GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS

2014 Experience Review

For the Years July 1, 2009, to June 30, 2013

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Board of Trustees
State Employees' Retirement System
Springfield, IL

Subject: Experience Review for the Years July 1, 2009, to June 30, 2013

Dear Members of the Board:

At your request, we have performed a review of the actuarial assumptions used to value the State Employees' Retirement System of Illinois (SERS or System). The primary purpose of the study is to determine the continued appropriateness of the current actuarial assumptions by comparing actual experience to expected experience. Our study was based on census information for the period from July 1, 2009, to June 30, 2013, as provided by SERS Staff.

Our study includes a review of the experience associated with the following actuarial assumptions:

- Investment Return
- Salary Increases
- Mortality
- Withdrawal
- Retirement
- Disability

Section I contains a summary of the actuarial assumption review. The results of this analysis are set forth in Section II of this report. Section III contains the cost impact on the Statutory contribution and funded status of the System as a result of the assumption modifications. Finally, Section IV contains a summary of all proposed rates.

The results of the experience study and recommended assumptions set forth in this report are based on the data and actuarial techniques and methods described above, and upon the provisions of SERS as of the most recent valuation date, June 30, 2013. This assumption review is based on data provided by SERS for the annual actuarial valuations as well as the Illinois State Board of Investments (ISBI) for the investment allocation. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy of completeness of the information provided. All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Based on these items, we certify these results to be true and correct.

The undersigned actuaries are members of the American Academy of Actuaries and are independent of the plan sponsor and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Please see the following pages for additional disclosures required by Actuarial Standards of Practice.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

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Additional Disclosures Required by Actuarial Standards of Practice

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

This report should not be relied on for any purpose other than the purpose stated.

The signing actuaries are independent of the plan sponsor.

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SECTION I

SUMMARY

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS
EXPERIENCE REVIEW SUMMARY

Background

For any pension plan, actuarial assumptions are selected that are intended to provide reasonable estimates of future expected events, such as retirement, turnover, and mortality. These assumptions, along with an actuarial cost method, the employee census data, and the plan's provisions are used to determine the actuarial liabilities and overall actuarially determined funding requirements for the plan. The true cost to the plan over time will be the actual benefit payments and expenses required by the plan's provisions for the participant group under the plan. To the extent the actual experience deviates from the assumptions, experience gains and losses will occur. These gains (losses) then serve to reduce (increase) future actuarially determined contributions and increase (reduce) the funded ratio. The actuarial assumptions should be individually reasonable and consistent in the aggregate, and should be reviewed periodically to ensure that they remain appropriate. The actuarial cost method, for plan sponsors that use actuarially based funding policies, automatically adjusts contributions over time for differences between what is assumed and the true experience under the plan.

The Actuarial Standards Board ("ASB") provides guidance on measuring the costs of financing a retirement program through the following Actuarial Standards of Practices (ASOP):

(1) ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*
(2) ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*
(3) ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*
(4) ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*

The recommendations provided in this report are consistent with the preceding actuarial standards of practice.

A revised version of ASOP No. 27 was adopted in September 2013. The revised statement is applicable for valuations with a measurement date on or after September 30, 2014. Therefore, the first valuation for SERS that will be impacted by the revised statement will be the June 30, 2015, actuarial valuation.

Under the currently effective version of ASOP No. 27 applicable to valuations with a measurement date before September 30, 2014, the assumed investment return recommendation is based on the building block approach, defined in ASOP 27 section 3.6.2(a), which generally includes the following steps:

(1) Determine the best estimate of real returns for each broad class of assets
(2) Compute an average real return range based on the plan's asset allocation and the characteristics of each asset class
(3) Combine the average real return range with the inflation expected range
(4) Use stochastic simulation to model an explicit range of best estimate returns and likelihood of achieving those returns
(5) Select an appropriate return within the range of results

However, the building block approach assumes that the contribution policy can support the asset allocation and liquidity requirements recognized in the simulation of projected assets. If future contributions are not expected to support the simulated portfolio of assets, an alternative methodology such as the cash flow approach, defined in ASOP 27 section 3.6.2(b), may need to be used.

Under the cash flow approach, the best estimate range of returns is generally based on the following steps:

(1) Project the plan's expected benefit and expenses
(2) Identify a high quality bond portfolio with similar cash flow characteristics as the plan's projected expected benefits and expenses
(3) Estimate the rate of return for the replicating bond portfolio
(4) Establish a risk adjusted range of incremental returns in excess of the replicating bond portfolio return that recognizes:
    a. uncertainties in the projected benefits and expenses,
    b. expected returns on future contributions,
    c. reinvestment of interest and principal payments not fully needed to pay current benefits,
    d. any mismatches between the expected benefit disbursement stream and the high quality bond portfolio's interest and principal payment stream, and
    e. current and expected future plan investments in equities or other asset classes other than high-quality bonds

The State of Illinois' funding policy for SERS is to annually contribute as a level percentage of pay an amount such that the funded ratio reaches 90 percent in the year 2045. The current funding policy is expected to support the building block approach as the basis to establish the plan's investment rate of return, provided the sponsor makes the actuarially determined contributions.

According to the revised ASOP No. 27, effective for valuations on or after September 30, 2014, each economic assumption selected by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Also according to the revised ASOP No. 27, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that

different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

Assumptions Reviewed

The actuarial assumptions are usually divided into two categories:

- Economic assumptions, which include:
  - Assumed rate of price inflation (as measured by the change in the Consumer Price Index for all urban consumers)
    - Underlies all other economic assumptions
    - Basis for cost-of-living increases for members hired on or after January 1, 2011
  - Assumed long-term rate of return on investments
    - Rate at which projected benefits are reduced to present value
    - Basis for reversionary annuity factors
  - General wage increases
    - Reflects inflationary forces on increases in pay for all members
  - Rate of payroll growth
    - Reflects expectation of growth in total payroll and affects level percent of pay statutory contribution

The economic assumptions are generally chosen on the basis of the actuary's expectations as to the effect of future economic conditions on the operation of the plan, with input from Staff, the Board, and other investment advisors.

- Demographic assumptions, which include the following rates:
  - Mortality
  - Retirement
  - Withdrawal (other termination of employment)
  - Disability

Demographic assumptions are generally based on the plan's own experience, taking into account emerging trends. Rates of salary increase due to promotion and longevity are also related to the plan's experience.

The accuracy and extent of the data is an important consideration in assessing demographic experience. The accuracy of the data for this study was good, but a significant amount of data is needed in reviewing mortality experience. For this reason, we do not necessarily give full credibility to the recent active mortality experience, but also factor in general experience among a wider universe of pension plans and retirement systems. A very large amount of data is required to develop a credible mortality table. The selection of a mortality table is based on trends in the plan's experience and general trends among pension plans and retirement systems.

- Other methods and assumptions include the following:
  - Cost method
  - Amortization method
  - Asset smoothing method
  - Dependent assumptions
  - Assumptions on refund of contributions vs. deferred annuity
  - Pay increase and decrement timing assumptions

Key Findings and Recommendations

Gabriel, Roeder, Smith & Company ("GRS") has performed an experience study of the State Employees' Retirement System (SERS or System) for the period from July 1, 2009, to June 30, 2013. The primary purpose of the study was to compare the demographic and economic experience against the actuarial assumptions used in the valuations. Our study was based on the information used to perform the valuations for the period from July 1, 2009, to June 30, 2013.

Following is a summary of our key findings and recommendations:

- **Price inflation**: We recommend maintaining the rate of price inflation of 3.00 percent.
- **Investment return**: The investment return assumption, net of investment expenses, compounded annually, is currently 7.75 percent. This reflects an underlying inflation assumption of 3.00 percent. We recommend lowering the rate to either 7.50 percent or 7.25 percent and monitoring the assumption for continued reasonability in the future.
- **Payroll growth assumption**: We recommend lowering the general payroll growth assumption from 4.00 percent to 3.50 percent, which reflects an underlying general or price inflation assumption of 3.00 percent.
- **Salary increase**: We reviewed salary experience for the period from July 1, 2009, to June 30, 2013. We determined salary increases between valuations and calculated average annual salary increases. We recommend lowering the salary increase assumption from its current level.
- **Normal retirement rates:** For members eligible for Regular Formula benefits, we recommend increasing the overall rates to better reflect observed experience. For members eligible for Alternate Formula benefits, we recommend increasing the overall rates to better reflect observed experience. Furthermore, for members in Alternate Formula positions, we recommend recognizing and accounting for retirement under Regular Formula eligibility and benefit provisions.
- **Turnover rates:** We recommend maintain the current service-based only rate structure. For members eligible for Regular Formula benefits, the proposed rates increase the expected turnover and for members eligible for Alternate Formula benefits, the proposed rates also increase expected turnover.
- **Mortality rates:** We recommend changing from the RP2000 Mortality table projected to 2015 to 105 percent of the RP2014 Healthy Annuitant Mortality table for the post-

retirement mortality assumption. We recommend that the pre-retirement mortality assumption be based on a percent of the RP2014 Total Employee mortality table. The percent of the table is 90 percent for males and 110 percent for females.

- **Disability rates:** We recommend increasing the load of 1.00 percent of pay on the normal cost to 1.34 percent of pay to reflect the near-term cash flow. This assumption is based on 110 percent of the most recently available disability payments as a percent of payroll and will be updated at each valuation as experience emerges.
- **Cost Method**: The actuarial cost method is Projected Unit Credit, which is required to be used by statute. The cost method will become Entry Age Normal upon the effective date of Public Act 98-0599.
- **Amortization Method**: We recommend no change to the 30-year open level percent of pay amortization method used to calculate the Annual Required Contribution for Governmental Accounting Standards Board (GASB) accounting purposes. The funding policy is defined by statute and does not directly amortize the unfunded actuarial liability and consequently, does not comply with GASB.
- **Asset Smoothing Method**: The asset smoothing method is defined by statute. Gains and losses (the difference between the actual investment return and the expected investment return) are smoothed in over a five-year period at a rate of 20 percent per year. There is currently no asset corridor. An asset corridor limits the amount that the actuarial (smoothed) value of assets can deviate from the market value of assets. The asset valuation method is prescribed by statute, and does not appear to allow a corridor. We believe an asset corridor would be reasonable provided it complied with State statues.
- **Dependent assumptions**: We recommend maintaining the current assumption on marital status that varies by sex for active members and the assumption that males are three years older than their spouses. We have also updated the data field used to determine the marital status of retirees effectively lowering the assumed marriage percent.
- **Decrement Timing**: We recommend maintaining decrement timing of middle of the year.
- **Assumptions as a result of Public Act 96-0889**: We recommend changes to the retirement rates for members hired on or after January 1, 2011. The assumptions will be monitored more closely as more members are hired and become eligible for Tier Two benefits.
- **Load for Inactive Members Eligible for Deferred Vested Pension Benefits:** We recommend adding an assumption to the valuation to account for the increase in liability that has been observed when a member transitions from inactive to retiree. We are recommending adding a load of 15 percent to the liability attributable to inactive members eligible for deferred vested pension benefits.

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The impact of adopting the recommended assumptions is summarized in the table below. The recommended assumptions increase the actuarial liability and decrease the funded ratio.

		Experience Study		
	Baseline Valuation	7.75% Discount Rate	7.50% Discount Rate	7.25% Discount Rate
Valuation Date:	June 30, 2013	June 30, 2013	June 30, 2013	June 30, 2013
Fiscal Year Ending:	June 30, 2015	June 30, 2015	June 30, 2015	June 30, 2015
Estimated Statutory Contributions:				
• Annual Amount	$1,748,430,000	$1,841,143,000	$1,889,490,000	$1,939,380,000
• Percentage of Covered Payroll	40.472%	42.618%	43.737%	44.892%
Annual Required Contribution (ARC):				
• Annual Amount	$1,983,988,983	$2,089,935,271	$2,154,834,660	$2,222,454,540
• Percentage of Covered Payroll	45.925%	48.377%	49.879%	51.445%
Actuarial Information				
• Normal Cost Amount	$551,051,796	$558,454,593	$593,579,020	$631,130,447
• Actuarial Accrued Liability (AAL)	$34,720,764,557	$35,209,061,536	$36,314,732,708	$37,479,392,897
• Unfunded Actuarial Accrued Liability (UAAL)	$22,843,345,661	$23,331,642,640	$24,437,313,812	$25,601,974,001
• Funded Ratio based on AVA	34.21%	33.73%	32.71%	31.69%
• UAAL as % of Covered Payroll	539.24%	550.77%	576.87%	604.36%
• Funded Ratio based on MVA	35.71%	35.22%	34.15%	33.09%

SECTION II

EXPERIENCE ANALYSIS

Economic assumptions reflect the effects of economic forces on the projections of retirement benefits payable from the plan and in the discounting of those benefits to present value.

These assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected spreads over price inflation. Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, these assumptions are less reliably based on recent past experience than are the demographic assumptions.

The key economic assumptions are:

1. Assumed Rate of Inflation – The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions.
2. Assumed Rate of Investment Return - The rate at which projected future benefits under the system are reduced to present value.
3. Rate of General Annual Pay Increases - This reflects inflationary forces on increases in pay for individual members.

Inflation

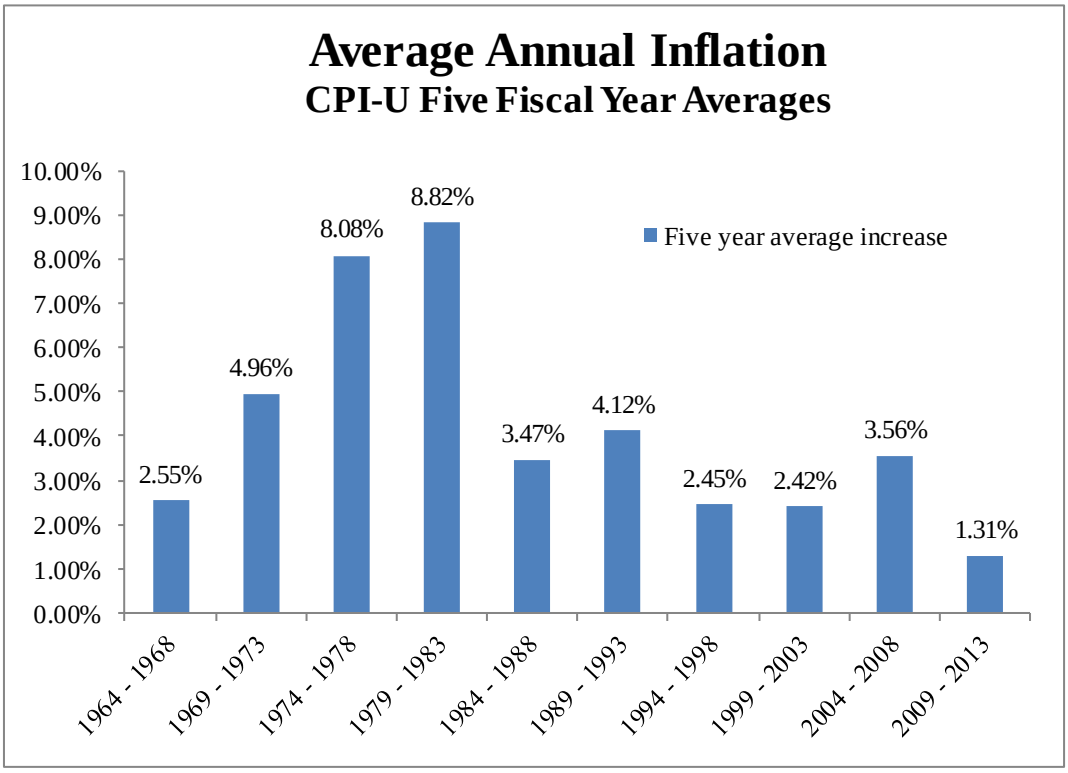
By "inflation," we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions we employ. It not only impacts investment return, but also salary increase rates, and the payroll growth assumption. The current annual inflation assumption is 3.00 percent.

Over the five-year period from June 2008 through June 2013, the CPI-U has increased at an average rate of 1.31 percent. However, the assumed inflation rate is only weakly tied to past results.

The following table shows the average inflation over various periods, ending June 2013.

