STATE EMPLOYEES RETIREMENT

Actuarial Experience Study for the period July 1, 2000 through June 30, 2004

SEGAL

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December 29, 2005

Mr. Dave Bergstrom
Minnesota State Retirement System
60 Empire Drive, Suite 300
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Dear Mr. Bergstrom:

We are pleased to submit this report on the actuarial experience of the State Employees Retirement Fund for the period July 1, 2000 through June 30, 2004. This investigation is the basis for our discussion on the proposed recommendations discovered through our analysis of the difference between actual and assumed experience. In addition, we recommend a broader, more comprehensive study on the economic assumptions.

All current actuarial assumptions and methods were reviewed as part of this study. Some of our proposed recommendations reflect changes to the assumptions and methods used in the July 1, 2004 actuarial valuation while other current assumptions and methods remain unchanged.

Our analysis was conducted in accordance with generally accepted actuarial principles as prescribed by the Actuarial Standards Board (ASB) and the American Academy of Actuaries. Additionally, the development of all assumptions contained herein are in accordance with the ASB Actuarial Standard of Practice (ASOP) No. 27 (*Selection of Economic Assumptions for Measuring Pension Obligations*) and ASOP No. 35 (*Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations*).

This study has found two areas of concern which require further discussions and analysis under a broader study. One of our findings was on the method for amortizing the Unfunded Accrued Liability. We believe that the method currently employed may create unstable contribution rates. A separate study should review all available methods and select an amortization method that best matches the long term nature of the stable benefit promise with a long term stable contribution rate.

Secondly, the economic assumptions reviewed here (investment return, inflation, salary increases, and payroll growth) have been reviewed in an aggregate context, as is the prescribed method for experience studies. However, the structure of the Fund may be exposing the Fund to risks that need to be more fully assessed with the cooperative efforts of MSRS, SBI and all related parties. There are demographic risks that may be emerging in light of the "split" of the fund between retirees and actives, as well as other possible economic risks more fully explained later in this report.

Thus, we recommend an "amortization method" study and an "economic forecast" study to be conducted before final recommendations can be issued on the matter of changing economic assumptions.

Demographic assumption changes, where applicable, are not a part of these future study recommendations, hence proposed recommendations and changes relating to demographics are presented in this report.

The undersigned actuaries are experienced with performing experience studies for large public-sector pension plans and are qualified to render the opinions contained in this report.

Sincerely,

(BR)
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I. INTRODUCTION AND SUMMARY OF KEY FINDINGS

Actuarial valuations are prepared annually to determine whether the statutory contribution rates are sufficient to fund the State Employees Retirement Fund on an actuarial reserve basis. Each actuarial valuation involves a projection of the benefits expected to be paid in the future to all members of the Fund. The projection of expected future benefit payments is based on the characteristics of members as of the valuation date, the benefit provisions in effect on that date and assumptions of future events and conditions.

The assumptions used in actuarial valuations can be grouped in two categories: (1) economic assumptions - the assumed long-term rates of investment return, salary increases and payroll growth, and (2) non-economic or demographic assumptions - the assumed rates of withdrawal, disability, retirement, and mortality. Demographic assumptions are selected primarily on the basis of recent experience, while economic assumptions rely more on a long-term perspective of expected future trends.

If actual experience exactly matches the expected experience, the actual annual cost of the Fund will equal the annual cost determined by the actuarial valuation. However, this result is virtually never achieved, due to the long-term forecast of the benefit projections and the numerous assumptions used in actuarial valuations. The Fund recognizes actuarial gains or actuarial losses each year, reflecting the net difference between actual experience and anticipated experience. Determination of the funded status is updated in connection with each actuarial valuation to reflect the net gain or loss. A pattern of gains or losses to one or more assumptions is the basis for interim changes to the assumptions. Each valuation measures the effectiveness of each assumption and allows for the monitoring of the assumptions.

We are providing to the Board proposed recommendations of the assumptions and methods used in the actuarial valuation. The Board has the ultimate responsibility for which assumptions and methods are used in the actuarial valuation. If the assumptions on an overall basis prove to be a good indicator of actual experience, the contribution rates for the current level of benefits will continue to be sufficient to meet the funding policy of the Fund. On the other hand, if the assumptions understate or overstate the actual cost of the Fund, the annual contribution rates will vary accordingly.

I. INTRODUCTION AND SUMMARY OF KEY FINDINGS (continued)

Actuarial experience studies are undertaken periodically and serve as the basis for recommended changes in actuarial assumptions and methods. A change in assumptions is recommended when it is demonstrated that the current assumptions do not accurately reflect the current trend determined from analysis of the data or anticipated future trends based upon reasonable expectations. The data analyzed is actual experience for demographic assumptions and economic forecast for economic assumptions. The Actuarial Standards Board (ASB) provides actuaries with standards of practice that provides guidance and recommendations on acceptable methods and techniques to be used in developing both economic and demographic assumptions. Specifically, these are the ASB Actuarial Standard of Practice (ASOP) No. 27 (*Selection of Economic Assumptions for Measuring Pension Obligations*) and ASOP No. 35 (*Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations*).

A change in actuarial methodology is recommended when such change adds stability to the actuarial valuation process or provides an approach that better fits the funding policy. The methods considered in this study include the actuarial cost method, the actuarial asset valuation method, and the amortization method.

This study reviews the actuarial experience of the State Employees Retirement Fund for the four-year period from July 1, 2000 through June 30, 2004, compares this experience to the current actuarial assumptions and recommends proposed changes to the assumptions as necessary. The actuarial methods used in performing the valuation are also reviewed in this study and proposed recommended changes are provided as necessary.

We recommend the following proposed changes to the actuarial assumptions or methods:

ECONOMIC ASSUMPTIONS

We conducted a review of all economic assumptions, including investment return, inflation, salary increases and payroll growth. While the short term four-year history does portray a story of lower salary increases and lower investment returns, we are not yet in a position to recommend a change without further analysis. The reason for these concerns that reach beyond an experience study are:

- The internal transfer of assets to the Post-Retirement Fund creates a possible exposure to demographic risk that can only be more fully assessed through a projection study. This generally is not an issue in plans where all assets remain aggregated and payable to all members. But with the Fund and this design for the post fund, we recommend a further study of this demographic impact on the long term capital market expectations.
- We are recommending a change in the asset accounting method for the Post-Retirement Fund. We have come to understand through various discussions that all parties are aware of the anomalous form of accounting for the Post-Retirement Fund and how it may not pass the GASB requirement that assets must be "market-related". (The method employed here has a portion of the assets as "liability-related".) We would suggest that this is a higher priority for the Fund to review. If accepted, we will assess the impact on the fund. Similar to the comments above, once the full impact of this accounting change is understood, SBI needs to be consulted for their assessment of any impact on the asset allocation and related long term capital market assumptions.
- Additionally, we recommend a more comprehensive study between the Fund and SBI on the long term capital market assumptions. This is for two reasons: One, we found that the SBI assumptions are on the optimistic side of average (and the Fund should review the related risk

so they can assess their long term optimal assumption for funding). Secondly, there have been recent, perhaps fundamental, changes in our economy that merit consideration of all parties (e.g., fuel prices, inflation).

In conclusion, this experience study presents the measurement of experience against assumptions, makes certain recommendations for change, but strongly recommends a more comprehensive study of the additional risks discussed above.

We recommend a review of these assumptions in their entirety, using the "building block" approach to ensure consistency between salaries, inflation and real rates of return. (See Actuarial Standard of Practice #27.)

Inflation

The current inflation assumption is 4.00%-4.50% per annum. We recognize that SBI assumes 3.00% and historical inflation has been lower. However, this assumption requires further study and modeling in light of the unique risks referenced above.

