 100.00% | 40.00% | 40.00% | 18.00% | | |
| 77 | 100.00% | 40.00% | 40.00% | 18.00% | | |
| 78 | 100.00% | 40.00% | 40.00% | 18.00% | | |
| 79 | 100.00% | 40.00% | 40.00% | 18.00% | | |
| 80 | 100.00% | 100.00% | 40.00% | 18.00% | | |
| Ref | 804 | 805 | 806 | 807 | 1094 | 1095 |
| Anch | 50 | 50 | 60 | 60 | 45 | 45 |
| Mult | 1.1 | 1 | 1 | 0 9 | 1 | 1 |

# PROPOSED RETIRED MORTALITY RATES

| Age | % Dying Next Year | |
|---|---|---|
| | Male | Female |
| 50 | 0.1369% | 0.1015% |
| 51 | 0.1440% | 0.1098% |
| 52 | 0.1514% | 0.1210% |
| 53 | 0.1701% | 0.1363% |
| 54 | 0.1817% | 0.1544% |
| 55 | 0.1986% | 0.1755% |
| 56 | 0.2177% | 0.2003% |
| 57 | 0.2517% | 0.2332% |
| 58 | 0.2974% | 0.2756% |
| 59 | 0.3388% | 0.3162% |
| 60 | 0.3881% | 0.3567% |
| 61 | 0.4376% | 0.4038% |
| 62 | 0.4966% | 0.4596% |
| 63 | 0.5760% | 0.5286% |
| 64 | 0.6571% | 0.6052% |
| 65 | 0.7659% | 0.6953% |
| 66 | 0.8629% | 0.7836% |
| 67 | 0.9744% | 0.8824% |
| 68 | 1.1237% | 0.9959% |
| 69 | 1.2537% | 1.1058% |
| 70 | 1.3671% | 1.2224% |
| 71 | 1.5149% | 1.3510% |
| 72 | 1.6663% | 1.5221% |
| 73 | 1.8437% | 1.6572% |
| 74 | 2.0471% | 1.8432% |
| 75 | 2.2802% | 2.0100% |
| 76 | 2.5438% | 2.2277% |
| 77 | 2.8943% | 2.4128% |
| 78 | 3.2259% | 2.6583% |
| 79 | 3.6581% | 2.9844% |
| 80 | 4.1439% | 3.2898% |

| Age | % Dying Next Year | |
|---|---|---|
| | Male | Female |
| 81 | 4.6947% | 3.6320% |
| 82 | 5.3179% | 4.0147% |
| 83 | 6.0671% | 4.4435% |
| 84 | 6.9094% | 4.9260% |
| 85 | 7.7020% | 5.4696% |
| 86 | 8.7312% | 6.0831% |
| 87 | 9.6919% | 6.9078% |
| 88 | 10.7454% | 7.8529% |
| 89 | 12.1344% | 8.9273% |
| 90 | 13.6910% | 9.9435% |
| 91 | 15.1302% | 11.2543% |
| 92 | 16.9960% | 12.4375% |
| 93 | 18.5121% | 13.6580% |
| 94 | 20.4586% | 14.8872% |
| 95 | 22.0697% | 16.4072% |
| 96 | 23.6783% | 17.5976% |
| 97 | 25.7507% | 18.7249% |
| 98 | 27.3309% | 19.7713% |
| 99 | 28.8660% | 21.1187% |
| 100 | 30.9359% | 21.9730% |
| 101 | 32.3989% | 22.7030% |
| 102 | 33.8068% | 23.2996% |
| 103 | 35.8628% | 24.4834% |
| 104 | 37.1685% | 25.4498% |
| 105 | 38.3040% | 26.6044% |
| 106 | 39.2003% | 27.9055% |
| 107 | 39.7886% | 29.3116% |
| 108 | 40.0000% | 30.7811% |
| 109 | 40.0000% | 32.2725% |
| 110 | 100.0000% | 100.0000% |
| Ref | #456x1sb2 | #457x1sb2 |