Fiscal Year	Annual Increase in CPI-U
2008-09	-1.43%
2009-10	1.05%
2010-11	3.56%
2011-12	1.66%
2012-13	1.75%
3-Year Average	2.32%
5-Year Average	1.31%
10-Year Average	2.43%
20-Year Average	2.43%
25-Year Average	2.77%
30-Year Average	2.88%
40-Year Average	4.25%
50-Year Average	4.15%

The graph below shows the average inflation over 5-year periods over the last 50 years:



We surveyed the inflation assumption used by investment consulting firms. In our sample of eight firms, the inflation assumption ranged from 2.30 percent to 3.25 percent, with an average of 2.62 percent.

In the Social Security Administration's 2013 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.8 percent under the intermediate cost assumption. (The inflation assumption is 1.8 percent and 3.8 percent respectively in the low cost and high cost projection scenarios.)

Therefore, we believe a reasonable long-term inflation assumption will likely fall in the range of 2.50 percent to 3.50 percent, although we recognize that inflation may fall outside this range over the next few years. We are recommending the inflation assumption be maintained at 3.00 percent. This is close to the average of 2.88 percent over the last 30-years and consistent with the assumption used by the SSA Office of the Chief Actuary for the intermediate cost projections.

Investment Return

ASOP 27

Actuaries are required to comply with Actuarial Standard of Practice No. 27 (ASOP 27) in setting economic assumptions for retirement plans, including the assumed investment return rate.

In a public retirement system like SERS, it is ultimately the Retirement Board's responsibility to approve the actuarial assumptions used in the actuarial valuations. It is the actuary's duty to provide the Board with information needed to make those decisions and to make

recommendations to the Board. Although the Board is the ultimate decision-making body, we are still bound by ASOP 27 in providing advice or recommendations to the Board.

The current standard applicable to valuations with measurement dates before September 30, 2014, requires the actuary to identify the components of each assumption, to evaluate relevant data, and to set a best-estimate range. Then the actuary selects a point within this best-estimate range. Alternatively, the actuary may simply set the assumption without specifying a best-estimate range. All economic assumptions are required to be individually reasonable and consistent in the aggregate.

The best-estimate range is "the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall." That is, there is a 50 percent likelihood that the compound rate of return will fall within the best estimate range. This is equivalent to establishing a confidence interval that ranges from the 25th to 75th percentile.

According to the revised ASOP No. 27 applicable to valuations with a measurement date on or after September 30, 2014, each economic assumption selected by the actuary should be reasonable. For this purpose, an assumption is reasonable if it has the following characteristics:

- It is appropriate for the purpose of the measurement;
- It reflects the actuary's professional judgment;
- It takes into account historical and current economic data that is relevant as of the measurement date;
- It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and
- It has no significant bias (i.e., it is not significantly optimistic or pessimistic).

Also according to the revised ASOP No. 27, the actuary should recognize the uncertain nature of the items for which assumptions are selected and, as a result, may consider several different assumptions reasonable for a given measurement. The actuary should also recognize that different actuaries will apply different professional judgment and may choose different reasonable assumptions. As a result, a range of reasonable assumptions may develop both for an individual actuary and across actuarial practice.

Real Return

The allocation of assets within the universe of investment options will significantly impact the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Based on information found on the Illinois State Board of Investment (ISBI) website as of January 31, 2014, following is a table with the System's current target asset allocation:

Asset Category	Current Target
Domestic Equity	30%
International Equity	20%
Fixed income plus Cash	20%
Private Equity	5%
Real Estate	10%
Infrastructure	5%
Hedge Funds	10%
Total	100%

We reviewed capital market assumptions developed and published by eight independent investment consulting firms.

These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility, and correlations among the different asset classes. While some of these assumptions may be based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term and long-term expectations. The estimates for core investments (i.e. fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds.

Given the System's current target asset allocation and the capital market assumptions from the investment consultants, the development of the average nominal return, net of investment expenses, is provided in the following table:

Investment Consultant	Date of Capital Market Assumptions	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return* (3)–(4)	Actuary Inflation Assumption	Actuary Investment Expense Assumption	Expected Nominal Return** (5)+(6)-(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	1/1/2013	6.72%	2.50%	4.22%	3.00%	0.50%	6.72%
2	1/1/2013	7.35%	3.00%	4.35%	3.00%	0.50%	6.85%
3	1/1/2013	6.97%	2.50%	4.47%	3.00%	0.50%	6.97%
4	12/31/2012	7.21%	2.40%	4.81%	3.00%	0.50%	7.31%
5	1/1/2013	8.28%	3.25%	5.03%	3.00%	0.50%	7.53%
6	9/30/2012	7.71%	2.51%	5.20%	3.00%	0.50%	7.70%
7	9/30/2012	8.13%	2.30%	5.83%	3.00%	0.50%	8.33%
8	1/1/2013	8.74%	2.50%	6.24%	3.00%	0.50%	8.74%
Average		**7.64%**	**2.62%**	**5.02%**	**3.00%**	**0.50%**	**7.52%**

**Average real rate of return is 4.52% net of investment expenses.*
***Based on arithmetic average.*

Based on each firm's assumptions, we estimated the expected real return of SERS's portfolio (col. (5)). Next, based on the actuary's recommended inflation and investment expense assumption, we estimated the nominal return net of investment expenses (col. (8)). As the table shows, the average one-year nominal return (net of expenses) of the eight firms is 7.52 percent, which is 0.23 percentage points less than the current assumption of 7.75 percent.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25th, 50th, and 75th percentiles of the 30-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 7.75 percent assumption as well as two alternate assumption of 7.50 percent and 7.25 percent.

Investment Consultant	Distribution of 30-Year Average Geometric Net Nominal Return			Probability of exceeding	Probability of exceeding	Probability of exceeding
	25th	50th	75th	7.75%	7.50%	7.25%
(1)	(2)	(3)	(4)	(5)	(5)	(5)
1	4.53%	6.01%	7.51%	21.7%	25.2%	28.8%
2	4.60%	6.11%	7.64%	23.5%	27.0%	30.8%
3	4.80%	6.27%	7.77%	25.2%	28.9%	32.9%
4	5.63%	6.84%	8.07%	30.9%	35.9%	41.1%
5	5.46%	6.88%	8.33%	34.2%	38.6%	43.2%
6	5.38%	6.93%	8.50%	36.2%	40.3%	44.5%
7	6.14%	7.63%	9.14%	47.9%	52.3%	56.8%
8	6.27%	7.90%	9.55%	52.4%	56.5%	60.5%
Average	**5.35%**	**6.82%**	**8.31%**	**34.0%**	**38.1%**	**42.3%**

As the analysis shows, there is a 50 percent likelihood that the 30-year average net real return will be between 5.35 percent and 8.31 percent. This becomes the best-estimate range under ASOP 27 applicable to valuations with measurement dates before September 30, 2014. However, none of the capital market assumptions provided by the investment consulting firms indicate there is more than a 50 percent chance of exceeding the current assumption of 7.75 percent over the next 30 years. Furthermore, the average results of all eight firms indicate there is about a 34 percent chance that the System will produce an average return that exceeds 7.75 percent over the next 30 years.

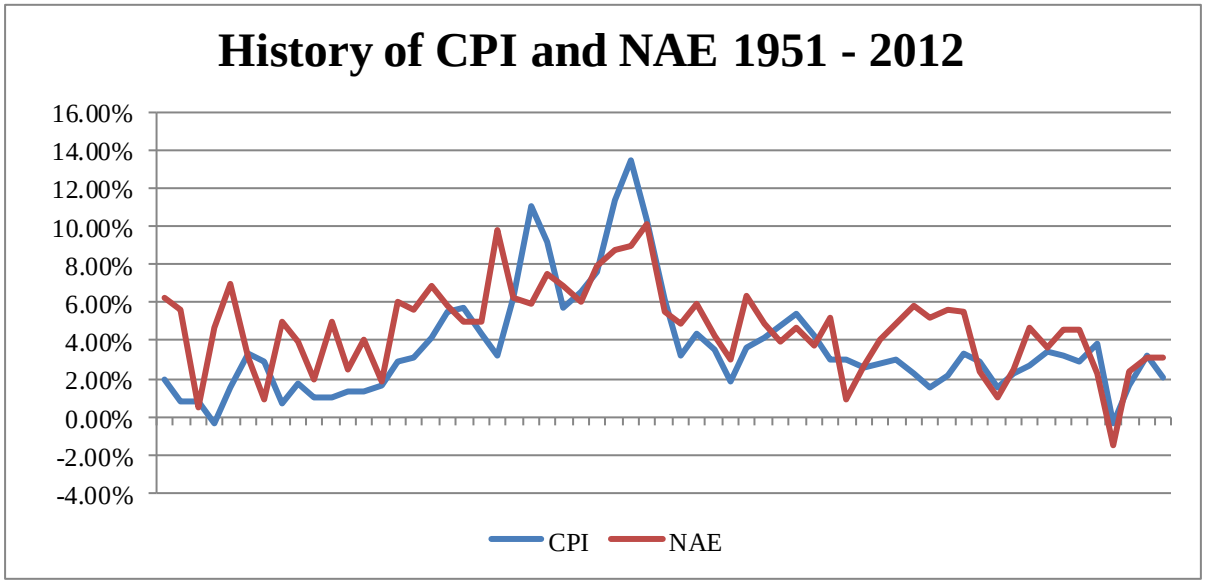
Recommendation

Based on our analysis of the expected investment return and the current target asset allocation, we recommend lowering the long-term investment return assumption to either 7.50 percent or 7.25 percent. We recommend that the assumed investment return be reviewed before the next experience review if warranted. Also, any significant changes in the target asset allocation may warrant an additional review of the rate of return assumption. We believe that this assumption can be supported by the revised Actuarial Standard of Practice No. 27. Under the Standard, all economic assumptions must be selected to be consistent with the purpose of the measurement. The purpose of the measurement is to determine the contribution rate which will lead to the accumulation of assets to pay benefits when due. The assumption of 7.50 percent or 7.25 percent

is below the arithmetic mean of 7.52 percent as disclosed above. Section 3.8.3 j. of the revised Actuarial Standard of Practice No. 27 states that "the use of a forward looking expected arithmetic return as an investment return assumption will produce a mean accumulated value."

General Wage Increase and Payroll Growth Assumption

The SERS assumptions make a distinction between price inflation (currently assumed to be 3.00 percent) and the rate of payroll growth (currently assumed to be 4.00 percent). The National Average Earnings (NAE) series published in connection with the operation of the Social Security program is a useful proxy for measuring general changes in wage levels in the economy. Increases in NAE typically exceed increases in the Consumer Price Index (CPI), although there are periods where the patterns are reversed. The economic argument for wages exceeding prices in the long run is that CPI is based on the prices of a fixed basket of goods whereas wages reflect innovations, real productivity growth, labor supply and demand, and other factors in addition to pure price inflation.



Over the last 61 years, NAE has exceeded CPI 41 times and the averages over that period are 4.6 percent for NAE and 3.6 percent for CPI. The last 25 years has had fewer cases of high inflation, but the distinction between prices and wages still appears. Over the last 25 years, the average increase in NAE is 3.6 percent and the average increase in CPI is 2.9 percent.

As with the investment return assumption, past experience does not dictate future expectations. Current expectations are mixed on whether price and wage inflation will remain low in the short term, particularly due to the after effects of recent federal government spending. For a long term view, the 2013 Annual Report from the Trustees of the Social Security Administration (SSA) assumes an intermediate average CPI of 2.8 percent over the next 75 years and an intermediate growth assumption for average wages in covered employment of 3.9 percent. The SSA report provides alternate "Low-cost" assumptions of 1.8 percent CPI/3.5 percent wages and "High-cost" assumptions of 3.8 percent CPI/4.3 percent wages.

With ongoing pressure on the ability of states to sustain across the board increases in wages consistent with historical norms, we do not believe there is justification to increase the

assumption for productivity increases; in other words, to increase the assumed gap between price increase and wage growth. In fact, we recommend lowering the assumption for productivity increases to 0.50 percent. Combining the recommendation with a 3.00 percent inflation assumption, implies a wage growth assumption of 3.50 percent. These assumptions are summarized below:

	Present Assumption
Price Inflation	3.00%
Productivity Increases	0.50%
Total Wage Inflation	3.50%

Salary Increase

The components that determine the total salary increase are wage inflation, merit and longevity increases and promotion increases. We reviewed salary increase based on both and service. A more credible pattern of increases emerged when salary increases were based on age only. Over the experience study period, actual salary increases were significantly lower than the assumed rate. We recommend recognizing a portion of the lower salary experience and changing the merit and longevity and promotion increase portion of the salary increase assumption to better reflect actual experience.

This assumption was developed using both Tier One and Tier Two data and is applicable to both Tier One and Tier Two members.

Table and Graph I compare the salary experience, current assumptions and recommended assumptions by years of service for each of the following:

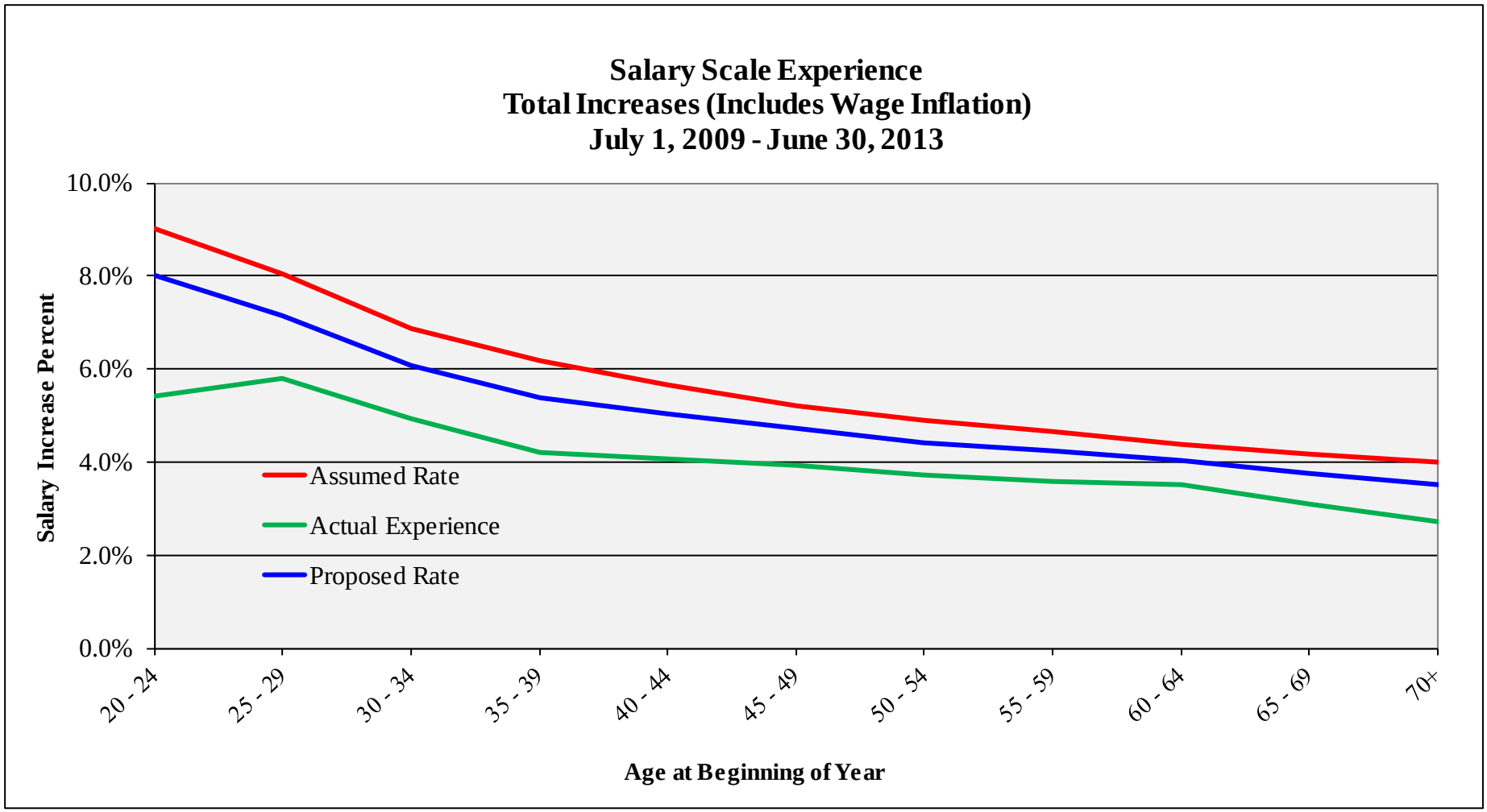
- Table I – Salary Experience by Age
- Graph I – Salary Experience by Age

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS
SALARY SCALE ASSUMPTION

Table I

Age at Beginning of Year	Number	Actual Payroll		Actual Total Increase	Expected Total Increase	Proposed Total Increase
		Prior Year	Current Year			
20 - 24	1,534	61,232,692	64,547,573	5.41%	9.00%	8.00%
25 - 29	7,667	386,052,623	408,391,461	5.79%	8.03%	7.13%
30 - 34	15,506	903,881,026	948,294,712	4.91%	6.87%	6.09%
35 - 39	22,883	1,473,985,376	1,535,761,457	4.19%	6.18%	5.39%
40 - 44	31,731	2,159,453,296	2,247,557,283	4.08%	5.67%	5.03%
45 - 49	40,715	2,861,674,229	2,974,427,603	3.94%	5.22%	4.71%
50 - 54	40,563	2,816,669,637	2,921,430,909	3.72%	4.89%	4.42%
55 - 59	33,792	2,316,622,121	2,399,731,357	3.59%	4.65%	4.22%
60 - 64	19,949	1,353,202,904	1,400,806,928	3.52%	4.38%	4.04%
65 - 69	5,758	391,780,318	403,971,609	3.11%	4.18%	3.75%
70+	2,039	128,071,263	131,571,881	2.73%	4.00%	3.50%
Total	**222,137**	**14,852,625,485**	**15,436,492,773**	**3.93%**	**5.30%**	**4.76%**

Graph I


Salary Scale Experience
Total Increases (Includes Wage Inflation)
July 1, 2009 - June 30, 2013
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Salary Increase Percent
Assumed Rate
Actual Experience
Proposed Rate
20 - 24
25 - 29
30 - 34
35 - 39
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70+
Age at Beginning of Year

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS
DEMOGRAPHIC ASSUMPTIONS

The following pages present the analysis of the demographic assumptions. These assumptions include assumed rates of mortality among active and retired members, retirement patterns, and turnover patterns. These patterns generally take the form of tables of rates of incidence based on age and/or years of service.