Salary Increase

The current salary increase is calculated using the reported salary for prior fiscal year, with new hires annualized, increased according to the ultimate table shown in the rate table to current fiscal year and annually for each future year. During a ten-year select period, 0.30% x (10-T) where T is completed years of service is added to the ultimate rate. When comparing experience against the assumptions we found that the select period of ten years may be too long, and that the assumed salary increases are higher than those actually paid during the study period. This assumption also merits further study in light of the risks referenced above.

Payroll Growth

The payroll growth assumption is 5.00% per annum and is higher than overall experience. We recommend that during the course of the broader study that this assumption be reviewed.

I. INTRODUCTION AND SUMMARY OF KEY FINDINGS (continued)

Withdrawal Rates Current withdrawal rates are based on the age and service of the member. During the three-year select period, the rates are 45% for males and 48% for females during the first year, 14% for males and 15% for females during the second year, and 9% for males and 10% for females during the third year. We recommend the ultimate withdrawal rates be decreased for females age 35 to 54, consistent with experience.

Disability Incidence Rates Disability incidence rates are currently age related, ending at age 64 to 65. We recommend increasing the rates for ages 50 to 60.

Retirement Rates Rule of 90 vs. Non-Rule of 90. The study indicates that actual Rule of 90 retirement rates are slightly lower than the current assumed rates. We recommend lowering Rule of 90 rates for ages 55 - 60.

Post-Retirement Mortality We recommend continued use of the current mortality table, the 1983 Group Annuity Mortality Table set back two years for males and set back one year for females.

Pre-Retirement Mortality We recommend continued use of the current mortality table, the 1983 Group Annuity Mortality Table set back five years for males and set back two years for females.

Disabled Mortality We recommend no change to the current tables.

II. ECONOMIC ASSUMPTIONS

The economic assumptions have a significant impact on the development of plan liabilities. Changes to these assumptions can substantially alter the results determined by the actuary. The goal of our analysis is to produce a consistent set of economic assumptions that appropriately reflect expected future economic trends.

The primary economic assumptions that affect the Fund's funding are:

- Investment return
- Salary increases
- Payroll growth
- Inflation

The current economic assumptions used for the July 1, 2004 actuarial valuation for the State Employees Retirement Fund are as follows:

Investment return	-	Pre-retirement: 8.50% per annum Post-retirement: 6.00% per annum
Salary increases	-	Reported salary for prior fiscal year, with new hires annualized, increased according to the ultimate table shown in the rate table to current fiscal year and annually for each future year. During a ten-year select period, 0.30% x (10-T) where T is completed years of service is added to the ultimate rate.
Payroll growth	-	5.00% per annum

The Actuarial Standards Board (ASB) has adopted Actuarial Standard of Practice No. 27 (ASOP 27), (Selection of Economic Assumptions for Measuring Pension Obligations) to provide actuaries guidance in developing economic assumptions. A key feature of the ASB's guidance is the "building block" approach in developing economic assumptions. This approach requires the actuary to consider the key component parts of major assumptions and determine reasonable best-estimates for each component.

Under this approach, we consider the investment rate of return assumption as the combination of an inflation component and a real rate of return component. The components of the salary increase assumption are inflation, productivity and merit. The inflation component is included in all economic assumptions, and therefore is key to developing a consistent set of actuarial assumptions. For this

reason we recommend that the comprehensive study look at long term inflation and its impact on the real and nominal rates of return, as well as the salary and payroll growth assumptions.

II. ECONOMIC ASSUMPTIONS (continued)

A. Inflation

In reviewing the assumed inflation component, we reviewed a commonly referenced historical measure of inflation, the Minneapolis-St. Paul, MN-WI and National Consumer Price Index for all urban consumers (CPI-U). The table below shows how recent inflation experience is well below the longer-term average rate.

Average Annual Change in CPI-U

	Minneapolis – St. Paul	National
Past 5 Years	2.94%	2.68%
Past 10 Years	2.73%	2.52%
Past 20 Years	3.06%	3.07%

The average annual rate of increase in the CPI-U over the five years ending June 30, 2004 is 2.94%. Historical trend is a less important consideration for the assumed rate of inflation, but assists in determining the reasonable bounds of expected inflation.

The typical range of expected inflation for actuarial assumptions in recent years is between 3.00% and 4.50%. Considering this trend, we have determined the current reasonable range to be between 2.75% and 3.50%.

As a check of the validity of this reasonable range, we reference the *2004 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (2004 OASDI Trustees Report).* The range of inflation rates in this report was 1.80% for low-cost projection and 3.80% for high-cost projection.

The current inflation assumption is 4.00%-4.50% per annum. We recommend that this be reviewed in the broader study to take into account risk factors such as recent economic developments, changing work force demographics, as well as using the past as a marker for reasonableness.

II. ECONOMIC ASSUMPTIONS (continued)

B. Investment Rate of Return

The investment rate of return assumption is developed using the "building block" approach as outlined in the ASOP 27. Under this approach, the investment rate of return assumption is made up of two components, the inflation component and the real investment rate of return component.

In developing the reasonable range for the real rate of return, we considered the historical returns of the Fund's two major asset classes, stocks and bonds. First, over the long term, U.S. Stocks (S&P 500) have averaged an annual rate of return of 10.20%, while U.S. Bonds have averaged a 5.70% annual rate of return according to Ibbotson Associates historical market data. Then we used the real rates as developed by SBI, and added the inflation component to develop the range.

The expected real rates of return as supplied by SBI are:

Asset Class	Real Return
Equity	
Domestic	6.25
International - unhedged	6.25
International - hedged	6.05
Emerging markets	8.50
Alternative Assets	
Private equity	10.00
Real assets	5.00
Yield oriented	5.50
Fixed Income	
Domestic bonds	3.50
Non dollar bonds - unhedged	3.50
Non dollar bonds - hedged	3.30
High Yield	4.50
Cash equivalents	1.00

Based on the Fund's current target allocation and total return assumptions, the expected real rate of return is 5.62% as developed on the next page.

II. ECONOMIC ASSUMPTIONS (continued)

B. Investment Rate of Return (continued)

ASSET CLASS	TARGET ALLOCATION* (A)	EXPECTED REAL RATE OF RETURN** (B)	CONTRIBUTION TO TOTAL REAL RATE OF RETURN (A)*(B)
Domestic and International Equity:	60%	6.25%	3.75%
Bonds:	24%	3.50%	0.84%
Alternative Assets:	15%	6.80%***	1.02%
Cash:	1%	1.00%	0.01%
Total Expected Real Rate of Return:			**5.62%**
Assumed Rate of Inflation (using a range of conservative to SBI estimate):			2.50% - 3.00%
Expected Investment Return:			8.12% - 8.62%
Allowance for Investment Expense:			.20%
Range Estimate for Investment Rate of Return Assumption:			7.92% - 8.42%

*Based on Investment Policy and Guidelines
**Based on 3.00% Assumed Rate of Inflation and the real returns and inflation rate provided by the Minnesota State Board of Investment
***Average of the returns of the three asset classes within alternative investments

These real rates of return and rates of inflation have been developed without further modeling of demographic risks to the plan (that may or may not play a role in changing asset allocations or return assumptions). This range development should be viewed as only a single point in the more broad study of long term economic forecasts.

The current assumption is 8.50%, which is slightly above the range developed for this assumption. The 8.50% appears optimistic, and we recommend a comprehensive review of all investment assumptions in the aggregate. Also, we recommend a more comprehensive study with SBI that could include a review of these real rate of return estimates in light of the very recent impacts in our economy.

A similar analysis of the Post-Retirement Fund also yields an expected net investment return range of 7.92% to 8.42% (the target allocation for the Post-Retirement Fund is nearly identical to the target allocation for the Basic Fund). The payment of earnings on retired reserves in excess of 6.00% is accounted for by a post-retirement rate of return assumption of 6.00%. In other words, the liabilities for

retired members are valued at 6.00% (not the assumed 8.50%) to "pay" for cost of living increases. With advancing baby boomer retirements, the economic forecast study will need to examine the impacts on the post as well as the active fund.