# PROPOSED ACTIVE MORTALITY RATES

| Age | % Dying Next Year | |
|---|---|---|
| | Male | Female |
| 20 | 0.0164% | 0.0108% |
| 21 | 0.0173% | 0.0107% |
| 22 | 0.0180% | 0.0106% |
| 23 | 0.0190% | 0.0104% |
| 24 | 0.0198% | 0.0105% |
| 25 | 0.0210% | 0.0109% |
| 26 | 0.0220% | 0.0113% |
| 27 | 0.0233% | 0.0118% |
| 28 | 0.0253% | 0.0127% |
| 29 | 0.0260% | 0.0133% |
| 30 | 0.0268% | 0.0140% |
| 31 | 0.0281% | 0.0148% |
| 32 | 0.0303% | 0.0164% |
| 33 | 0.0340% | 0.0198% |
| 34 | 0.0383% | 0.0225% |
| 35 | 0.0431% | 0.0249% |
| 36 | 0.0479% | 0.0269% |
| 37 | 0.0527% | 0.0289% |
| 38 | 0.0574% | 0.0307% |
| 39 | 0.0616% | 0.0324% |
| 40 | 0.0645% | 0.0343% |
| 41 | 0.0670% | 0.0365% |
| 42 | 0.0695% | 0.0398% |
| 43 | 0.0721% | 0.0436% |
| 44 | 0.0753% | 0.0479% |
| 45 | 0.0790% | 0.0527% |
| 46 | 0.0833% | 0.0579% |
| 47 | 0.0882% | 0.0620% |
| 48 | 0.0927% | 0.0662% |
| 49 | 0.0976% | 0.0704% |
| 50 | 0.1027% | 0.0761% |
| 51 | 0.1080% | 0.0823% |
| 52 | 0.1136% | 0.0908% |
| 53 | 0.1276% | 0.1022% |
| 54 | 0.1363% | 0.1158% |
| 55 | 0.1489% | 0.1316% |
| 56 | 0.1633% | 0.1502% |
| 57 | 0.1888% | 0.1749% |
| 58 | 0.2231% | 0.2067% |
| 59 | 0.2541% | 0.2372% |
| 60 | 0.2911% | 0.2675% |
| 61 | 0.3282% | 0.3029% |
| 62 | 0.3725% | 0.3447% |
| 63 | 0.4320% | 0.3965% |
| 64 | 0.4928% | 0.4539% |
| 65 | 0.5744% | 0.5215% |
| Ref | #456sb2x0 75 | #457sb2x0.75 |

# PROPOSED SALARY INCREASE RATES

| Service | % Increases in Salaries Next Year | | |
|---|---|---|---|
| | Merit and Seniority | Base | Total |
| 0 | 3.50% | 4.00% | 7.50% |
| 1 | 3.50% | 4.00% | 7.50% |
| 2 | 3.50% | 4.00% | 7.50% |
| 3 | 3.50% | 4.00% | 7.50% |
| 4 | 3.50% | 4.00% | 7.50% |
| 5 | 2.50% | 4.00% | 6.50% |
| 6 | 2.50% | 4.00% | 6.50% |
| 7 | 2.50% | 4.00% | 6.50% |
| 8 | 2.50% | 4.00% | 6.50% |
| 9 | 2.50% | 4.00% | 6.50% |
| 10 | 1.50% | 4.00% | 5.50% |
| 11 | 1.50% | 4.00% | 5.50% |
| 12 | 1.50% | 4.00% | 5.50% |
| 13 | 1.50% | 4.00% | 5.50% |
| 14 | 1.50% | 4.00% | 5.50% |
| 15 | 0.00% | 4.00% | 4.00% |
| 16 | 0.00% | 4.00% | 4.00% |
| 17 | 0.00% | 4.00% | 4.00% |
| 18 | 0.00% | 4.00% | 4.00% |
| 19 | 0.00% | 4.00% | 4.00% |
| 20 | 0.00% | 4.00% | 4.00% |
| 21 | 0.00% | 4.00% | 4.00% |
| 22 | 0.00% | 4.00% | 4.00% |
| 23 | 0.00% | 4.00% | 4.00% |
| 24 | 0.00% | 4.00% | 4.00% |
| 25 | 0.00% | 4.00% | 4.00% |
| 26 | 0.00% | 4.00% | 4.00% |
| 27 | 0.00% | 4.00% | 4.00% |
| 28 | 0.00% | 4.00% | 4.00% |
| 29 | 0.00% | 4.00% | 4.00% |
| 30 | 0.00% | 4.00% | 4.00% |
| 31 | 0.00% | 4.00% | 4.00% |
| 32 | 0.00% | 4.00% | 4.00% |
| 33 | 0.00% | 4.00% | 4.00% |
| 34 | 0.00% | 4.00% | 4.00% |
| 35 | 0.00% | 4.00% | 4.00% |
| 36 | 0.00% | 4.00% | 4.00% |
| 37 | 0.00% | 4.00% | 4.00% |
| 38 | 0.00% | 4.00% | 4.00% |
| 39 | 0.00% | 4.00% | 4.00% |
| 40 | 0.00% | 4.00% | 4.00% |
| Ref | 4 | 4.00% | |