Absent any significant changes in benefit provisions, these assumptions generally exhibit reasonable consistency over periods of time. As a result, each demographic assumption is normally reviewed by relating actual experience to that assumed over the recent past.

The analysis of demographic experience is conducted for each assumption using a measure known as the "Actual to Expected (A/E) Ratio." The A/E Ratio is simply the ratio of the actual number of occurrences of the event to which the assumption applies (e.g., deaths or retirements) to the number expected to occur in accordance with the assumption. An A/E Ratio of 1.00 indicates that the assumption precisely predicted the number of occurrences. An A/E Ratio exceeding 1.00 indicates that the assumption underestimated actual experience. Conversely, an A/E Ratio lower than 1.00 indicates that the assumption overestimated actual experience.

These are statistical analyses. As a result, there are several considerations we must keep in mind as we analyze these ratios:

1. An actuarial assumption is designed to reflect average experience over long periods of time (30 - 50 years). As a result:
    a. A deviation between actual experience and that expected from our assumptions for one or two years does not necessarily mean that the assumption should be changed.
    b. A change in actuarial assumption should result if the experience indicates a consistent pattern which is different from that assumed over a period of years.
2. The larger the amount of data available, the more reliable the statistics used in the analysis. As a result:
    a. Events that occur with great frequency (e.g., general employment turnover) are more credibly predictable than those occurring less frequently (e.g., active member death).
    b. In all cases, data covering the entire study period produce more credible results than data for a single year.
    c. Year by year experience is helpful only in identifying trends and determining whether the four-year data is truly reflective of the entire period.

This analysis is based on the valuation data for the four-year period from July 1, 2009, to June 30, 2013.

Retirement

The System provisions establish the minimum eligibility requirements for retirement as follows:

Upon termination of State service, a member is eligible for a pension at age 60 with at least eight years of pension credit or at any age with 35 or more years of credit.

General formula members are eligible for a retirement annuity if the sum of the member's age plus years (and whole months) of pension credit equals or exceeds 85. General formula members between ages 55 and 60 with at least 25 years of pension credit are eligible for a retirement annuity reduced by one-half of 1 percent for each month the member is under age 60. Certain positions in the Department of Corrections were placed under the general formula effective July 1, 2005.

Members serving in a position in which service toward the Alternative Retirement Annuity may be earned are eligible to receive the Alternative Retirement Annuity at age 50 with at least 25 years of alternate pension credit or at age 55 with at least 20 years of alternate pension credit in such a position. Security employees of the Department of Human Services were placed under the alternative formula effective January 1, 2001. Certain members of the Department of Transportation and the Toll Highway Authority were placed under the alternative formula effective August 1, 2001.

Retirement cost, however, is determined not by the minimum eligibility requirements but by the ages at which members actually retire. The valuation does not assume that everyone retires at earliest eligibility. The assumption about the timing of retirement once eligibility has been established is a major component in cost calculations. Note that higher rates of retirement at earlier retirement ages or years of service upon attaining retirement eligibility generally result in higher actuarially determined contributions, and vice versa.

Experience during the last four years was considered in the analysis shown on the following pages. The "Exposure" column shows the number of employees eligible to retire at various years of service or ages throughout the experience period. An individual could potentially be counted up to five times if eligible each year in the period. By tabulating employees in this fashion we are able to answer the question: "For all employees eligible at condition X, how many retired?"

Normal Retirement Experience

Current and past experience has shown that retirement rates under this System are correlated with age. Currently, the System uses age-based rates with higher rates at key ages, with 100 percent retirement at age 70. We recommend the following changes:

- Extending the age based rates to age 75 for both males and females.
- For both male and female members, an increase in rates in the early ages and a decrease in the rates in later ages to reflect the actual experience of the System.

Applying the proposed rates to historical data generates the following number of retirements by age at retirement:

	Regular Formula - Number of Retirements					
	Male Members			Female Members		
Nearest Age	Actual	Current Assumption	Proposed Assumption	Actual	Current Assumption	Proposed Assumption
50-54	182	116	185	481	288	464
55-59	551	364	558	928	737	907
60-64	1,262	1,036	1,237	1,637	1,429	1,701
65-69	676	536	672	707	675	719
70-74	145	850	148	172	897	169
75+	89	421	421	71	362	362
Total	**2,905**	**3,322**	**3,221**	**3,996**	**4,387**	**4,322**
Total Excluding 75+	**2,816**	**2,901**	**2,800**	**3,925**	**4,025**	**3,960**

Early Retirement Experience

Early retirement experience for male and female members was generally lower than the current early retirement rates. We recommend the following changes:

- For male members, we recommend a decrease in the rates at age 55 and from ages 57 to 59 and no change to the rate at age 56.
- For female members, we recommend a decrease in the rates from ages 55 to 57 and at age 59 and an increase to the rate at age 58.

Retirement Experience and Recommendations

The tables and graphs on the following pages show experience for normal and early retirement.

- Table and Graph II(a) – Normal Retirement Experience – Regular Formula Male Members
- Table and Graph II(b) – Normal Retirement Experience – Regular Formula Female Members
- Table and Graph II(c) – Early Retirement Experience – Regular Formula Male Members
- Table and Graph II(d) – Early Retirement Experience – Regular Formula Female Members

Table II(a)

Normal Retirement Experience – Regular Formula Male Members

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
50	0	0		0	5.0%		0	15.0%	
51	12	2	16.7%	1	5.0%	3.3	2	15.0%	1.0
52	127	33	26.0%	19	15.0%	1.7	32	25.0%	1.0
53	259	63	24.3%	31	12.0%	2.0	65	25.0%	1.0
54	432	84	19.4%	65	15.0%	1.3	86	20.0%	1.0
55	541	88	16.3%	65	12.0%	1.4	95	17.5%	0.9
56	637	114	17.9%	64	10.0%	1.8	111	17.5%	1.0
57	722	111	15.4%	72	10.0%	1.5	108	15.0%	1.0
58	802	119	14.8%	80	10.0%	1.5	120	15.0%	1.0
59	825	119	14.4%	83	10.0%	1.4	124	15.0%	1.0
60	2,150	237	11.0%	215	10.0%	1.1	215	10.0%	1.1
61	1,968	215	10.9%	197	10.0%	1.1	197	10.0%	1.1
62	1,827	360	19.7%	274	15.0%	1.3	365	20.0%	1.0
63	1,558	269	17.3%	195	12.5%	1.4	273	17.5%	1.0
64	1,244	181	14.5%	156	12.5%	1.2	187	15.0%	1.0
65	1,033	213	20.6%	207	20.0%	1.0	207	20.0%	1.0
66	778	196	25.2%	156	20.0%	1.3	195	25.0%	1.0
67	583	114	19.6%	73	12.5%	1.6	117	20.0%	1.0
68	465	93	20.0%	58	12.5%	1.6	93	20.0%	1.0
69	343	60	17.5%	43	12.5%	1.4	60	17.5%	1.0
70	267	48	18.0%	267	100.0%	0.2	47	17.5%	1.0
71	190	35	18.4%	190	100.0%	0.2	33	17.5%	1.1
72	148	23	15.5%	148	100.0%	0.2	22	15.0%	1.0
73	131	22	16.8%	131	100.0%	0.2	23	17.5%	1.0
74	114	17	14.9%	114	100.0%	0.1	23	20.0%	0.7
75+	421	89	21.1%	421	100.0%	0.2	421	100.0%	0.2
Totals:	**17,577**	**2,905**	**16.5%**	**3,322**	**18.9%**	**0.9**	**3,221**	**18.3%**	**0.9**
Excluding 75+:	**17,156**	**2,816**	**16.4%**	**2,901**	**16.9%**	**1.0**	**2,800**	**16.3%**	**1.0**

Graph II(a)

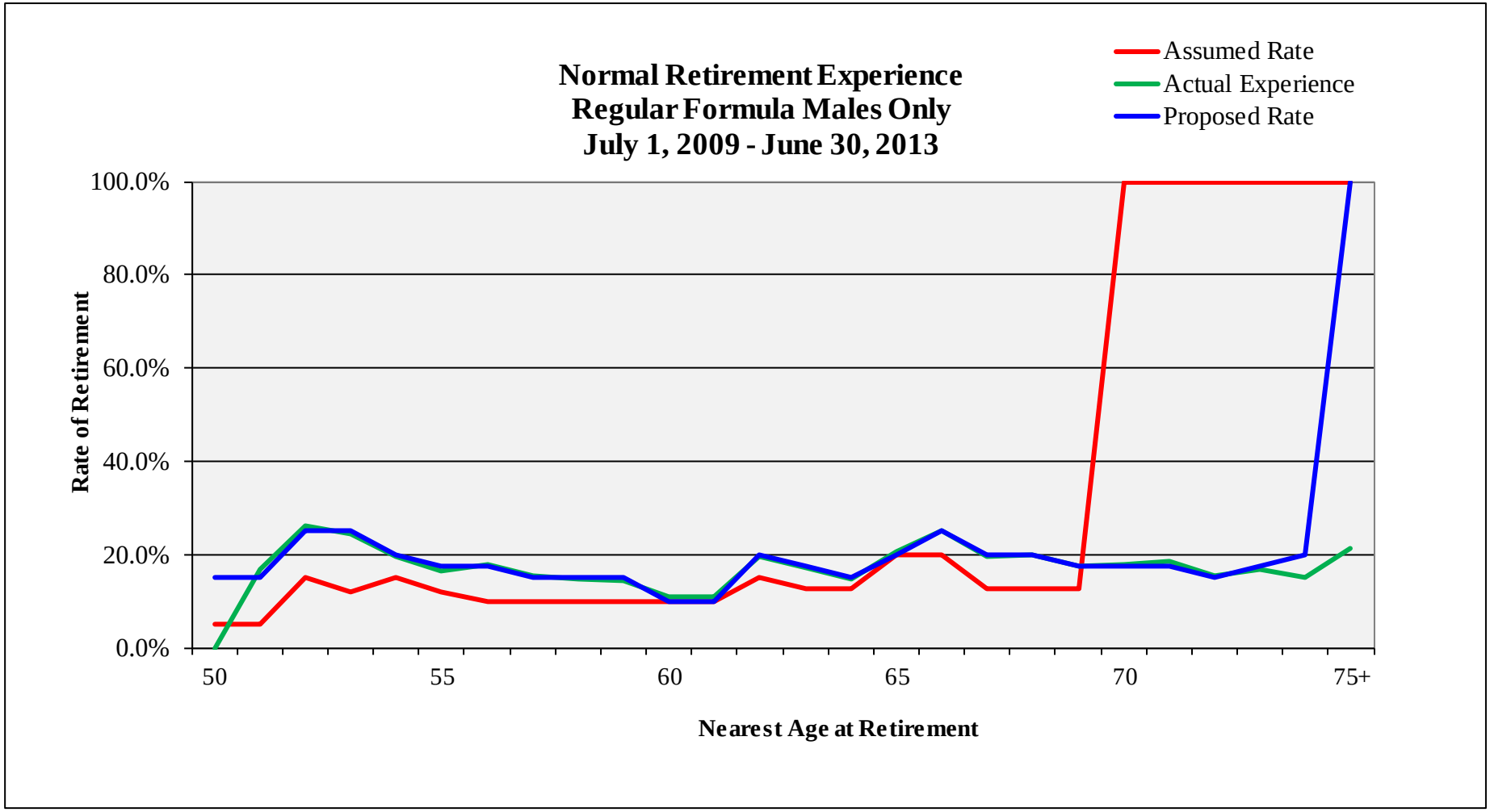

Normal Retirement Experience
Regular Formula Males Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
50
55
60
65
70
75+
Nearest Age at Retirement

Table II(b)

Normal Retirement Experience – Regular Formula Female Members

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
50	0	0		0	5.0%		0	25.0%	
51	42	10	23.8%	2	5.0%	4.8	11	25.0%	0.9
52	397	131	33.0%	60	15.0%	2.2	119	30.0%	1.1
53	642	155	24.1%	96	15.0%	1.6	161	25.0%	1.0
54	864	185	21.4%	130	15.0%	1.4	173	20.0%	1.1
55	1,057	187	17.7%	137	13.0%	1.4	169	16.0%	1.1
56	1,115	182	16.3%	145	13.0%	1.3	178	16.0%	1.0
57	1,173	190	16.2%	152	13.0%	1.2	188	16.0%	1.0
58	1,178	182	15.4%	153	13.0%	1.2	188	16.0%	1.0
59	1,150	187	16.3%	150	13.0%	1.3	184	16.0%	1.0
60	2,796	406	14.5%	363	13.0%	1.1	447	16.0%	0.9
61	2,434	301	12.4%	243	10.0%	1.2	304	12.5%	1.0
62	2,083	402	19.3%	365	17.5%	1.1	417	20.0%	1.0
63	1,710	298	17.4%	257	15.0%	1.2	299	17.5%	1.0
64	1,338	230	17.2%	201	15.0%	1.1	234	17.5%	1.0
65	1,052	233	22.1%	263	25.0%	0.9	263	25.0%	0.9
66	799	179	22.4%	160	20.0%	1.1	160	20.0%	1.1
67	591	117	19.8%	118	20.0%	1.0	118	20.0%	1.0
68	511	97	19.0%	77	15.0%	1.3	102	20.0%	1.0
69	379	81	21.4%	57	15.0%	1.4	76	20.0%	1.1
70	271	56	20.7%	271	100.0%	0.2	54	20.0%	1.0
71	213	31	14.6%	213	100.0%	0.1	32	15.0%	1.0
72	167	32	19.2%	167	100.0%	0.2	33	20.0%	1.0
73	133	29	21.8%	133	100.0%	0.2	27	20.0%	1.1
74	113	24	21.2%	113	100.0%	0.2	23	20.0%	1.0
75+	362	71	19.6%	362	100.0%	0.2	362	100.0%	0.2
Totals:	**22,570**	**3,996**	**17.7%**	**4,387**	**19.4%**	**0.9**	**4,322**	**19.1%**	**0.9**
Excluding 75+:	**22,208**	**3,925**	**17.7%**	**4,025**	**18.1%**	**1.0**	**3,960**	**17.8%**	**1.0**

Graph II(b)