II. ECONOMIC ASSUMPTIONS (continued)

C. Salary Increase Assumption

Under the "building block" approach recommended in the ASOP 27, this assumption is composed of three components; inflation, productivity, and merit/promotion. The inflation and productivity components are combined to produce the assumed rate of wage inflation. This rate represents the "across the board" average annual increase in salaries shown in the experience data. The merit component includes the additional increases in salary due to performance, seniority, promotions, etc.

This component is typically more correlated to years of service than age, especially at lower years of service. Thus, we recommend the continued use of a select-and-ultimate salary scale. The current annual salary increase assumption for selected ages at the ultimate rate is as follows:

Age	Rate
20	6.75%
25	6.75%
30	6.75%
35	6.75%
40	6.75%
45	6.45%
50	5.95%
55	5.45%
60	5.25%
65	5.25%
70	5.25%

During the first ten years of employment, referred to as the select period, an amount equal to:

- 0.30% X (10 – T), where T is completed years of service is added to the ultimate rate.

The determination of the reasonable range for the productivity component considers the historical experience of the workforce, as well as national indicators of productivity growth.

II. ECONOMIC ASSUMPTIONS (continued)

C. Salary Increase Assumption (continued)

Below is a summary of the observed and assumed, average annual salary increase during the ten-year select period.

	1	2
Age Group	**Observed Average Annual Increase**	**Assumed Average Annual Increase**
Under 20	8.39%	9.38%
20 – 25	3.98%	8.93%
25 – 30	4.21%	8.88%
30 – 35	3.77%	8.04%
35 – 40	3.77%	7.69%
40 – 45	3.12%	7.12%
45 – 50	3.14%	6.74%
50 – 55	2.88%	6.07%
55 – 60	2.58%	5.65%
60 – 65	2.29%	5.58%
65 – 70	1.61%	5.58%

Below is a summary of the observed and assumed, average annual salary increase for all participants during both the select and ultimate periods.

	1	2
Service	**Observed Average Annual Increase**	**Assumed Average Annual Increase**
1 – 2	4.64%	9.10%
2 – 3	4.37%	8.84%
3 – 4	4.20%	8.54%
4 – 5	3.40%	8.22%
5 – 6	3.21%	7.91%
6 – 7	3.81%	7.59%
7 – 8	3.84%	7.29%
8 – 9	3.33%	6.99%
Ultimate	2.82%	6.09%

C. Salary Increase Assumption (continued)

We recommend decreasing the length of the select period of the salary scale from ten years to five years, and that further study be given to the overall salary increase assumptions.

We will closely monitor the experience in the upcoming actuarial valuations. When a trend of excessive gains or losses is apparent, we will alert the Fund to these results.

D. Payroll Growth Assumption

Unlike the other economic assumptions, the payroll growth assumption plays no part in the calculation of the Fund's liabilities. It does, however, have a material impact upon the determination of the amortization of the unfunded actuarial accrued liability and the determination of contribution rates. Under the current funding method, the amortization of the unfunded actuarial accrued liability over the funding period is calculated to be level as a percent of payroll. This calculation requires an assumption of the future annual increase in total covered payroll over the funding period.

The average of the total active member payroll of the Fund has increased 3.50% annually since July 1, 2001. The average annual increase in the number of active members is -1.46% per year. This experience study shows that historically the payroll growth experience has been lower than assumed, but similar to other economic assumptions we recommend this assumption to be a part of the broader economic forecast study.

III. DEMOGRAPHIC ASSUMPTIONS

The assumptions discussed in this section are demographic in nature, and rely heavily on the experience data and it's credibility. The actuary often uses professional judgment in applying a level of credibility to experience data.

A primary analysis tool used in measuring the effectiveness of demographic assumptions is the actual to-expected ratio, or A/E ratio. This ratio is the number of actual occurrences divided by the assumed number of occurrences. An A/E ratio greater than 100% results from more actual occurrences than assumed, and an A/E ratio less than 100% results from less actual occurrences than assumed. An A/E ratio of 100% is not always the most desired result. For example, the trend of decreasing mortality rates is well documented, therefore the recommended mortality assumption should reflect the current mortality rates from the data with a margin to appropriately account for the expected trend of mortality improvement. Thus, an A/E ratio greater than 100% is typically desired for the recommended assumption.

A. Withdrawal Rates

The withdrawal rates used in actuarial valuations project the percentage of employees who are expected to terminate employment each year before the first assumed retirement age.

Current Actuarial Assumptions

The current assumption utilizes a "select and ultimate" approach. The select rates are used to reflect the consistency of withdrawal rates among employees with the same years of service regardless of their age. After the three-year select period, age-related rates are used to approximate the employees' withdrawal rates.

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

The select withdrawal rates used for the July 1, 2004 actuarial valuation for the first three years of service are shown below:

Service	Male	Female
0 - 1	45.00%	48.00%
1 - 2	14.00%	15.00%
2 - 3	9.00%	10.00%

The ultimate withdrawal rates used for the July 1, 2004 actuarial valuation are shown below for selected ages:

Age	Male	Female
20	6.90%	8.55%
25	5.90%	7.80%
30	4.90%	7.05%
35	3.90%	6.30%
40	3.20%	5.55%
45	2.70%	4.80%
50	2.20%	3.90%
55	0.00%	0.00%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

Membership Experience

A member withdraws from active employment when a termination from employment occurs prior to attaining the eligibility requirement for a retirement benefit. The current assumption utilizes an approach that accounts for a change in withdrawal rates at varying ages of employees with more than three years of service. It is reflected in the experience data that the change in these rates are more correlated to the change in years of service. It is apparent that after a certain "select" period, the rates of withdrawal for employees vary within a small range which can be approximated with a single "ultimate" rate.

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

The tables below summarize the total number of withdrawals during the select period, the actual average number per year and the expected average number per year based on the assumed withdrawal rates for male and female participants.

Male

Years of Service	Number of Withdrawals Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
0 – 1	332	296	295	262	296	387	0.76
1 – 2	167	145	152	198	166	169	0.98
2 – 3	90	99	102	114	101	84	1.20
Total	**589**	**540**	**549**	**574**	**563**	**640**	**0.88**

Female

Years of Service	Number of Withdrawals Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
0 – 1	556	496	470	501	506	614	0.82
1 – 2	265	265	278	305	278	266	1.05
2 – 3	140	183	209	221	188	145	1.30
Total	**961**	**944**	**957**	**1,027**	**972**	**1,025**	**0.95**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

The tables below summarize the actual, expected, and recommended select withdrawal rates for male and female participants:

Male

Years of Service	Actual	Expected	A/E Ratio	Recommended
0 – 1	34%	45%	0.76	45%
1 – 2	14%	14%	0.98	14%
2 – 3	11%	9%	1.20	9%

Female

Years of Service	Actual	Expected	A/E Ratio	Recommended
0 – 1	40%	48%	0.82	48%
1 – 2	16%	15%	1.05	15%
2 – 3	13%	10%	1.30	10%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

The tables below summarize the total number of individuals during the ultimate period, the actual average number per year and the expected average number per year based on the assumed withdrawal rates for male and female participants.

Male

Age Group	Number of Withdrawals Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
20 – 25	0	1	0	1	1	2	0.50
25 – 30	11	23	12	17	16	18	0.89
30 – 35	64	38	51	55	52	42	1.24
35 – 40	87	58	55	54	64	60	1.07
40 – 45	65	78	85	88	79	81	0.98
45 – 50	78	87	81	76	81	91	0.89
50 – 55	62	63	76	86	72	87	0.83
Total	**367**	**348**	**360**	**377**	**365**	**381**	**0.96**

Female

Age Group	Number of Withdrawals Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
20 – 25	2	0	6	2	3	4	0.75
25 – 30	39	34	37	48	40	37	1.08
30 – 35	99	104	78	86	92	83	1.11
35 – 40	128	116	87	109	110	129	0.85
40 – 45	137	122	121	122	126	178	0.71
45 – 50	127	109	129	127	123	186	0.66
50 – 55	107	95	139	144	121	142	0.85
Total	**639**	**580**	**597**	**638**	**615**	**759**	**0.81**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

The tables below summarize the actual, expected, and recommended ultimate withdrawal rates for male and female participants for selected ages.