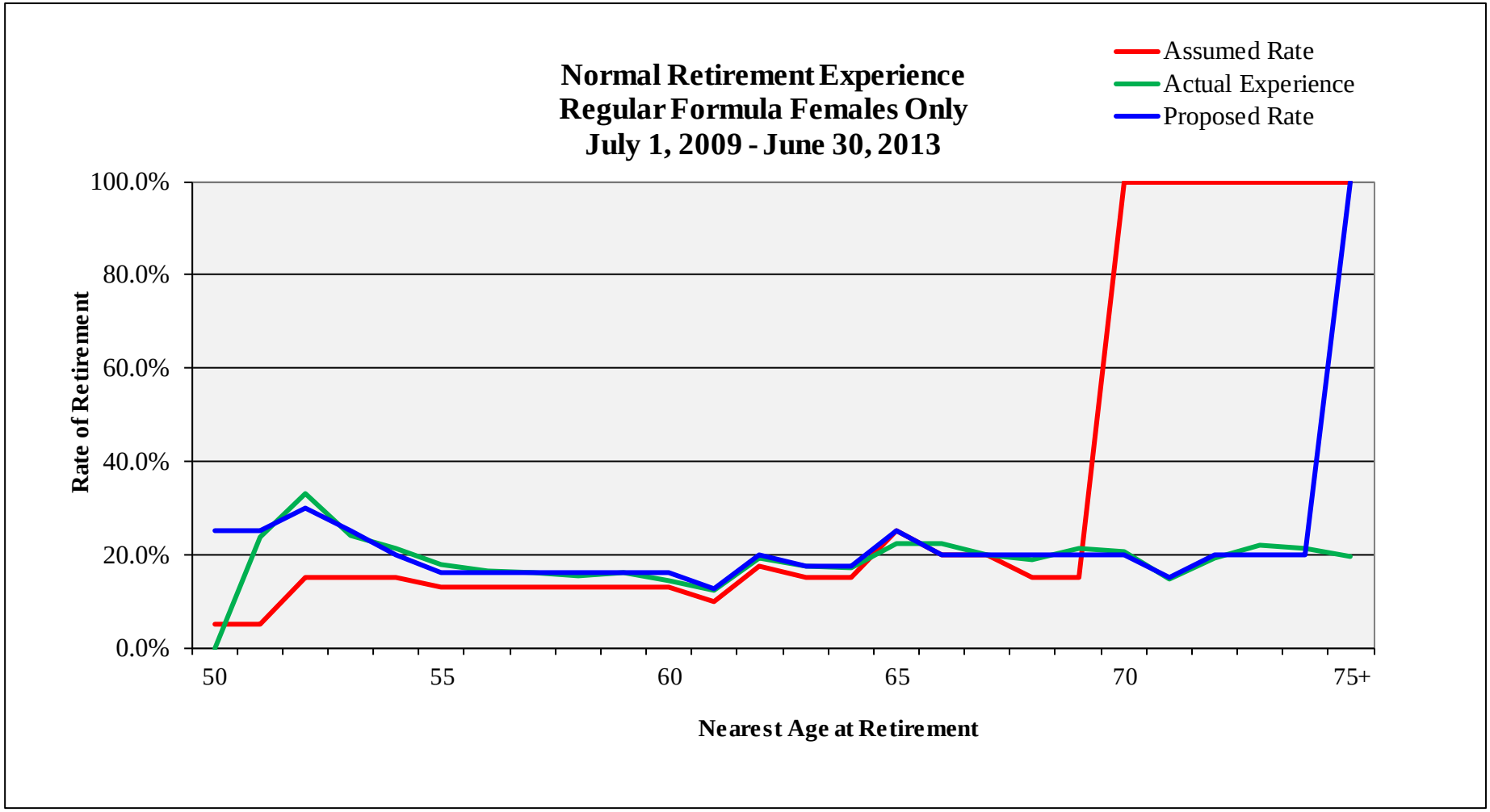

Normal Retirement Experience
Regular Formula Females Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
50
55
60
65
70
75+
Nearest Age at Retirement

Table II(c)

Early Retirement Experience – Regular Formula Male Members

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
55	528	22	4.2%	29	5.5%	0.8	24	4.5%	0.9
56	418	29	6.9%	25	6.0%	1.2	25	6.0%	1.2
57	303	13	4.3%	23	7.5%	0.6	15	5.0%	0.9
58	198	12	6.1%	18	9.0%	0.7	15	7.5%	0.8
59	117	11	9.4%	14	12.0%	0.8	11	9.5%	1.0
Totals:	**1,564**	**87**	**5.6%**	**109**	**7.0%**	**0.8**	**90**	**5.8%**	**1.0**

Graph II(c)

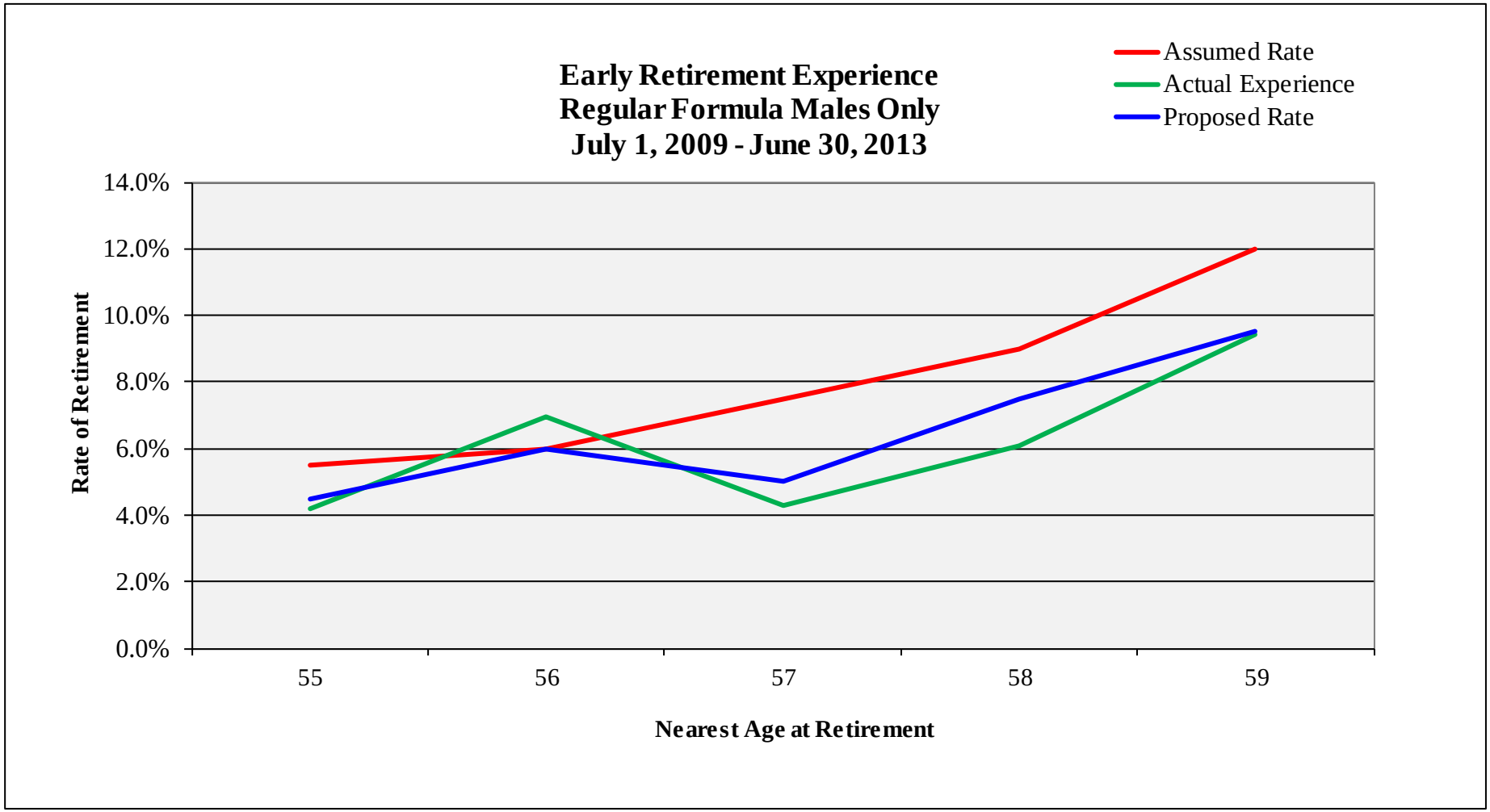
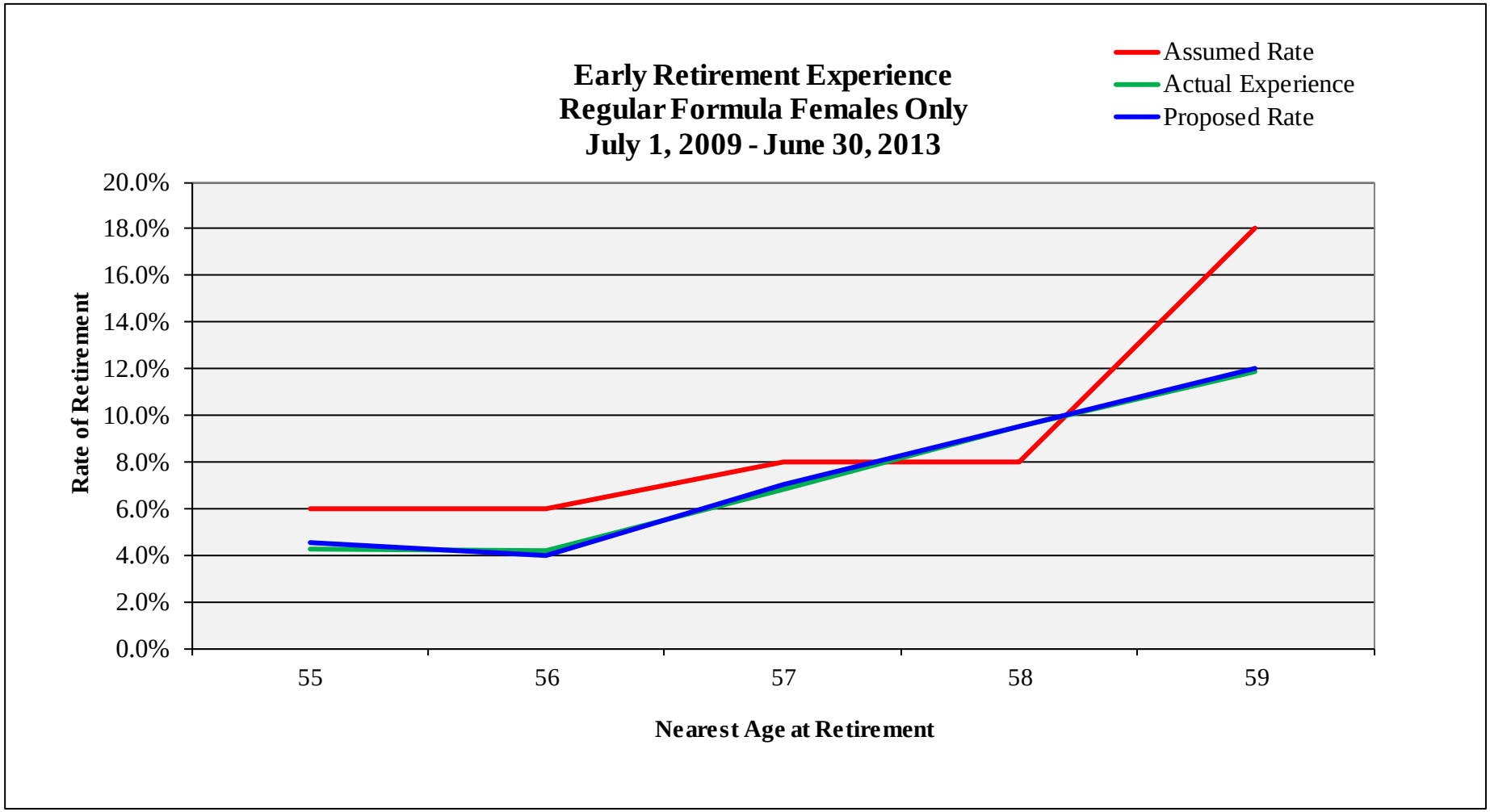

Early Retirement Experience
Regular Formula Males Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
Rate of Retirement
55
56
57
58
59
Nearest Age at Retirement

Table II(d)

Early Retirement Experience – Regular Formula Female Members

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate	Actual / Expected	Expected Retirements	Proposed Rate	Actual / Expected
55	633	27	4.3%	38	6.0%	0.7	28	4.5%	1.0
56	500	21	4.2%	30	6.0%	0.7	20	4.0%	1.1
57	367	25	6.8%	29	8.0%	0.9	26	7.0%	1.0
58	242	23	9.5%	19	8.0%	1.2	23	9.5%	1.0
59	135	16	11.9%	24	18.0%	0.7	16	12.0%	1.0
Totals:	**1,877**	**112**	**6.0%**	**141**	**7.5%**	**0.8**	**113**	**6.0%**	**1.0**

Graph II(d)


Early Retirement Experience
Regular Formula Females Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
Rate of Retirement
20.0%
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
55
56
57
58
59
Nearest Age at Retirement

Normal Retirement Experience

Current and past experience has shown that retirement rates under this System are correlated with age. Currently, the System uses age-based rates with higher rates at key ages, with 100 percent retirement at age 70. Among other changes discussed below, we are recommending extending the age based rates to age 72 for both males and females.

Generally speaking, members are eligible to receive alternate formula benefits provided they are age 50 with at least 25 years of alternate formula pension credit or at age 55 with at least 20 years of alternate formula pension credit. During the analysis, it was noted that a number of members working in positions in which alternate formula pension credit is accrued were retiring based upon regular formula eligibility. As a result, we are recommending that this experience be recognized and accounted for in the valuation. As a result, we have developed separate rates for those members who could potentially retire based upon regular formula eligibility and benefit provisions. Furthermore, for member's eligible for retirement based upon the alternate formula eligibility, we are recommending changes to the rates to reflect the actual experience of the System.

For alternate formula members eligible for retirement under the alternate formula provisions, applying the proposed rates to historical data generates the following number of retirements by age at retirement:

	Alternate Formula Retiring Under Alternate Formula - Number of Retirements					
	Male Members			**Female Members**		
Nearest Age	**Actual**	**Current Assumption**	**Proposed Assumption**	**Actual**	**Current Assumption**	**Proposed Assumption**
50-54	1,385	1,137	1,382	242	256	237
55-59	739	586	755	230	232	222
60-64	336	331	337	139	116	139
65-69	126	109	127	47	44	48
70-71	12	26	12	7	12	7
72+	10	34	34	4	16	16
Total	**2,608**	**2,224**	**2,647**	**669**	**676**	**669**
Total Excluding 72+	**2,598**	**2,190**	**2,613**	**665**	**660**	**653**

For alternate formula members eligible for retirement under the regular formula provisions, applying the proposed rates to historical data generates the following number of retirements by age at retirement:

	Alternate Formula Retiring Under Regular Formula - Number of Retirements					
	Male Members			Female Members		
Nearest Age	Actual	Current Assumption	Proposed Assumption	Actual	Current Assumption	Proposed Assumption
60-64	164	N/A	175	62	N/A	60
65-69	155	N/A	151	38	N/A	45
70-71	15	N/A	13	8	N/A	8
72+	11	N/A	59	5	N/A	31
Total	**345**	**N/A**	**398**	**113**	**N/A**	**144**
Total Excluding 72+	**334**	**N/A**	**339**	**108**	**N/A**	**113**

Retirement Experience and Recommendations

The tables and graphs on the following pages show experience for normal and early retirement.

- Table and Graph III(a) – Normal Retirement Experience – Alternate Formula Male Members - Eligible for Retirement Under the Alternate Formula Provisions
- Table and Graph III(b) – Normal Retirement Experience – Alternate Formula Female Members - Eligible for Retirement Under the Alternate Formula Provisions
- Table and Graph III(c) – Normal Retirement Experience – Alternate Formula Male Members - Eligible for Retirement Under the Regular Formula Provisions
- Table and Graph III(d) – Normal Retirement Experience – Alternate Formula Female Members - Eligible for Retirement Under the Regular Formula Provisions

Table III(a)

Normal Retirement Experience – Alternate Formula Male Members - Eligible for Retirement under the Alternate Formula Provisions

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
50	1,005	602	59.9%	503	50.0%	1.2	603	60.0%	1.0
51	604	277	45.9%	211	35.0%	1.3	272	45.0%	1.0
52	459	202	44.0%	161	35.0%	1.3	207	45.0%	1.0
53	376	141	37.5%	132	35.0%	1.1	150	40.0%	0.9
54	374	163	43.6%	131	35.0%	1.2	150	40.0%	1.1
55	715	246	34.4%	250	35.0%	1.0	250	35.0%	1.0
56	556	183	32.9%	111	20.0%	1.6	195	35.0%	0.9
57	447	123	27.5%	89	20.0%	1.4	123	27.5%	1.0
58	361	106	29.4%	72	20.0%	1.5	108	30.0%	1.0
59	316	81	25.6%	63	20.0%	1.3	79	25.0%	1.0
60	267	77	28.8%	80	30.0%	1.0	80	30.0%	1.0
61	224	59	26.3%	67	30.0%	0.9	56	25.0%	1.1
62	208	93	44.7%	94	45.0%	1.0	94	45.0%	1.0
63	169	69	40.8%	51	30.0%	1.4	68	40.0%	1.0
64	131	38	29.0%	39	30.0%	1.0	39	30.0%	1.0
65	103	57	55.3%	52	50.0%	1.1	57	55.0%	1.0
66	56	29	51.8%	11	20.0%	2.6	28	50.0%	1.0
67	37	17	45.9%	11	30.0%	1.5	19	50.0%	0.9
68	38	11	28.9%	19	50.0%	0.6	11	30.0%	1.0
69	33	12	36.4%	17	50.0%	0.7	12	35.0%	1.0
70	19	10	52.6%	19	100.0%	0.5	10	50.0%	1.0
71	7	2	28.6%	7	100.0%	0.3	2	30.0%	1.0
72+	34	10	29.4%	34	100.0%	0.3	34	100.0%	0.3
Totals:	**6,539**	**2,608**	**39.9%**	**2,224**	**34.0%**	**1.2**	**2,647**	**40.5%**	**1.0**
Excluding 72+:	**6,505**	**2,598**	**39.9%**	**2,190**	**33.7%**	**1.2**	**2,613**	**40.2%**	**1.0**

Graph III(a)

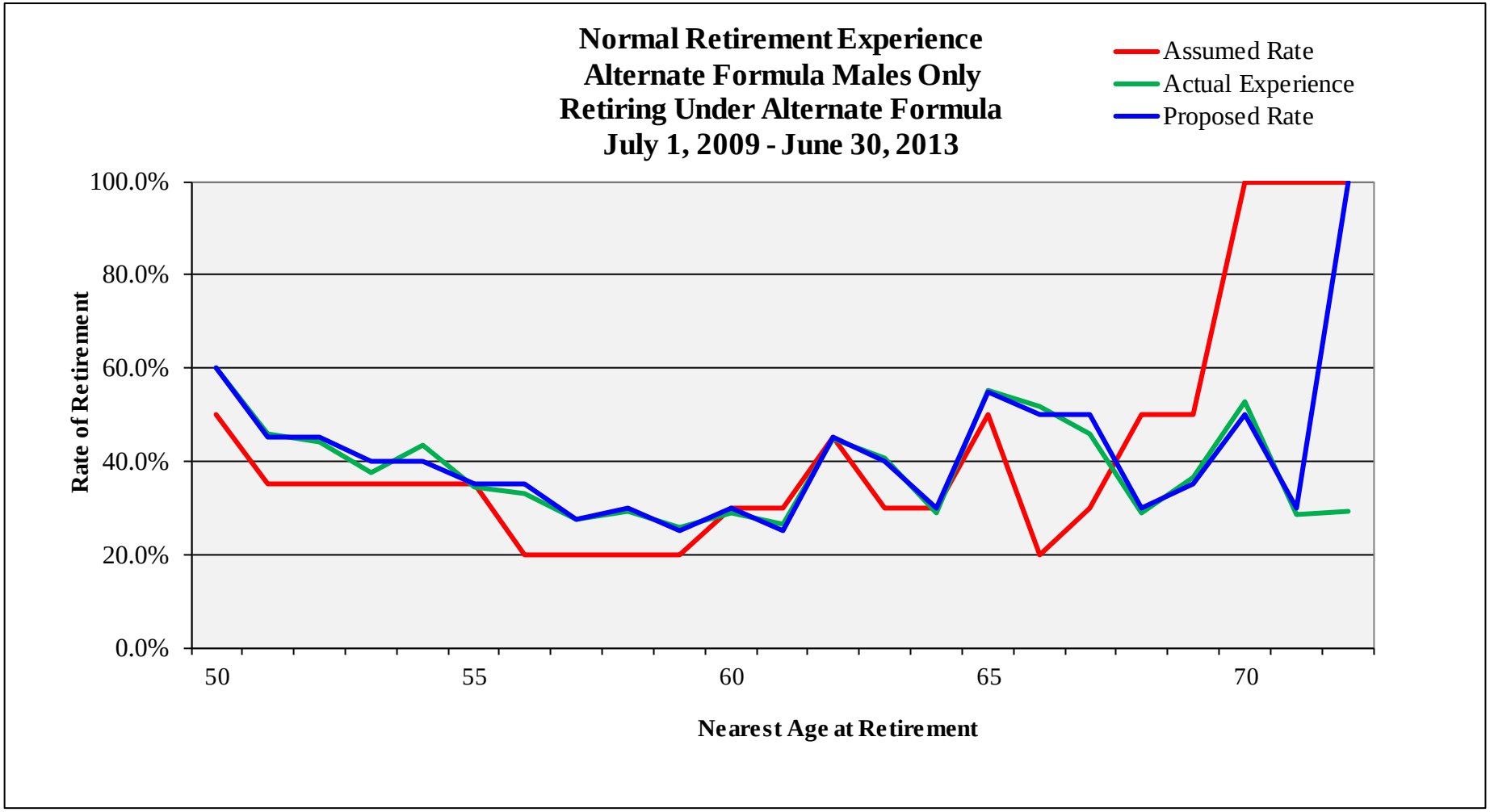

Normal Retirement Experience
Alternate Formula Males Only
Retiring Under Alternate Formula
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
50
55
60
65
70
Nearest Age at Retirement

Table III(b)

Normal Retirement Experience – Alternate Formula Female Members - Eligible for Retirement under the Alternate Formula Provisions

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
50	188	78	41.5%	94	50.0%	0.8	75	40.0%	1.0
51	148	61	41.2%	37	25.0%	1.6	59	40.0%	1.0
52	125	42	33.6%	50	40.0%	0.8	44	35.0%	1.0
53	111	36	32.4%	44	40.0%	0.8	33	30.0%	1.1
54	102	25	24.5%	31	30.0%	0.8	26	25.0%	1.0
55	243	76	31.3%	73	30.0%	1.0	73	30.0%	1.0
56	190	45	23.7%	48	25.0%	0.9	48	25.0%	0.9
57	170	37	21.8%	43	25.0%	0.9	34	20.0%	1.1
58	172	41	23.8%	43	25.0%	1.0	34	20.0%	1.2
59	131	31	23.7%	26	20.0%	1.2	33	25.0%	0.9
60	121	37	30.6%	24	20.0%	1.5	36	30.0%	1.0
61	88	19	21.6%	26	30.0%	0.7	18	20.0%	1.1
62	89	38	42.7%	36	40.0%	1.1	40	45.0%	1.0
63	69	25	36.2%	17	25.0%	1.4	24	35.0%	1.0
64	52	20	38.5%	13	25.0%	1.5	21	40.0%	1.0
65	37	15	40.5%	15	40.0%	1.0	15	40.0%	1.0
66	26	16	61.5%	10	40.0%	1.5	16	60.0%	1.0
67	21	10	47.6%	8	40.0%	1.2	11	50.0%	0.9
68	13	2	15.4%	5	40.0%	0.4	2	15.0%	1.0
69	12	4	33.3%	5	40.0%	0.8	4	35.0%	1.0
70	8	5	62.5%	8	100.0%	0.6	5	60.0%	1.0
71	4	2	50.0%	4	100.0%	0.5	2	50.0%	1.0
72+	16	4	25.0%	16	100.0%	0.3	16	100.0%	0.3
Totals:	**2,136**	**669**	**31.3%**	**676**	**31.7%**	**1.0**	**669**	**31.3%**	**1.0**
Excluding 72+:	**2,120**	**665**	**31.4%**	**660**	**31.1%**	**1.0**	**653**	**30.8%**	**1.0**

Graph III(b)

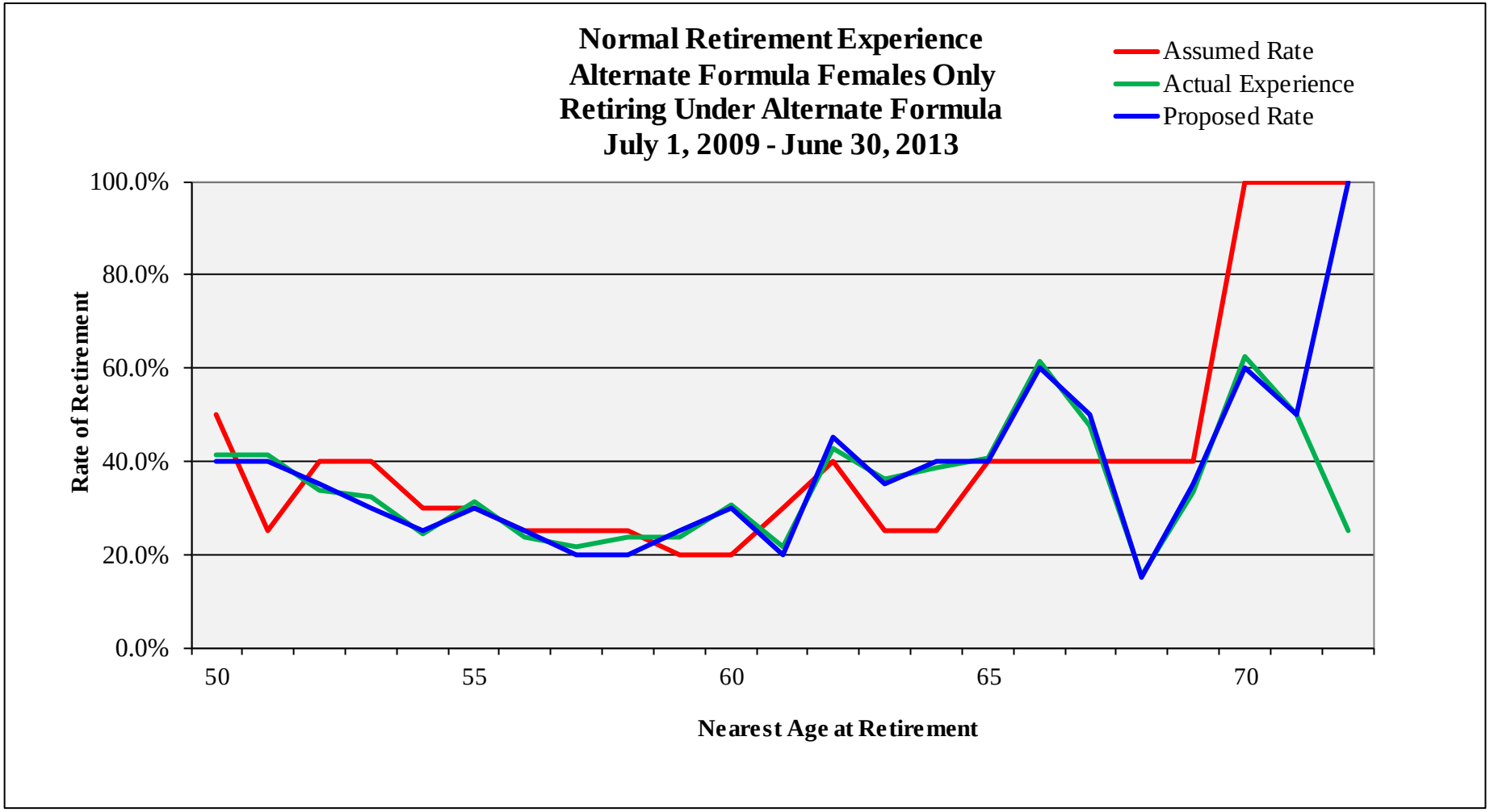

Normal Retirement Experience
Alternate Formula Females Only
Retiring Under Alternate Formula
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
50
55
60
65
70
Nearest Age at Retirement

Table III(c)

Normal Retirement Experience – Alternate Formula Male Members - Eligible for Retirement under the Regular Formula Provisions

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
60	457	24	5.3%	N/A	N/A	N/A	23	5.0%	1.0
61	477	23	4.8%	N/A	N/A	N/A	24	5.0%	1.0
62	472	47	10.0%	N/A	N/A	N/A	47	10.0%	1.0
63	454	41	9.0%	N/A	N/A	N/A	45	10.0%	0.9
64	357	29	8.1%	N/A	N/A	N/A	36	10.0%	0.8
65	283	60	21.2%	N/A	N/A	N/A	57	20.0%	1.1
66	188	35	18.6%	N/A	N/A	N/A	38	20.0%	0.9
67	134	29	21.6%	N/A	N/A	N/A	27	20.0%	1.1
68	99	19	19.2%	N/A	N/A	N/A	17	17.5%	1.1
69	66	12	18.2%	N/A	N/A	N/A	12	17.5%	1.0
70	45	8	17.8%	N/A	N/A	N/A	8	17.5%	1.0
71	28	7	25.0%	N/A	N/A	N/A	5	17.5%	1.4
72+	59	11	18.6%	N/A	N/A	N/A	59	100.0%	0.2
Totals:	**3,119**	**345**	**11.1%**	**N/A**	**N/A**	**N/A**	**398**	**12.8%**	**0.9**
Excluding 72+:	**3,060**	**334**	**10.9%**	**N/A**	**N/A**	**N/A**	**339**	**11.1%**	**1.0**

Graph III(c)