Male

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	1.59%	6.23%	0.50	6.23%
25 – 30	4.86%	5.54%	0.89	5.54%
30 – 35	5.87%	4.74%	1.24	4.74%
35 – 40	3.99%	3.74%	1.07	3.74%
40 – 45	3.08%	3.14%	0.98	3.14%
45 – 50	2.34%	2.66%	0.89	2.66%
50 – 55	1.78%	2.15%	0.83	2.15%

Female

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	5.68%	8.09%	0.75	8.09%
25 – 30	8.05%	7.63%	1.08	7.63%
30 – 35	7.83%	7.06%	1.11	7.06%
35 – 40	5.36%	6.30%	0.85	5.11%
40 – 45	3.90%	5.53%	0.71	4.43%
45 – 50	3.11%	4.71%	0.66	3.74%
50 – 55	3.27%	3.83%	0.85	3.09%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

A. Withdrawal Rates (continued)

Findings and Recommendations

To develop the recommended rates of withdrawal, we first determined the exposure-weighted rate at service category for the ultimate assumption and each age for the select assumption. A graduation method is then used to smooth the variation in rates while capturing overall experience trend.

We recommend the withdrawal assumption continue to utilize a select and ultimate approach.

The data reflects that the actual withdrawal rates match the assumed withdrawal rates in the select period reasonably well. Therefore, we recommend the continued use of the current assumed rates in the select period. For the ultimate rates, the data reflected lower than expected withdrawal rates for females over age 35. We recommend decreasing the female rates at ages 35 - 54 to better reflect experience.

The complete tables of recommended withdrawal rates are shown in Appendix B.

The actual/expected ratio of the recommended assumptions are as follows:

Select Period:

Males:	88.0%
Females:	94.8%

Ultimate Period:

Males:	95.5%
Females:	96.8%

B. Disability Incidence Rates

The rates of disability used in actuarial valuations project the percentage of employees who are expected to become disabled each year.

Current Actuarial Assumptions

The disability incidence rates used for the July 1, 2004 actuarial valuation are shown below for selected ages:

Age	Male	Female
20	0.01%	0.01%
25	0.01%	0.01%
30	0.01%	0.01%
35	0.03%	0.03%
40	0.08%	0.08%
45	0.13%	0.13%
50	0.24%	0.24%
55	0.42%	0.36%
60	0.65%	0.52%
65	0.00%	0.00%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

B. Disability Incidence Rates (continued)

The tables below summarize the total number of disabilities in each age group, the actual average number and the expected average number based on the assumed disability incidence rates for male and female participants.

Male

	Number of Disabilities Fiscal Year Ended June 30				Average Per Year		
Age Group	**2001**	**2002**	**2003**	**2004**	**Actual**	**Expected**	**Ratio**
20 – 25	0	0	0	0	0	0	--
25 – 30	0	0	0	0	0	0	--
30 – 35	0	0	1	0	0	0	--
35 – 40	1	0	0	1	1	1	1.00
40 – 45	4	1	5	4	4	3	1.33
45 – 50	5	4	6	5	5	6	0.83
50 – 55	11	21	17	24	18	14	1.29
55 – 60	14	30	19	24	22	15	1.47
60 – 65	12	9	6	7	9	10	0.90
Total	**47**	**65**	**54**	**65**	**59**	**49**	**1.20**

Female

	Number of Disabilities Fiscal Year Ended June 30				Average Per Year		
Age Group	**2001**	**2002**	**2003**	**2004**	**Actual**	**Expected**	**Ratio**
20 – 25	0	0	0	0	0	0	--
25 – 30	0	0	0	1	0	0	--
30 – 35	0	2	0	1	1	0	--
35 – 40	2	0	4	1	2	2	1.00
40 – 45	4	3	7	7	5	4	1.25
45 – 50	10	15	6	7	10	8	1.25
50 – 55	16	6	14	15	13	13	1.00
55 – 60	12	8	18	17	14	11	1.27
60 – 65	8	5	13	10	9	7	1.29
Total	**52**	**39**	**62**	**59**	**54**	**45**	**1.20**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

B. Disability Incidence Rates (continued)

The tables summarize the actual, expected, and recommended disability incidence rates for male and female participants for selected ages.

Male

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	0.00%	0.01%	--	0.01%
25 – 30	0.00%	0.01%	--	0.01%
30 – 35	0.01%	0.01%	--	0.01%
35 – 40	0.02%	0.05%	1.00	0.05%
40 – 45	0.11%	0.10%	1.33	0.10%
45 – 50	0.12%	0.16%	0.83	0.16%
50 – 55	0.41%	0.31%	1.29	0.37%
55 – 60	0.71%	0.49%	1.47	0.59%
60 – 65	0.63%	0.72%	0.90	0.87%

Female

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	0.00%	0.01%	--	0.01%
25 – 30	0.01%	0.01%	--	0.01%
30 – 35	0.03%	0.01%	--	0.01%
35 – 40	0.06%	0.05%	1.00	0.05%
40 – 45	0.12%	0.10%	1.25	0.10%
45 – 50	0.20%	0.16%	1.25	0.16%
50 – 55	0.29%	0.29%	1.00	0.35%
55 – 60	0.52%	0.40%	1.27	0.48%
60 – 65	0.75%	0.58%	1.29	0.70%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

B. Disability Incidence Rates (continued)

Findings and Recommendations

For active employees, actual experience shows disability incidence occurs with higher frequency for both genders, especially at later ages. We recommend increasing the rates of disability for ages 50 to 60 to reflect this trend.

The complete table of recommended disability incidence rates for active employees is shown in Appendix C.

The actual/expected ratios of the recommended assumptions are as follows:

Males:	100.7%
Females:	105.9%

C. Retirement Rates

The rates of retirement used in actuarial valuations project the percentage of employees who are expected to retire each year.

Current Actuarial Assumptions

The retirement rates used for the July 1, 2004 actuarial valuation are shown below:

Age	Rule of 90 Eligible	Other
55	25%	5%
56	25%	5%
57	25%	5%
58	25%	5%
59	25%	5%
60	25%	10%
61	25%	10%
62	50%	25%
63	40%	20%
64	40%	20%
65	45%	45%
66	30%	30%
67	30%	30%
68	30%	30%
69	30%	30%
70	30%	30%
71	100%	100%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

C. Retirement Rates (continued)

The tables below and on the next page summarize the total number of retirements at each age, the actual average number and the expected average number based on the assumed retirement rates.

Rule of 90 Eligible

	Number of Retirements Fiscal Year Ended June 30				Average Per Year		
Age	**2001**	**2002**	**2003**	**2004**	**Actual**	**Expected**	**Ratio**
55	4	4	4	4	4	3	1.33
56	6	3	9	9	7	16	0.44
57	14	11	8	26	15	28	0.54
58	19	10	22	15	17	33	0.52
59	30	25	17	28	25	36	0.69
60	29	25	18	34	27	36	0.75
61	29	25	32	40	32	35	0.91
62	58	42	38	53	48	60	0.80
63	14	18	21	30	21	30	0.70
64	6	10	19	27	16	24	0.67
65	17	33	24	28	26	22	1.18
66	1	4	4	11	5	7	0.71
67	2	2	6	6	4	5	0.80
68	4	3	5	4	4	4	1.00
69	4	0	1	2	2	4	0.50
70	4	3	3	2	3	4	0.75
71	1	0	2	3	2	9	0.22
Total	**242**	**218**	**233**	**322**	**258**	**356**	**0.72**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

C. Retirement Rates (continued)

All Other Retirements

Age	Number of Retirements Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
55	44	41	31	65	45	65	0.69
56	30	33	41	51	39	55	0.71
57	43	36	35	50	41	44	0.93
58	39	38	28	36	35	36	0.97
59	33	46	31	46	39	31	1.26
60	32	23	30	51	34	52	0.65
61	35	30	30	79	44	44	1.00
62	81	77	67	115	85	89	0.96
63	26	27	41	54	37	48	0.77
64	42	34	31	44	38	37	1.03
65	50	48	54	65	54	62	0.87
66	16	17	13	33	20	23	0.87
67	6	12	12	19	12	15	0.80
68	6	6	6	19	9	11	0.82
69	8	2	9	9	7	7	1.00
70	4	5	3	5	4	5	0.80
71	0	1	3	6	3	13	0.23
Total	**495**	**476**	**465**	**747**	**546**	**637**	**0.86**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

C. Retirement Rates (continued)

The tables below and on the next page summarize the actual, expected, and recommended retirement rates.