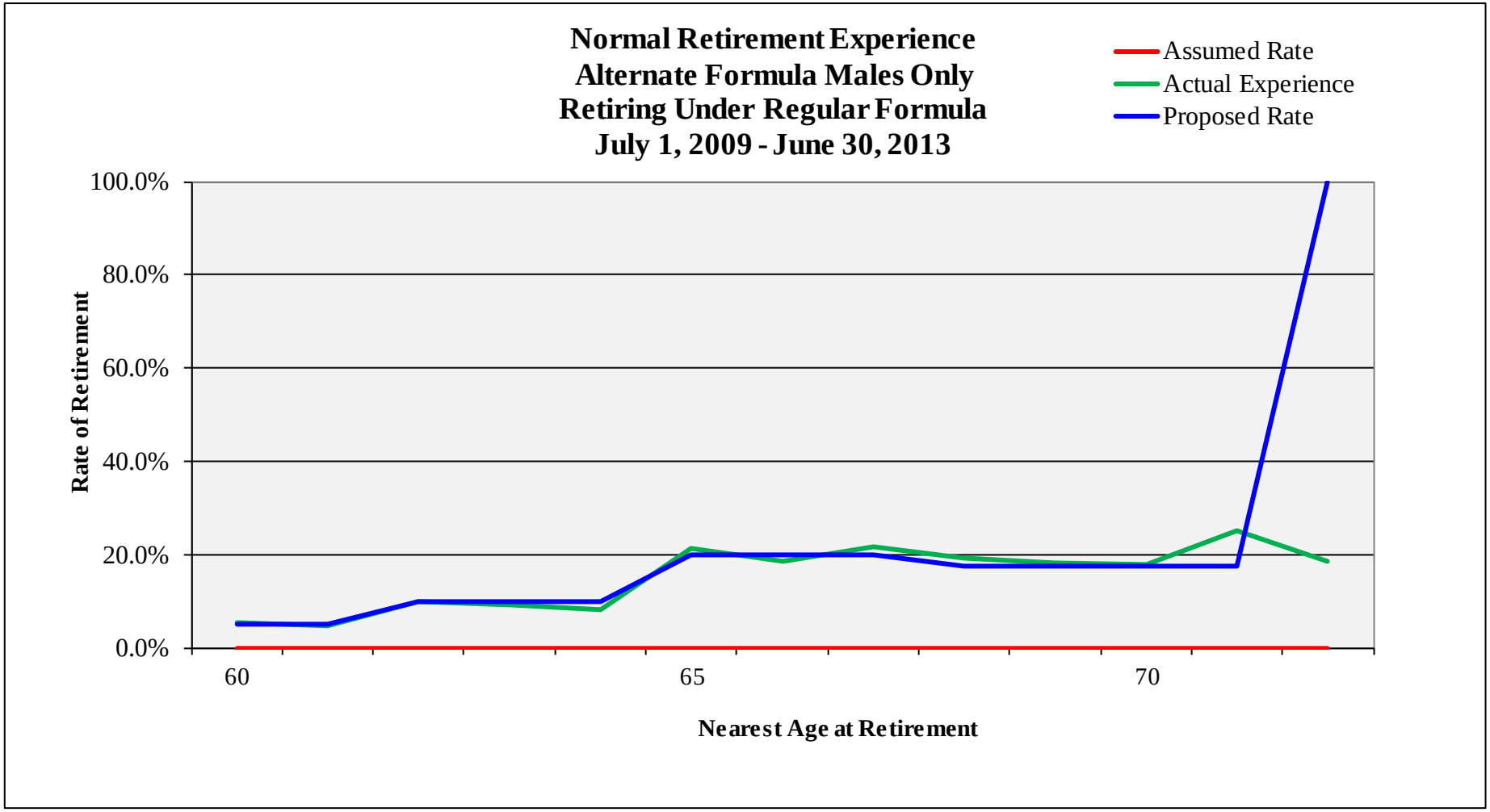
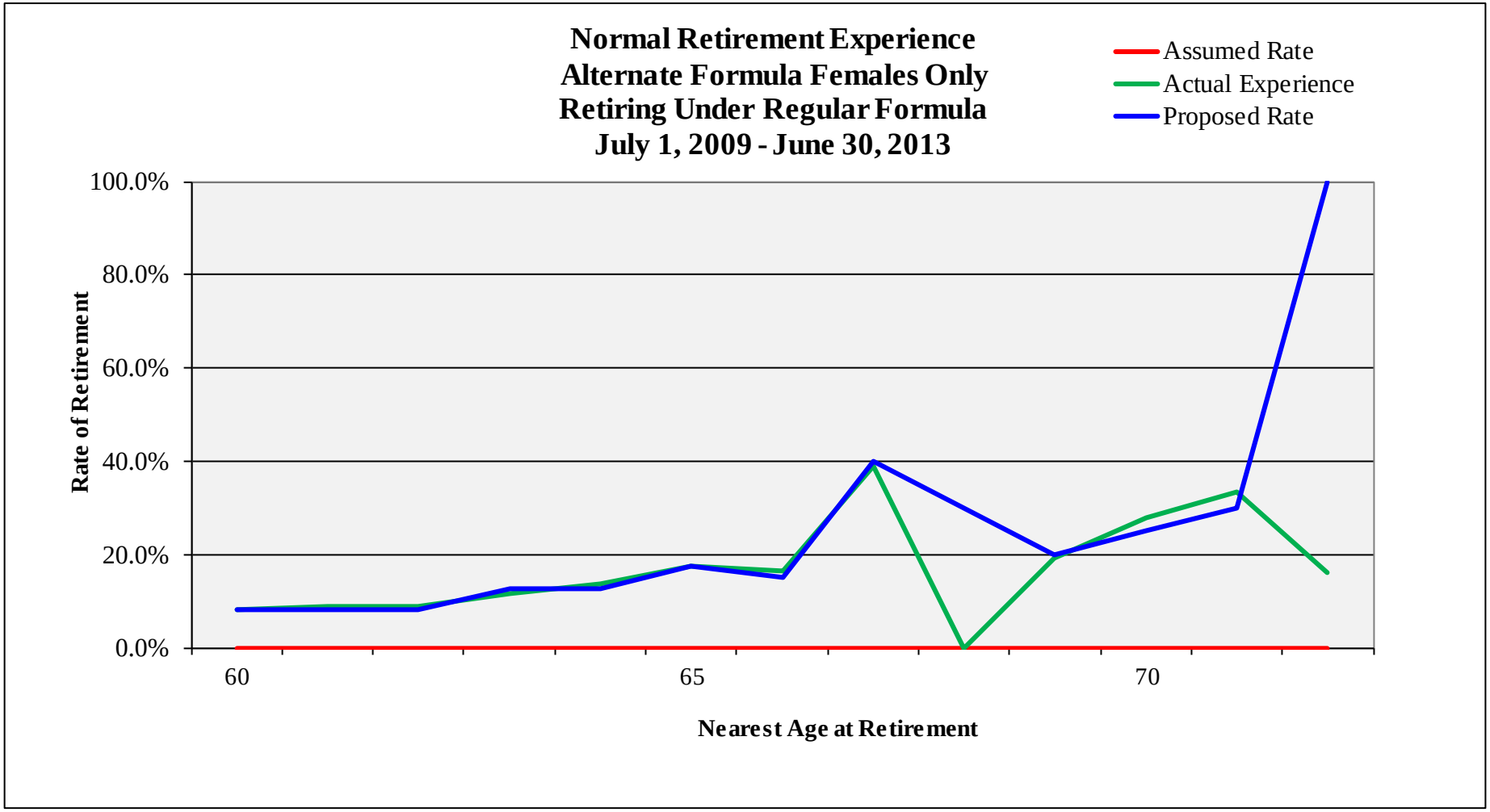

Normal Retirement Experience
Alternate Formula Males Only
Retiring Under Regular Formula
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
60
65
70
Nearest Age at Retirement

Table III(d)

Normal Retirement Experience – Alternate Formula Female Members - Eligible for Retirement under the Regular Formula Provisions

	Actual Experience			Current Assumptions			Proposed Assumptions		
Nearest Age @ Retirement	Exposures	Retirements	Actual Rate	Expected Retirements	Assumed Rate[1]	Actual / Expected	Expected Retirements	Proposed Rate[1]	Actual / Expected
60	170	14	8.2%	N/A	N/A	N/A	14	8.0%	1.0
61	146	13	8.9%	N/A	N/A	N/A	12	8.0%	1.1
62	115	10	8.7%	N/A	N/A	N/A	9	8.0%	1.1
63	112	13	11.6%	N/A	N/A	N/A	14	12.5%	0.9
64	88	12	13.6%	N/A	N/A	N/A	11	12.5%	1.1
65	69	12	17.4%	N/A	N/A	N/A	12	17.5%	1.0
66	49	8	16.3%	N/A	N/A	N/A	7	15.0%	1.1
67	36	14	38.9%	N/A	N/A	N/A	14	40.0%	1.0
68	25	0	0.0%	N/A	N/A	N/A	8	30.0%	0.0
69	21	4	19.0%	N/A	N/A	N/A	4	20.0%	1.0
70	18	5	27.8%	N/A	N/A	N/A	5	25.0%	1.0
71	9	3	33.3%	N/A	N/A	N/A	3	30.0%	1.0
72+	31	5	16.1%	N/A	N/A	N/A	31	100.0%	0.2
Totals:	**889**	**113**	**12.7%**	**N/A**	**N/A**	**N/A**	**144**	**16.2%**	**0.8**
Excluding 72+:	**858**	**108**	**12.6%**	**N/A**	**N/A**	**N/A**	**113**	**13.2%**	**1.0**

Graph III(d)


Normal Retirement Experience
Alternate Formula Females Only
Retiring Under Regular Formula
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
100.0%
80.0%
60.0%
40.0%
20.0%
0.0%
Rate of Retirement
60
65
70
Nearest Age at Retirement

RETIREMENT ASSUMPTION – TIER TWO ONLY

Currently, there are no Tier Two members eligible for retirement. Therefore, the retirement assumptions can only be developed based upon our future expectation of the group's behavior.

We are recommending a change to the retirement rates for Tier Two members eligible for regular formula benefits. Based on these changes, more Tier Two members will remain in service and eventually receive unreduced normal retirement benefits.

	Members Eligible For Early Retirement			
Nearest Age	Current Assumed Rate		Proposed Assumed Rate	
@ Retirement	Male	Female	Male	Female
62	30%	30%	30%	30%
63	34%	34%	15%	15%
64	38%	38%	15%	15%
65	42%	42%	15%	15%
66	46%	46%	15%	15%

	Members Eligible For Normal Retirement			
Nearest Age	Current Assumed Rate		Proposed Assumed Rate	
@ Retirement	Male	Female	Male	Female
67	50%	50%	50%	50%
68	75%	75%	35%	35%
69	90%	90%	35%	35%
70	100%	100%	35%	35%
71	100%	100%	20%	20%
72	100%	100%	20%	20%
73	100%	100%	20%	20%
74	100%	100%	20%	20%
75	100%	100%	100%	100%

RETIREMENT ASSUMPTION – TIER TWO ONLY

For Tier Two members eligible for alternate formula benefits, we recommend rates that are consistent with the age-based retirement rates developed for Tier One members retiring with alternate formula benefits for ages 61 and older. For members retiring at age 60, we recommend a higher rate.

	Members Eligible For Normal Retirement			
Nearest Age	Current Assumed Rate		Proposed Assumed Rate	
@ Retirement	Male	Female	Male	Female
60	35%	20%	50%	50%
61	37%	15%	25%	20%
62	38%	25%	45%	45%
63	40%	40%	40%	35%
64	41%	40%	30%	40%
65	80%	55%	55%	40%
66	40%	55%	50%	60%
67	55%	45%	50%	50%
68	55%	45%	30%	15%
69	40%	45%	35%	35%
70	100%	100%	50%	60%
71	100%	100%	30%	50%
72	100%	100%	100%	100%

Turnover

Currently, turnover rates are based solely on service. Based on our analysis, no credible patterns of age-based terminations were present, therefore, we are recommending the service based structure.

Turnover experience during the last four years was considered in the analysis shown on the following pages. The "Exposure" column shows the number of employees at various years of service throughout the experience period.

The "Turnover" column shows the number of employees at various years of service that have gone from active status for reasons other than retirement and death. This includes members moving to inactive status as well as members terminating and receiving a refund of contributions.

Typically, we would consider a status change from active to inactive a termination in developing turnover rates. However, because some of these participants return to active status and accrue additional benefits, we have considered this in our analysis of turnover experience. The "Net Turnover" column shows the number of employees by years of service that have gone from inactive to active status between the experience study period of July 1, 2009, to June 30, 2013. Inactive members, in the case, are defined as those that terminate employment but do not receive a return of their accumulated contributions. While these participants are not necessarily the same exact participants that went to inactive status during the experience study period, we believe that using this data helps us develop proposed net effective turnover rates.

This assumption was developed using both Tier One and Tier Two data and is applicable to both Tier One and Tier Two members.

The table and graph on the following pages show termination experience by service, including the impact of members returning from inactive to active status.

- Table and Graph IV(a) – Termination Experience by Service - Regular Formula Male Members
- Table and Graph IV(b) – Termination Experience by Service - Regular Formula Female Members
- Table and Graph IV(c) – Termination Experience by Service - Alternate Formula Male Members
- Table and Graph IV(d) – Termination Experience by Service - Alternate Formula Female Members

Table IV(a)

Termination Experience by Service - Regular Formula Male Members

	Actual Experience					Current Assumptions			Proposed Assumptions		
Service	Exposures	Turnover	Rehires	Net Turnover	Actual Rate	Expected Turnover	Assumed Rate	Actual / Expected[1]	Expected Turnover	Proposed Rate	Actual / Expected[2]
0	2,995	806	111	695	23.21%	539	18.00%	1.3	689	23.00%	1.0
1	4,405	613	79	534	12.12%	529	12.00%	1.0	529	12.00%	1.0
2	3,154	346	42	304	9.64%	189	6.00%	1.6	300	9.50%	1.0
3	2,655	216	26	190	7.16%	146	5.50%	1.3	186	7.00%	1.0
4	2,489	173	18	155	6.23%	124	5.00%	1.2	156	6.25%	1.0
5	2,359	118	21	97	4.11%	106	4.50%	0.9	100	4.25%	1.0
6	2,312	121	16	105	4.54%	81	3.50%	1.3	98	4.25%	1.1
7	2,017	83	17	66	3.27%	61	3.00%	1.1	71	3.50%	0.9
8	2,025	81	19	62	3.06%	61	3.00%	1.0	61	3.00%	1.0
9	2,290	73	17	56	2.45%	57	2.50%	1.0	57	2.50%	1.0
10	2,557	72	15	57	2.23%	51	2.00%	1.1	64	2.50%	0.9
11	2,518	60	16	44	1.75%	50	2.00%	0.9	50	2.00%	0.9
12	2,203	51	7	44	2.00%	44	2.00%	1.0	44	2.00%	1.0
13	1,870	48	6	42	2.25%	37	2.00%	1.1	37	2.00%	1.1
14	1,576	30	7	23	1.46%	24	1.50%	1.0	24	1.50%	1.0
15	1,512	19	12	7	0.46%	23	1.50%	0.3	23	1.50%	0.3
16	1,524	35	10	25	1.64%	23	1.50%	1.1	23	1.50%	1.1
17	1,596	28	4	24	1.50%	20	1.25%	1.2	24	1.50%	1.0
18	1,574	25	5	20	1.27%	20	1.25%	1.0	24	1.50%	0.8
19	1,662	24	4	20	1.20%	21	1.25%	1.0	25	1.50%	0.8
20	1,802	30	6	24	1.33%	18	1.00%	1.3	27	1.50%	0.9
21	1,831	28	5	23	1.26%	18	1.00%	1.3	27	1.50%	0.8
22	1,859	34	5	29	1.56%	19	1.00%	1.6	28	1.50%	1.0
23	1,803	26	6	20	1.11%	18	1.00%	1.1	27	1.50%	0.7
24	1,475	32	6	26	1.76%	15	1.00%	1.8	22	1.50%	1.2
25	1,133	21	0	21	1.85%	11	1.00%	1.9	17	1.50%	1.2
26	985	26	2	24	2.44%	10	1.00%	2.4	15	1.50%	1.6
27	808	13	1	12	1.49%	8	1.00%	1.5	12	1.50%	1.0
28	624	12	1	11	1.76%	6	1.00%	1.8	9	1.50%	1.2
29	550	11	0	11	2.00%	6	1.00%	2.0	8	1.50%	1.3
30+	937	45	1	44	4.70%	9	1.00%	4.7	14	1.50%	3.1
	59,100	**3,300**	**485**	**2,815**	**4.76%**	**2,344**	**3.97%**	**1.2**	**2,790**	**4.72%**	**1.0**

[1] *Reflects actual turnover net of inactive members who returned to active service.*
[2] *Actual to expected ratio based on net turnover.*

Graph IV(a)

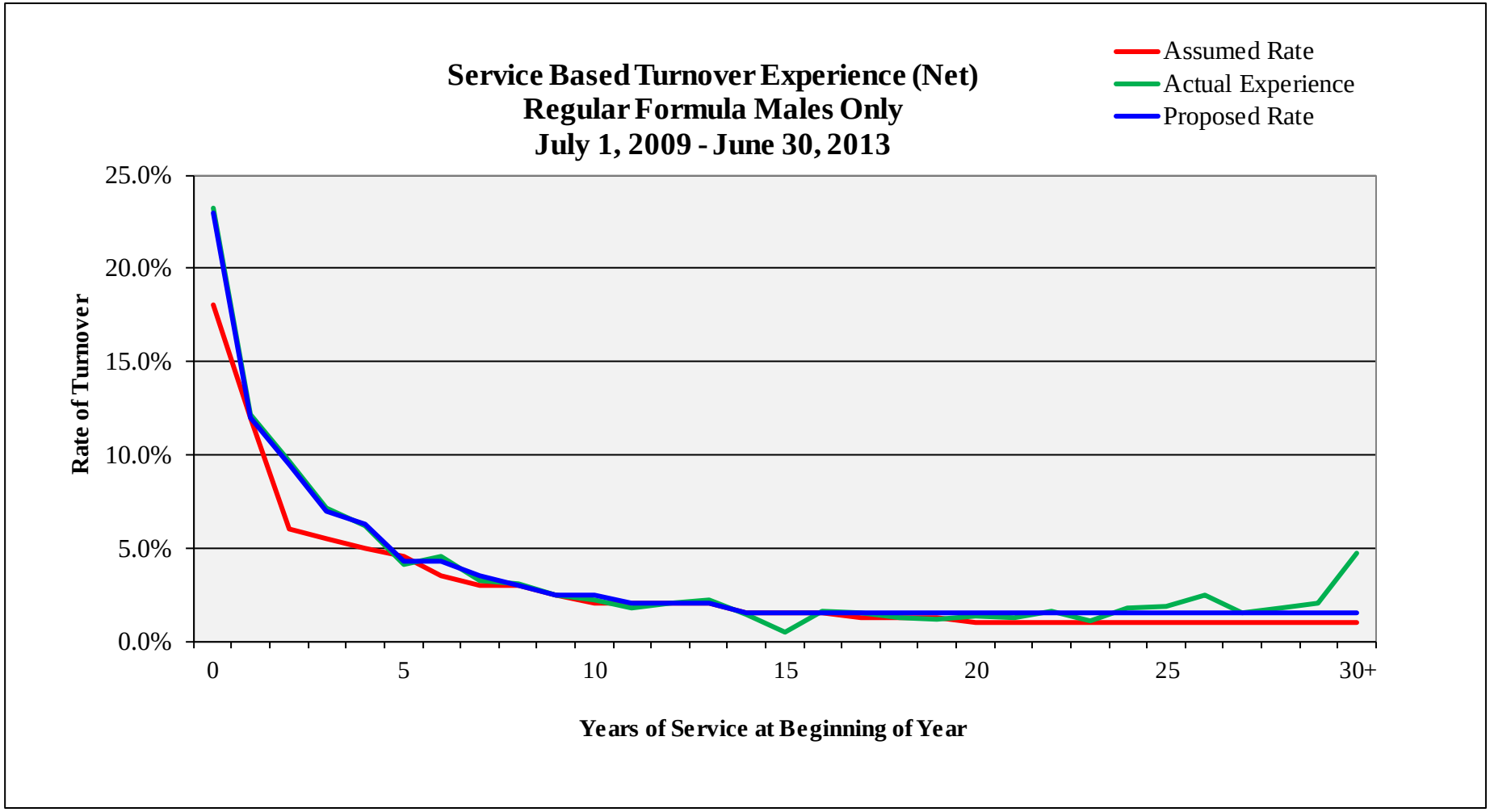

Service Based Turnover Experience (Net)
Regular Formula Males Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
0
5
10
15
20
25
30+
Years of Service at Beginning of Year