Rule of 90 Eligible

Age	Actual	Average Expected	Ratio	Average Recommended
55	35%	25%	1.33	20%
56	11%	25%	0.44	20%
57	13%	25%	0.54	20%
58	12%	25%	0.52	20%
59	17%	25%	0.69	20%
60	18%	25%	0.75	20%
61	23%	25%	0.91	25%
62	40%	50%	0.80	50%
63	28%	40%	0.70	40%
64	26%	40%	0.67	40%
65	53%	45%	1.18	45%
66	22%	30%	0.71	30%
67	26%	30%	0.80	30%
68	31%	30%	1.00	30%
69	13%	30%	0.50	30%
70	24%	30%	0.75	30%
71	17%	100%	0.22	100%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

C. Retirement Rates (continued)

All Other Retirements

Age	Actual	Average Expected	Ratio	Average Recommended
55	4%	5%	0.69	5%
56	4%	5%	0.71	5%
57	5%	5%	0.93	5%
58	5%	5%	0.97	5%
59	6%	5%	1.26	5%
60	7%	10%	0.65	10%
61	10%	10%	1.00	10%
62	24%	25 %	0.96	25%
63	15%	20%	0.77	20%
64	20%	20%	1.03	20%
65	40%	45%	0.87	45%
66	26%	30%	0.87	30%
67	24%	30%	0.80	30%
68	25%	30%	0.82	30%
69	29%	30%	1.00	30%
70	26%	30%	0.80	30%
71	20%	100%	0.23	100%

C. Retirement Rates (continued)

Findings and Recommendations

For Rule of 90 Retirement the data shows lower than expected retirements at lower ages. We recommend lowering the Rule of 90 retirement rates for ages 55 to 60. For non-Rule of 90 retirements, the assumptions reflect actual experience reasonably well. Therefore, we recommend keeping the current rates for the non-Rule of 90 retirements.

The complete table of recommended retirement rates for active employees are shown in Appendix D.

The actual/expected ratios of the recommended assumptions are as follows:

Rule of 90 Retirement:	103.1%
All Other Retirement:	85.6%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement

The post-retirement mortality rates used in actuarial valuations project the percentage of beneficiaries and non-disabled retirees who are expected to die in the upcoming year.

Current Actuarial Assumptions

The mortality table for male beneficiaries and non-disabled retirees used for the July 1, 2004 actuarial valuation is the 1983 Group Annuity Mortality (GAM) Table for males, set back two years. The mortality table for female beneficiaries and non-disabled retirees is the 1983 Group Annuity Mortality (GAM) Table for females, set back one year. The mortality rates are shown below for selected ages:

Mortality Rates

Age	Male	Female
50	0.31%	0.15%
55	0.52%	0.23%
60	0.77%	0.38%
65	1.24%	0.64%
70	2.22%	1.09%
75	3.67%	2.11%
80	6.07%	3.85%
85	9.75%	6.38%
90	14.41%	10.14%
95	20.30%	16.51%
100	28.08%	26.82%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement (continued)

The tables below and on the next page summarize the total number of deaths in each age group, the actual average number and the expected average number based on the assumed mortality rates for male and female participants.

Male

Age Group	Number of Deaths Fiscal Year Ended June 30*				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
50 – 55	2	0	0	1	1	0	--
55 – 60	4	13	4	3	6	3	2.00
60 – 65	14	18	17	21	18	13	1.38
65 – 70	46	46	35	52	45	32	1.41
70 – 75	87	75	61	74	74	51	1.45
75 – 80	103	85	104	94	97	70	1.39
80 – 85	105	115	91	117	107	76	1.41
85 – 90	72	69	70	80	73	56	1.30
90 – 95	40	35	43	34	38	28	1.36
95 – 100	4	7	10	18	10	8	1.25
Total	**477**	**463**	**435**	**494**	**469**	**337**	**1.39**

** Death counts not reconciled with Fund data.*

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement (continued)

Female

Age Group	Number of Deaths Fiscal Year Ended June 30*				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
50 – 55	0	1	0	1	1	0	--
55 – 60	3	2	1	8	4	2	2.00
60 – 65	6	10	8	14	10	6	1.67
65 – 70	18	24	13	13	17	14	1.21
70 – 75	31	31	40	31	33	27	1.22
75 – 80	46	56	50	44	49	48	1.02
80 – 85	73	80	69	54	69	65	1.06
85 – 90	84	74	80	77	79	69	1.14
90 – 95	56	43	60	49	52	43	1.21
95 – 100	21	21	22	26	23	19	1.21
Total	**338**	**342**	**343**	**317**	**337**	**293**	**1.15**

** Death counts not reconciled with Fund data.*

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement (continued)

The tables below and on the next page summarize the actual, expected and recommended post-retirement mortality rates for male and female participants for selected ages.

Male

Age Group	Actual*	Average Expected	Ratio	Average Recommended
50 – 55	2.36%	0.41%	--	0.41%
55 – 60	1.13%	0.65%	2.00	0.65%
60 – 65	1.28%	0.95%	1.38	0.95%
65 – 70	2.21%	1.59%	1.41	1.59%
70 – 75	3.98%	2.74%	1.45	2.74%
75 – 80	6.16%	4.47%	1.39	4.47%
80 – 85	10.25%	7.29%	1.41	7.29%
85 – 90	14.46%	11.14%	1.30	11.14%
90 – 95	22.00%	16.27%	1.36	16.27%
95 – 100	25.49%	22.02%	1.25	22.02%

** Death counts not reconciled with Fund data.*

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement (continued)

Female

Age Group	Actual*	Average Expected	Ratio	Average Recommended
50 – 55	0.58%	0.19%	--	0.19%
55 – 60	0.63%	0.30%	2.00	0.30%
60 – 65	0.74%	0.49%	1.67	0.49%
65 – 70	0.94%	0.79%	1.21	0.79%
70 – 75	1.80%	1.44%	1.22	1.44%
75 – 80	2.80%	2.72%	1.02	2.72%
80 – 85	5.00%	4.72%	1.06	4.72%
85 – 90	8.63%	7.58%	1.14	7.58%
90 – 95	14.40%	11.85%	1.21	11.85%
95 – 100	22.73%	19.33%	1.21	19.33%

** Death counts not reconciled with Fund data.*

III. DEMOGRAPHIC ASSUMPTIONS (continued)

D. Mortality Rates – Post-Retirement (continued)

Findings and Recommendations

Post-Retirement experience was similar for males and females. According to Segal's death data, the current mortality assumption overstated both male experience and female experience. However, we could not reconcile the reported death counts with the Fund data, therefore, we do not recommend changing the mortality rates at this time.

We recommend the continued use of the 1983 GAM table set back two years for males and one year for females. We will monitor future mortality experience of the entire membership group and recommend adjustments as necessary.

The complete tables of recommended mortality rates for non-disabled retirees are shown in Appendix E.

The actual/expected ratios of the recommended assumptions are as follows:

Males:	139.2%
Females:	115.0%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement

The pre-retirement mortality rates used in actuarial valuations project the percentage of active employees who are expected to die during the upcoming year.

Current Actuarial Assumptions

The mortality table for active male employees currently used for the July 1, 2004 actuarial valuation is the 1983 Group Annuity Mortality Table for males, set back five years. The Mortality Table for active female employees is the 1983 Group Annuity Mortality Table for females, set back two years. The mortality rates are shown below for selected ages:

Mortality Rates

Age	Male	Female
20	0.03%	0.02%
25	0.04%	0.02%
30	0.05%	0.03%
35	0.06%	0.04%
40	0.09%	0.06%
45	0.12%	0.08%
50	0.22%	0.14%
55	0.39%	0.21%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement (continued)

The tables below and on the next page summarize the total number of deaths in each age group, the actual average number and the expected average number based on the assumed death rates for male and female participants.

Male

Age Group	Number of Deaths Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
20 – 25	0	0	0	1	0	0	--
25 – 30	0	0	0	1	0	1	--
30 – 35	1	1	1	0	1	1	1.00
35 – 40	2	1	1	1	1	2	0.50
40 – 45	0	3	3	6	3	3	1.00
45 – 50	7	10	8	15	10	6	1.67
50 – 55	8	15	9	11	11	13	0.85
55 – 60	12	15	13	19	15	14	1.07
60 – 65	8	10	4	11	8	9	0.89
65 – 70	3	4	6	5	5	3	1.67
70 – 75	1	1	2	2	2	1	2.00
Total	**42**	**60**	**47**	**72**	**56**	**53**	**1.06**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement (continued)

Female

Age Group	Number of Deaths Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
20 – 25	1	1	0	1	1	0	--
25 – 30	0	1	1	0	1	1	1.00
30 – 35	0	0	0	2	1	1	1.00
35 – 40	2	0	1	0	1	2	0.50
40 – 45	2	4	0	3	2	3	0.67
45 – 50	8	3	4	0	4	5	0.80
50 – 55	4	4	5	7	5	7	0.71
55 – 60	2	5	4	6	4	7	0.57
60 – 65	2	2	6	3	3	5	0.60
65 – 70	0	4	0	0	1	2	0.50
70 – 75	1	0	0	0	0	0	--
Total	**22**	**24**	**21**	**22**	**23**	**33**	**0.70**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement (continued)

The tables below and on the next page summarize the actual, expected, and recommended pre-retirement mortality rates for male and female participants for selected ages.

Male

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	0.04%	0.04%	--	0.04%
25 – 30	0.02%	0.04%	--	0.04%
30 – 35	0.04%	0.05%	1.00	0.05%
35 – 40	0.05%	0.07%	0.50	0.07%
40 – 45	0.09%	0.10%	1.00	0.10%
45 – 50	0.25%	0.16%	1.07	0.16%
50 – 55	0.24%	0.28%	0.85	0.28%
55 – 60	0.48%	0.46%	1.07	0.46%
60 – 65	0.61%	0.69%	0.89	0.69%
65 – 70	1.70%	1.06%	1.67	1.06%
70 – 75	2.35%	0.94%	2.00	0.94%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement (continued)

Female

Age Group	Actual	Average Expected	Ratio	Average Recommended
20 – 25	0.08%	0.02%	--	0.02%
25 – 30	0.02%	0.03%	1.00	0.03%
30 – 35	0.02%	0.03%	1.00	0.03%
35 – 40	0.02%	0.05%	0.50	0.05%
40 – 45	0.05%	0.07%	0.67	0.07%
45 – 50	0.08%	0.10%	0.80	0.10%
50 – 55	0.11%	0.16%	0.71	0.16%
55 – 60	0.16%	0.25%	0.57	0.25%
60 – 65	0.27%	0.41%	0.60	0.41%
65 – 70	0.39%	0.66%	0.50	0.66%
70 – 75	0.40%	0.53%	--	0.53%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

E. Mortality Rates – Pre-Retirement (continued)

Findings and Recommendations

Pre-retirement experience was different on a gender basis. The current mortality assumption understated male experience and overstated female experience. However, the differences were not large enough to warrant changing mortality rates at this time. We recommend the continued use of the 1983 GAM table set back five years for males and two years for females.

The complete tables of recommended mortality rates for pre-retirement employees are shown in Appendix F.

III. DEMOGRAPHIC ASSUMPTIONS (continued)

F. Mortality Rates – Disabled

The disabled mortality rates used in actuarial valuations project the percentage of disabled retirees who are expected to die in the upcoming year. Mortality for disabled retirees is expected to be higher than mortality for non-disabled retirees.

Current Actuarial Assumptions

The mortality table for disabled retirees currently used for the July 1, 2004 actuarial valuation is the 1965 Railroad Retirement Board rates through age 54. For ages 55 through 64, graded rates between the 1965 Railroad Retirement Board and the healthy post-retirement table are used. For ages 65 and later, the healthy post-retirement table is used. The mortality rates are shown below for selected ages:

Age	Males	Females
35	4.41%	4.41%
40	4.41%	4.41%
45	4.48%	4.48%
50	4.86%	4.86%
55	5.43%	5.41%
60	3.72%	3.51%
65	1.24%	0.64%
70	2.22%	1.09%
75	3.67%	2.11%
80	6.07%	3.85%
85	9.75%	6.38%
90	14.41%	10.14%
95	20.30%	16.51%

III. DEMOGRAPHIC ASSUMPTIONS (continued)

F. Mortality Rates – Disabled (continued)

The tables below and on the next page summarize the total number of disabled deaths in each age group, the actual average number and the expected number based on the assumed disability mortality rates for male and female participants.

Male

Age Group	Number of Disabled Deaths Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
35 – 40	1	0	3	0	1	0	--
40 – 45	0	0	1	0	0	1	--
45 – 50	4	3	2	4	3	2	1.50
50 – 55	1	2	7	2	3	4	0.75
55 – 60	5	13	3	2	6	5	1.20
60 – 65	5	8	4	5	6	4	1.50
65 – 70	8	8	9	5	8	1	8.00
Total	**24**	**34**	**29**	**18**	**27**	**17**	**1.59**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

F. Mortality Rates – Disabled (continued)

Female

Age Group	Number of Disabled Deaths Fiscal Year Ended June 30				Average Per Year		
	2001	2002	2003	2004	Actual	Expected	Ratio
35 - 40	0	0	1	1	1	0	--
40 – 45	2	1	3	0	2	1	2.00
45 – 50	1	0	7	2	3	3	1.00
50 – 55	0	1	2	5	2	5	0.40
55 – 60	5	3	5	3	4	4	1.00
60 – 65	4	4	4	4	4	2	2.00
65 – 70	4	4	6	0	4	1	4.00
Total	**16**	**13**	**28**	**15**	**20**	**16**	**1.25**

III. DEMOGRAPHIC ASSUMPTIONS (continued)

F. Mortality Rates – Disabled (continued)

The tables below summarize the actual, expected, and recommended pre-retirement mortality rates for male and female participants for selected ages.

Male

Age Group	Actual	Average Expected	Ratio	Average Recommended
35 – 40	23.53%	4.41%	--	0.09%
40 – 45	2.17%	4.43%	--	0.13%
45 – 50	7.83%	4.60%	1.50	0.22%
50 – 55	4.36%	5.28%	0.75	0.41%
55 – 60	5.75%	4.76%	1.20	0.62%
60 – 65	4.30%	2.76%	1.50	0.93%
65 – 70	8.67%	1.52%	8.00	1.52%

Female

Age Group	Actual	Average Expected	Ratio	Average Recommended
35 – 40	6.45%	4.41%	--	0.05%
40 – 45	5.94%	4.43%	2.00	0.07%
45 – 50	3.64%	4.62%	1.00	0.12%
50 – 55	2.23%	5.23%	0.40	0.18%
55 – 60	4.26%	4.72%	1.00	0.29%
60 – 65	3.96%	2.46%	2.00	0.47%
65 – 70	4.96%	0.78%	4.00	0.78%

F. Mortality Rates – Disabled (continued)

Findings and Recommendations

For active employees, actual experience shows disabled mortality occurs with more than expected frequency. However, exposure on this assumption is very low, so we recommend no change to this assumption.