Table IV(b)

Termination Experience by Service - Regular Formula Female Members

	Actual Experience					Current Assumptions			Proposed Assumptions		
Service	Exposures	Turnover	Rehires	Net Turnover	Actual Rate	Expected Turnover	Assumed Rate	Actual / Expected[1]	Expected Turnover	Proposed Rate	Actual / Expected[2]
0	2,714	732	97	635	23.40%	461	17.00%	1.4	624	23.00%	1.0
1	4,798	689	98	591	12.32%	528	11.00%	1.1	576	12.00%	1.0
2	3,957	396	67	329	8.31%	336	8.50%	1.0	336	8.50%	1.0
3	3,597	283	49	234	6.51%	252	7.00%	0.9	234	6.50%	1.0
4	3,418	230	52	178	5.21%	188	5.50%	0.9	171	5.00%	1.0
5	3,166	185	35	150	4.74%	158	5.00%	0.9	150	4.75%	1.0
6	2,943	144	46	98	3.33%	118	4.00%	0.8	103	3.50%	1.0
7	2,737	131	36	95	3.47%	96	3.50%	1.0	96	3.50%	1.0
8	2,971	124	36	88	2.96%	74	2.50%	1.2	89	3.00%	1.0
9	3,464	119	42	77	2.22%	87	2.50%	0.9	87	2.50%	0.9
10	3,852	128	42	86	2.23%	96	2.50%	0.9	96	2.50%	0.9
11	3,832	123	40	83	2.17%	77	2.00%	1.1	77	2.00%	1.1
12	3,310	90	33	57	1.72%	66	2.00%	0.9	66	2.00%	0.9
13	2,752	64	20	44	1.60%	55	2.00%	0.8	55	2.00%	0.8
14	2,344	55	22	33	1.41%	35	1.50%	0.9	35	1.50%	0.9
15	2,309	50	10	40	1.73%	35	1.50%	1.2	35	1.50%	1.2
16	2,276	43	14	29	1.27%	34	1.50%	0.8	34	1.50%	0.8
17	2,215	62	23	39	1.76%	33	1.50%	1.2	33	1.50%	1.2
18	2,163	30	12	18	0.83%	32	1.50%	0.6	32	1.50%	0.6
19	2,306	49	15	34	1.47%	23	1.00%	1.5	35	1.50%	1.0
20	2,498	36	13	23	0.92%	25	1.00%	0.9	25	1.00%	0.9
21	2,656	48	11	37	1.39%	20	0.75%	1.9	27	1.00%	1.4
22	2,666	51	17	34	1.28%	20	0.75%	1.7	27	1.00%	1.3
23	2,450	42	12	30	1.22%	18	0.75%	1.6	25	1.00%	1.2
24	1,993	27	4	23	1.15%	15	0.75%	1.5	20	1.00%	1.2
25	1,444	19	7	12	0.83%	11	0.75%	1.1	14	1.00%	0.8
26	1,254	22	3	19	1.52%	9	0.75%	2.0	13	1.00%	1.5
27	1,092	11	4	7	0.64%	8	0.75%	0.9	11	1.00%	0.6
28	969	15	0	15	1.55%	7	0.75%	2.1	10	1.00%	1.5
29	1,022	14	0	14	1.37%	8	0.75%	1.8	10	1.00%	1.4
30+	2,157	94	5	89	4.13%	16	0.75%	5.5	22	1.00%	4.1
	81,325	**4,106**	**865**	**3,241**	**3.99%**	**2,943**	**3.62%**	**1.1**	**3,166**	**3.89%**	**1.0**

[1] *Reflects actual turnover net of inactive members who returned to active service.*
[2] *Actual to expected ratio based on net turnover.*

Graph IV(b)

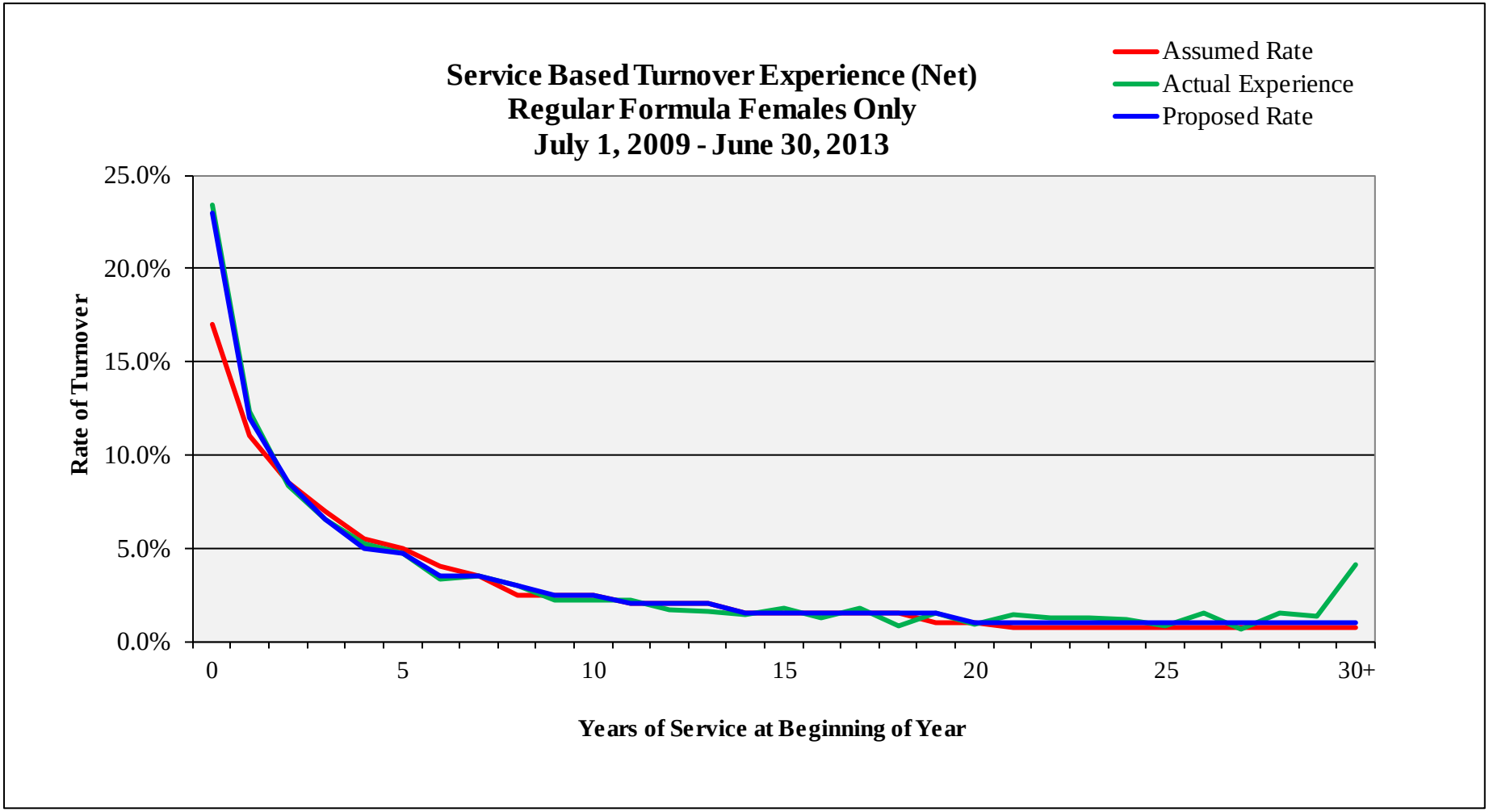

Service Based Turnover Experience (Net)
Regular Formula Females Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
0
5
10
15
20
25
30+
Years of Service at Beginning of Year

Table IV(c)

Termination Experience by Service - Alternate Formula Male Members

	Actual Experience					Current Assumptions			Proposed Assumptions		
Service	Exposures	Turnover	Rehires	Net Turnover	Actual Rate	Expected Turnover	Assumed Rate	Actual / Expected[1]	Expected Turnover	Proposed Rate	Actual / Expected[2]
0	928	60	60	0	0.00%	37	4.00%	0.0	30	3.25%	0.0
1	1,989	95	33	62	3.12%	50	2.50%	1.2	65	3.25%	1.0
2	1,916	92	20	72	3.76%	48	2.50%	1.5	62	3.25%	1.2
3	1,333	37	10	27	2.03%	33	2.50%	0.8	27	2.00%	1.0
4	1,070	32	12	20	1.87%	27	2.50%	0.7	19	1.75%	1.1
5	1,353	42	18	24	1.77%	34	2.50%	0.7	24	1.75%	1.0
6	1,458	45	14	31	2.13%	22	1.50%	1.4	26	1.75%	1.2
7	1,709	43	15	28	1.64%	26	1.50%	1.1	30	1.75%	0.9
8	2,385	51	20	31	1.30%	36	1.50%	0.9	36	1.50%	0.9
9	2,527	52	11	41	1.62%	38	1.50%	1.1	38	1.50%	1.1
10	2,999	57	16	41	1.37%	45	1.50%	0.9	45	1.50%	0.9
11	3,083	50	14	36	1.17%	31	1.00%	1.2	39	1.25%	0.9
12	2,690	47	10	37	1.38%	27	1.00%	1.4	34	1.25%	1.1
13	2,609	32	9	23	0.88%	26	1.00%	0.9	26	1.00%	0.9
14	2,369	38	14	24	1.01%	24	1.00%	1.0	24	1.00%	1.0
15	2,028	27	5	22	1.08%	20	1.00%	1.1	20	1.00%	1.1
16	1,925	28	10	18	0.94%	14	0.75%	1.2	19	1.00%	0.9
17	1,718	26	4	22	1.28%	13	0.75%	1.7	17	1.00%	1.3
18	1,509	18	7	11	0.73%	11	0.75%	1.0	15	1.00%	0.7
19	1,587	23	3	20	1.26%	12	0.75%	1.7	16	1.00%	1.3
20	1,590	14	5	9	0.57%	12	0.75%	0.8	16	1.00%	0.6
21	1,622	21	10	11	0.68%	8	0.50%	1.4	16	1.00%	0.7
22	1,496	18	5	13	0.87%	7	0.50%	1.7	15	1.00%	0.9
23	1,339	23	2	21	1.57%	7	0.50%	3.1	13	1.00%	1.6
24	1,026	14	6	8	0.78%	5	0.50%	1.6	10	1.00%	0.8
25	706	12	3	9	1.27%	4	0.50%	2.5	7	1.00%	1.3
26	600	17	1	16	2.67%	3	0.50%	5.3	6	1.00%	2.7
27	395	9	3	6	1.52%	2	0.50%	3.0	4	1.00%	1.5
28	252	8	4	4	1.59%	1	0.50%	3.2	3	1.00%	1.6
29	145	5	2	3	2.07%	1	0.50%	4.1	1	1.00%	2.1
30+	74	6	0	6	8.11%	0	0.50%	16.2	1	1.00%	8.1
	48,430	**1,042**	**346**	**696**	**1.44%**	**623**	**1.29%**	**1.1**	**702**	**1.45%**	**1.0**

[1] *Reflects actual turnover net of inactive members who returned to active service.*
[2] *Actual to expected ratio based on net turnover.*

Graph IV(c)

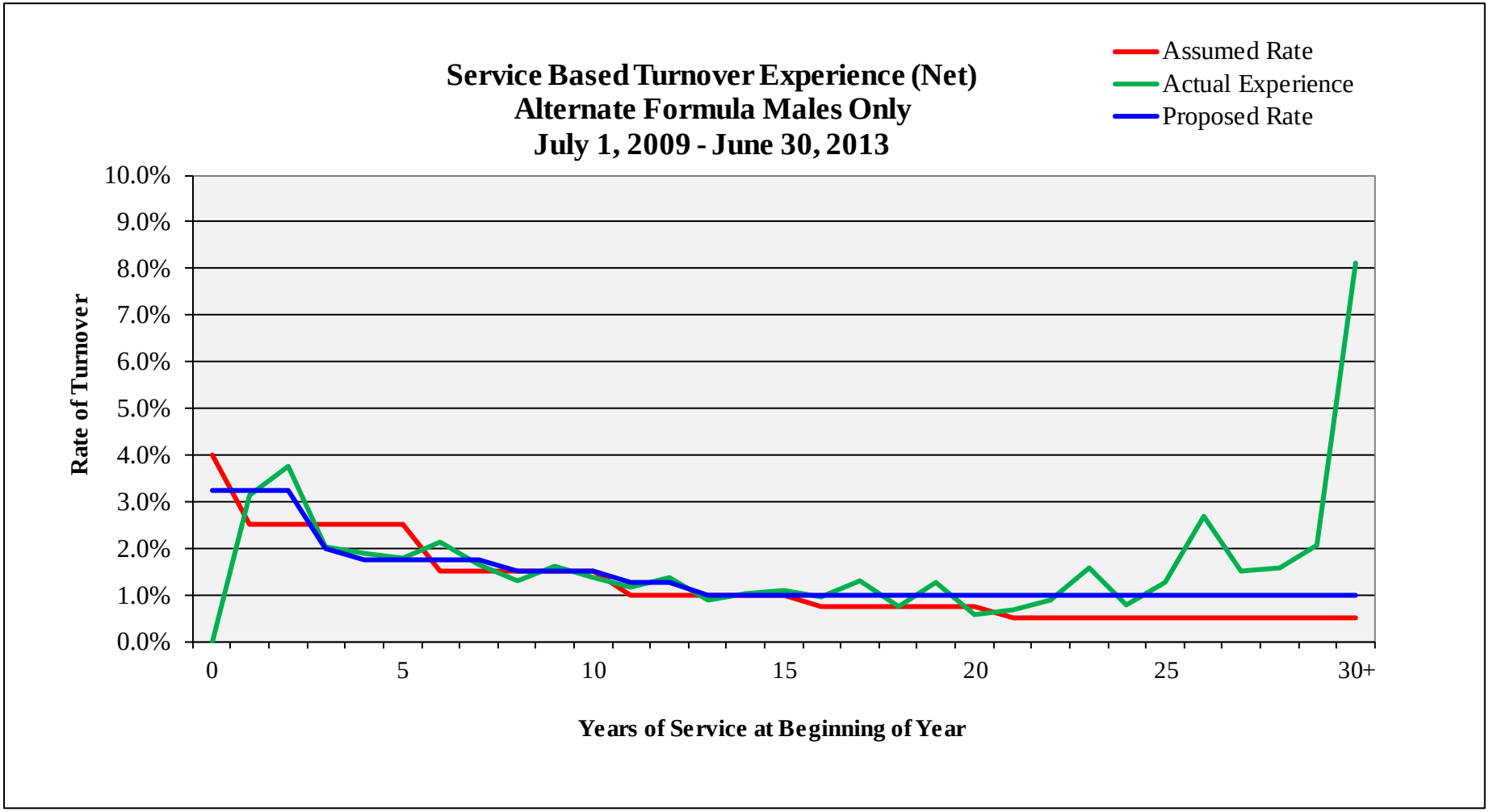

Service Based Turnover Experience (Net)
Alternate Formula Males Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
10.0%
9.0%
8.0%
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
0
5
10
15
20
25
30+
Years of Service at Beginning of Year