III. DEMOGRAPHIC ASSUMPTIONS (continued)

G. Percent Married

Current Actuarial Assumptions

85% of all members are assumed to be married.

Findings and Recommendations

The current assumption remains reasonable.

H. Presence and Age of Beneficiary

Current Actuarial Assumptions

Females are assumed to be three years younger than males.

Findings and Recommendations

On average, experience data has shown that current male retirees are 3.29 years older than their female spouses and that female retirees are 2.37 years younger than their male spouses. Therefore, the current assumption remains reasonable.

I. Optional Form of Annuity

Current Actuarial Assumptions

For male retires, 20% are assumed to elect a 50% Joint and Survivor annuity and 50% are assumed to elect a 100% Joint and Survivor annuity. For female retires, 10% are assumed to elect a 50% Joint and Survivor annuity and 15% are assumed to elect a 100% Joint and Survivor annuity.

Findings and Recommendations

The current assumption remains reasonable.

IV. ACTUARIAL COST METHODS

Actuarial Cost Method

The actuarial cost method is the procedure used to allocate the cost of the plan among different plan years. A portion of the value of benefits is attributable to past service (actuarial accrued liability) and the remainder (the present value of future normal costs) is attributable to future service. Recent actuarial valuations have been based on the actuarial cost method known as the Entry Age Normal Actuarial Cost Method. This method produces costs that remain relatively level as a percentage of covered payroll. Under the Entry Age Normal Cost Method, the total contribution requirement has two components - an annual normal cost, and a payment with respect to the unfunded actuarial accrued liability. The annual normal cost is calculated for each active employee as the level percentage of pay required over the employee's period of assumed employment to pay the total expected benefits. If actuarial assumptions are met, the total normal cost rate will remain level as a percentage of payroll.

The actuarial accrued liability is the present value of benefits allocated to years prior to the valuation date. It reflects the average liability allocated for past service when the plan was established, as well as adjustments for plan amendments, changes in assumptions, and experience gains and losses. The unfunded actuarial accrued liability is the amount of the accrued liability in excess of the actuarial value of assets. It is paid (amortized) in installments over a period of years, *i.e.* the funding period.

Approximately 75% of large public retirement systems use the Entry Age Normal Cost Method. We recommend that the use of the current actuarial cost method be continued.

Actuarial Asset Valuation Method

The purpose of an actuarial asset valuation method is to smooth the normal volatility of the economic markets and dampen the effect this volatility has on determining the Fund's (Association's) statutory rates. The current asset valuation method under the non-MPRIF Reserves is a reasonable approach. The actuarial value of assets are valued under a smoothing method which recognizes the gains and losses gradually over five years.

IV. ACTUARIAL COST METHODS (continued)

Actuarial Asset Valuation Method (continued)

The total market value of assets provided for the valuation is equal to the sum of the non-MPRIF assets and MPRIF reserve. The MPRIF reserve is a "true-up" each year to equal the MPRIF liabilities as of the valuation date, and does not reflect the actual MPRIF market value of assets as of that date. Therefore, the total "market value of assets" is adjusted each year to account for the change in reserves under MPRIF, and balances out in the non-MPRIF assets as either a gain or loss. Hence, the "market value of assets" used to determine contribution rates and funded ratios contains amounts that do not exist as an asset. In GASB language, this implies that a portion of the assets are "liability" related, and not fully "market-related".

To comply with GASB, the actuarial value of assets are required to be used in the calculation of the funded ratios, and should be market related. The non-MPRIF asset smoothing method is market related and complies with GASB. However, we recommend a review of this asset method for the Post-Retirement Fund by the auditors to ensure it is GASB compliant.

Amortization Schedule

The current amortization schedule under the Fund is defined as a closed amortization period ending July 1, 2020, for years when there exists a positive Unfunded Actuarial Accrued Liability (UAAL). During the years where there is a negative UAAL, the surplus amount is amortized over 30 years as a level percentage of payroll.

This schedule creates volatility in the actuarial required contribution. Since gains and losses are amortized over a steadily decreasing (closed) period, this method can result in highly variable contribution rates from year to year. As the amortization period approaches zero, the more variable the rate becomes (For example, a loss in 2019 would have to be paid off in one year).

We recommend the Fund undertake a more comprehensive "amortization method" study to select an amortization method that satisfies a requirement of paying off the UAAL within a reasonable period of time and that reduces volatility in the rate. Reducing rate volatility will help with budget and planning, while still satisfying the funding requirements of the Fund.

APPENDIX A

SUMMARY OF PROPOSED RECOMMENDATIONS

Assumption/Method	July 1, 2004 Actuarial Valuation	Recommended in 2005 Experience Study
Inflation	4.00%-4.50% per annum	Conduct broader study with SBI
Investment Return	8.50% per annum, net of investment expenses	Conduct broader study with SBI
Salary Increases	Age based rates, with ten-year select period	Conduct broader study with SBI
Payroll Growth	5.00% per annum	Conduct broader study with SBI
Withdrawal	Age and gender based rates with three-year select period	Lower female rates for ages 35 to 54
Disability Incidence	Age based rates	Higher rates for ages 50 to 60
Retirement	Age based rates for Rule of 90 retirements and for non-Rule of 90 retirements	Lower Rule of 90 retirement rates for ages 55 to 60; no change for all other retirements
Post-Retirement Mortality	1983 GAM Table for regular members set back two years for males and one year for females	No change
Pre-Retirement Mortality	1983 GAM Table for regular employees set back five years for males and two years for females	No change

APPENDIX A

SUMMARY OF PROPOSED RECOMMENDATIONS (continued)

Assumption/Method	July 1, 2004 Actuarial Valuation	Recommended in 2005 Experience Study
Disabled Mortality	1965 Railroad Retirement Board Disabled Life Mortality Table through age 54, graded to healthy mortality at age 65	No change
Beneficiary Mortality	1983 GAM Table for regular beneficiaries set back two years for males and one year for females	No change
Dependent Children	No dependent children are assumed	No change
Marital Status	85% of all members are assumed to be married	No change
Spouse Age	Females are assumed to be three years younger than males	No change
Optional Form Election	Joint and Survivor annuities elected at gender-based rates	No change
Actuarial Cost Method	Entry age normal	No change
Asset Valuation Method	Five-year smoothing Method under only the non-MPRIF reserves	Recommend review by auditors to determine GASB compliance
Amortization Method	Closed amortization period; 30 years as of July 1, 2004	Recommend ongoing review with Board and broader study

APPENDIX B

RECOMMENDED WITHDRAWAL RATES

Select Period		
Years of Service	**Males**	**Females**
0 – 1	45.00%	48.00%
1 – 2	14.00%	15.00%
2 – 3	9.00%	10.00%

Ultimate Period					
Age	**Males**	**Females**	**Age**	**Males**	**Females**
20	6.90%	8.55%	38	3.40%	4.63%
21	6.70%	8.40%	39	3.30%	4.50%
22	6.50%	8.25%	40	3.20%	4.38%
23	6.30%	8.10%	41	3.10%	4.25%
24	6.10%	7.95%	42	3.00%	4.13%
25	5.90%	7.80%	43	2.90%	4.00%
26	5.70%	7.65%	44	2.80%	3.88%
27	5.50%	7.50%	45	2.70%	3.75%
28	5.30%	7.35%	46	2.60%	3.63%
29	5.10%	7.20%	47	2.50%	3.50%
30	4.90%	7.05%	48	2.40%	3.35%
31	4.70%	6.90%	49	2.30%	3.20%
32	4.50%	6.75%	50	2.20%	3.05%
33	4.30%	6.60%	51	2.10%	2.90%
34	4.10%	6.45%	52	2.00%	2.75%
35	3.90%	5.10%	53	1.90%	2.60%
36	3.70%	4.93%	54	1.80%	2.45%
37	3.50%	4.75%			

APPENDIX C

RECOMMENDED DISABILITY INCIDENCE RATES

Age	Male	Female
20	0.000100	0.000100
21	0.000100	0.000100
22	0.000100	0.000100
23	0.000100	0.000100
24	0.000100	0.000100
25	0.000100	0.000100
26	0.000100	0.000100
27	0.000100	0.000100
28	0.000100	0.000100
29	0.000010	0.000100
30	0.000100	0.000100
31	0.000100	0.000100
32	0.000100	0.000100
33	0.000100	0.000100
34	0.000200	0.000200
35	0.000300	0.000300
36	0.000400	0.000400
37	0.000500	0.000500
38	0.000600	0.000600
39	0.000700	0.000700
40	0.000800	0.000800
41	0.000900	0.000900
42	0.001000	0.001000
43	0.001100	0.001100
44	0.001200	0.001200
45	0.001300	0.001300
46	0.001400	0.001400
47	0.001500	0.001500
48	0.001800	0.001800

APPENDIX C

RECOMMENDED RATES OF DISABILITY INCIDENCE RATES (continued)

Age	Male	Female
49	0.002100	0.002100
50	0.002880	0.002880
51	0.003240	0.003240
52	0.003600	0.003600
53	0.004080	0.003840
54	0.004560	0.004080
55	0.005040	0.004320
56	0.005520	0.004560
57	0.006000	0.004800
58	0.006600	0.005280
59	0.007200	0.005760
60	0.007800	0.006240
61	0.008400	0.006720
62	0.009000	0.007200
63	0.009600	0.007680
64	0.010200	0.008160
65	0.000000	0.000000

APPENDIX D

RECOMMENDED RETIREMENT RATES

Age	Rule of 90 Retirement Rate	All Other Retirement Rate
55	25%	5%
56	20%	5%
57	20%	5%
58	20%	5%
59	20%	5%
60	20%	10%
61	25%	10%
62	50%	25%
63	40%	20%
64	40%	20%
65	45%	45%
66	30%	30%
67	30%	30%
68	30%	30%
69	30%	30%
70	30%	30%
71	100%	100%

APPENDIX E

RECOMMENDED POST-RETIREMENT MORTALITY RATES

Age	Male	Female
20	0.000353	0.000179
21	0.000365	0.000189
22	0.000377	0.000201
23	0.000392	0.000212
24	0.000408	0.000225
25	0.000424	0.000238
26	0.000444	0.000253
27	0.000464	0.000268
28	0.000488	0.000283
29	0.000513	0.000301
30	0.000542	0.000320
31	0.000572	0.000342
32	0.000607	0.000364
33	0.000645	0.000388
34	0.000687	0.000414
35	0.000734	0.000443
36	0.000785	0.000476
37	0.000860	0.000502
38	0.000907	0.000535
39	0.000966	0.000573
40	0.001039	0.000617
41	0.001128	0.000665
42	0.001238	0.000716
43	0.001370	0.000775
44	0.001527	0.000841
45	0.001715	0.000919
46	0.001932	0.001010

APPENDIX E

RECOMMENDED POST-RETIREMENT MORTALITY RATES (continued)

Age	Male	Female
47	0.002183	0.001117
48	0.002471	0.001237
49	0.002790	0.001366
50	0.003138	0.001505
51	0.003513	0.001647
52	0.003909	0.001793
53	0.004324	0.001948
54	0.004755	0.002119
55	0.005200	0.002315
56	0.005660	0.002541
57	0.006131	0.002803
58	0.006618	0.003103
59	0.007139	0.003442
60	0.007719	0.003821
61	0.008384	0.004241
62	0.009158	0.004702
63	0.010064	0.005210
64	0.011133	0.005769
65	0.012391	0.006385
66	0.013868	0.007064
67	0.015592	0.007817
68	0.017579	0.008681
69	0.019804	0.009702
70	0.022229	0.010921
71	0.024817	0.012385
72	0.027530	0.014128
73	0.030354	0.016159
74	0.033370	0.018481

APPENDIX E

RECOMMENDED POST-RETIREMENT MORTALITY RATES (continued)

Age	Male	Female
75	0.036680	0.021091
76	0.040388	0.023992
77	0.044597	0.027184
78	0.049388	0.030672
79	0.054758	0.034459
80	0.060678	0.038549
81	0.067125	0.042945
82	0.074070	0.047655
83	0.081484	0.052691
84	0.089320	0.058071
85	0.097525	0.063807
86	0.106047	0.069918
87	0.114836	0.076570
88	0.124170	0.083870
89	0.133870	0.091935
90	0.144073	0.101354
91	0.154859	0.111750
92	0.166307	0.123076
93	0.178214	0.135630
94	0.190460	0.149577
95	0.203007	0.165103
96	0.217904	0.182419
97	0.234086	0.201757
98	0.248436	0.222043
99	0.263954	0.243899
100	0.280803	0.268185

APPENDIX F

RECOMMENDED PRE-RETIREMENT MORTALITY RATES

Age	Male	Female
20	0.000325	0.000108
21	0.000333	0.000179
22	0.000343	0.000189
23	0.000353	0.000201
24	0.000365	0.000212
25	0.000377	0.000225
26	0.000392	0.000238
27	0.000408	0.000253
28	0.000424	0.000268
29	0.000444	0.000283
30	0.000464	0.000301
31	0.000488	0.000320
32	0.000513	0.000342
33	0.000542	0.000364
34	0.000572	0.000388
35	0.000607	0.000414
36	0.000645	0.000443
37	0.000687	0.000476
38	0.000734	0.000502
39	0.000785	0.000535
40	0.000860	0.000573
41	0.000907	0.000617
42	0.000966	0.000665
43	0.001039	0.000716
44	0.001128	0.000775
45	0.001238	0.000841
46	0.001370	0.000919

APPENDIX F

RECOMMENDED PRE-RETIREMENT MORTALITY RATES (continued)

Age	Male	Female
47	0.001527	0.001010
48	0.001715	0.001117
49	0.001932	0.001237
50	0.002183	0.001366
51	0.002471	0.001505
52	0.002790	0.001647
53	0.003138	0.001793
54	0.003513	0.001948
55	0.003909	0.002119
56	0.004324	0.002315
57	0.004755	0.002541
58	0.005200	0.002803
59	0.005660	0.003103
60	0.006131	0.003442
61	0.006618	0.003821
62	0.007139	0.004241
63	0.007719	0.004702
64	0.008384	0.005210
65	0.009158	0.005769
66	0.010064	0.006385
67	0.011133	0.007064
68	0.012391	0.007817
69	0.013868	0.008681
70	0.015592	0.009702
71	0.017579	0.010921
72	0.019804	0.012385
73	0.022229	0.014128
74	0.024817	0.016159

APPENDIX F

RECOMMENDED PRE-RETIREMENT MORTALITY RATES (continued)

Age	Male	Female
75	0.027530	0.018481
76	0.030354	0.021091
77	0.033370	0.023992
78	0.036680	0.027184
79	0.040388	0.030672
80	0.044597	0.034459
81	0.049388	0.03 8549
82	0.054758	0.042945
83	0.060678	0.047655
84	0.067125	0.052691
85	0.074070	0.058071
86	0.081484	0.063807
87	0.089300	0.069918
88	0.097525	0.076570
89	0.106047	0.083870
90	0.114836	0.091935
91	0.124170	0.101354
92	0.133870	0.111750
93	0.144073	0.123076
94	0.154859	0.135630
95	0.166307	0.149577
96	0.178214	0.165103
97	0.190460	0.182419
98	0.203007	0.201757
99	0.217904	0.222043
100	0.234086	0.243899