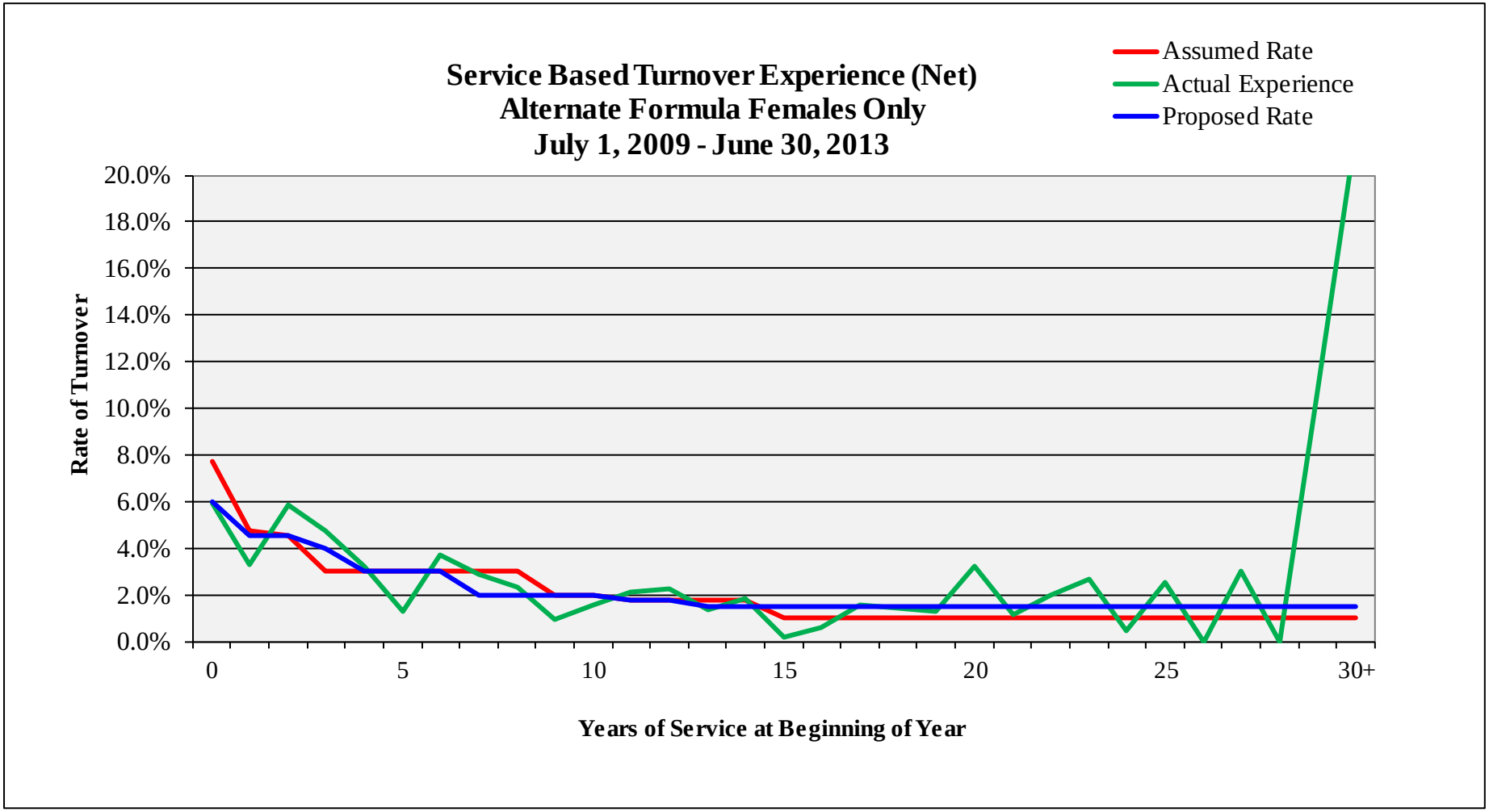
Table IV(d)

Termination Experience by Service - Alternate Formula Female Members

	Actual Experience					Current Assumptions			Proposed Assumptions		
Service	Exposures	Turnover	Rehires	Net Turnover	Actual Rate	Expected Turnover	Assumed Rate	Actual / Expected[1]	Expected Turnover	Proposed Rate	Actual / Expected[2]
0	270	24	8	16	5.93%	21	7.75%	0.8	16	6.00%	1.0
1	549	37	19	18	3.28%	26	4.75%	0.7	25	4.50%	0.7
2	531	39	8	31	5.84%	24	4.50%	1.3	24	4.50%	1.3
3	423	27	7	20	4.73%	13	3.00%	1.6	17	4.00%	1.2
4	341	18	7	11	3.23%	10	3.00%	1.1	10	3.00%	1.1
5	381	12	7	5	1.31%	11	3.00%	0.4	11	3.00%	0.4
6	375	17	3	14	3.73%	11	3.00%	1.2	11	3.00%	1.2
7	383	14	3	11	2.87%	11	3.00%	1.0	8	2.00%	1.4
8	566	23	10	13	2.30%	17	3.00%	0.8	11	2.00%	1.1
9	640	16	10	6	0.94%	13	2.00%	0.5	13	2.00%	0.5
10	822	25	12	13	1.58%	16	2.00%	0.8	16	2.00%	0.8
11	911	28	9	19	2.09%	16	1.75%	1.2	16	1.75%	1.2
12	841	22	3	19	2.26%	15	1.75%	1.3	15	1.75%	1.3
13	822	20	9	11	1.34%	14	1.75%	0.8	12	1.50%	0.9
14	764	17	3	14	1.83%	13	1.75%	1.0	11	1.50%	1.2
15	700	12	11	1	0.14%	7	1.00%	0.1	11	1.50%	0.1
16	648	11	7	4	0.62%	6	1.00%	0.6	10	1.50%	0.4
17	571	10	1	9	1.58%	6	1.00%	1.6	9	1.50%	1.1
18	491	10	3	7	1.43%	5	1.00%	1.4	7	1.50%	1.0
19	463	8	2	6	1.30%	5	1.00%	1.3	7	1.50%	0.9
20	434	16	2	14	3.23%	4	1.00%	3.2	7	1.50%	2.2
21	439	8	3	5	1.14%	4	1.00%	1.1	7	1.50%	0.8
22	406	9	1	8	1.97%	4	1.00%	2.0	6	1.50%	1.3
23	339	9	0	9	2.65%	3	1.00%	2.7	5	1.50%	1.8
24	234	3	2	1	0.43%	2	1.00%	0.4	4	1.50%	0.3
25	119	3	0	3	2.52%	1	1.00%	2.5	2	1.50%	1.7
26	96	1	1	0	0.00%	1	1.00%	0.0	1	1.50%	0.0
27	66	3	1	2	3.03%	1	1.00%	3.0	1	1.50%	2.0
28	40	0	0	0	0.00%	0	1.00%	0.0	1	1.50%	0.0
29	19	2	0	2	10.53%	0	1.00%	10.5	0	1.50%	7.0
30+	23	5	0	5	21.74%	0	1.00%	21.7	0	1.50%	14.5
	13,707	**449**	**152**	**297**	**2.17%**	**284**	**2.07%**	**1.0**	**294**	**2.14%**	**1.0**

[1] *Reflects actual turnover net of inactive members who returned to active service.*
[2] *Actual to expected ratio based on net turnover.*

Graph IV(d)


Service Based Turnover Experience (Net)
Alternate Formula Females Only
July 1, 2009 - June 30, 2013
Assumed Rate
Actual Experience
Proposed Rate
Rate of Turnover
20.0%
18.0%
16.0%
14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
0
5
10
15
20
25
30+
Years of Service at Beginning of Year

Disability

Because members who receive disability benefits typically spend less than one year on disability, they are assumed to return to work and are considered active members. We have reviewed the history of disability benefit payments as disclosed in the System's Financial Statements. Based on this analysis, we recommend increasing the load on the normal cost to a percentage of pay based equal to 110 percent of the most recent disability benefit payments to reflect the near-term cash flow. This assumption will be updated at each valuation date as experience emerges.

	Total Disability Benefit Payments	Covered Payroll	Disability Payments as a % of Payroll	Annual Increase in Disability Payments
2013	$ 55,664,045	$ 4,236,191,000	1.31%	7.79%
2012	51,642,228	4,329,084,000	1.19%	3.28%
2011	50,000,581	4,211,186,000	1.19%	5.93%
2010	47,201,278	4,119,361,000	1.15%	5.94%
2009	44,556,315	4,027,263,000	1.11%	

Mortality

Post-retirement mortality is an important component in cost calculations and should be updated from time to time to reflect current and expected future longevity improvements. Pre-retirement mortality is a relatively minor component in cost calculations. The frequency of pre-retirement deaths is so low that mortality assumptions based on actual experience can only be produced for very large retirement systems.

The trend of mortality improvement has been a long and relatively constant one in the United States over the past century. While, most experts agree that overall mortality will improve in the near future, there are differing opinions on the long-term trend in mortality improvement. In order to allow for expected future mortality improvements, we recommend adopting an assumption that would assume less deaths than actually occurred based on historical data. We believe that 20 percent is a reasonable margin for future mortality improvement. For reference, a 20 percent margin would result in an actual to expected ratio of 120 percent in the tables below.

Retirees

We reviewed the mortality experience separately for active members and service retirees during the five-year study period. The results shown on the following pages indicate that there were fewer deaths than expected under the current assumption.

We recommend changing from the RP2000 mortality table, sex distinct, with rates projected to 2015, to 105 percent of the RP2014 Healthy Annuitant mortality table, sex distinct. We believe this table provides a margin for near-term mortality improvements.

Active Participants

We recommend updating the pre-retirement mortality assumption to be based on a percentage of the RP2014 Total Employee mortality table to reflect that experience shows active members having lower mortality rates than retirees of the same age. We recommend a percentage 90 percent for males and 110 percent for females. Also, while not directly reviewed in this experience study, we recommend maintaining the assumptions that five percent of deaths among active employees are assumed to be in the performance of their duty.

A Note about Mortality Rates

The recommended post-retirement mortality assumption is 105 percent of the RP2014 Healthy Annuitant mortality table, sex-distinct. We are recommending the use of RP2014 as a static table, which means that the probability of a 60-year-old retired male dying in any particular year is 0.816 percent, whether the 60-year-old was born in 1948 or 1988.

The use of generational mortality tables is an emerging trend in the actuarial industry, and is based on the assumption that life expectancy increases from generation to generation. Simply put, this means that the life expectancy of someone born in 1988 is greater than that of someone born in 1948. Adopting a generational mortality table tends to increase liabilities, as future

increases in life expectancy imply longer payment of retirement benefits. Should the assumption of increased life expectancy prove true, actuarial valuations that continue to use static mortality tables may be required to update their tables to reflect the improved life expectancy, resulting in liability increases in the future. To the extent that future mortality improvements can be reflected in a current valuation, retirement systems can begin to fund the increased liabilities, thereby reducing (or eliminating) future contribution rate increases that would eventually occur with the use of static tables.

We believe that the recommended mortality tables contain a sufficient level of conservatism to cover any increases in life expectancy in the near future. We will continue to monitor the use and acceptance of generational mortality tables by public retirement systems and keep the Board apprised of emerging trends.

The following tables and graphs contain the mortality experience for the experience study period:

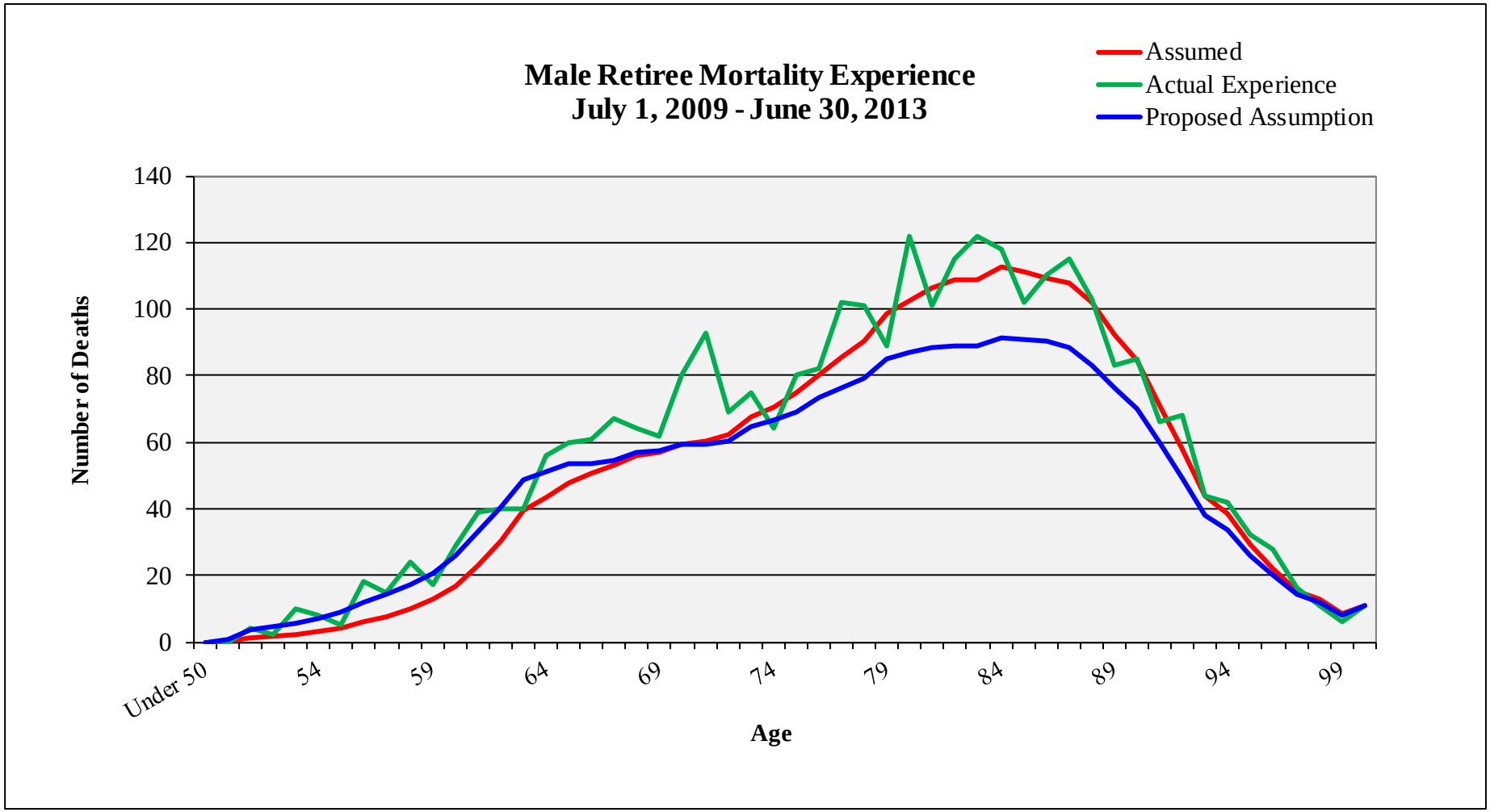
- Table and Graph V(a) – Post-Retirement Mortality Experience
- Table and Graph V(b) – Pre-Retirement Mortality Experience

Table V(a)

Post-Retirement Mortality Experience

Male Service Retiree Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 50	0	0	0.000%	0	0.000%	0.00	0	0.000%	0.00
50-54	4,242	24	0.566%	9	0.209%	2.70	22	0.515%	1.10
55-59	10,506	79	0.752%	40	0.380%	1.98	73	0.694%	1.08
60-64	20,979	204	0.972%	154	0.732%	1.33	199	0.950%	1.02
65-69	20,348	314	1.543%	264	1.299%	1.19	276	1.356%	1.14
70-74	14,706	381	2.591%	320	2.177%	1.19	311	2.113%	1.23
75-79	11,099	454	4.090%	429	3.869%	1.06	382	3.442%	1.19
80-84	7,686	578	7.520%	539	7.012%	1.07	444	5.782%	1.30
85-89	4,299	513	11.933%	522	12.153%	0.98	429	9.970%	1.20
90-94	1,501	305	20.320%	295	19.671%	1.03	250	16.681%	1.22
95-99	313	93	29.712%	88	28.127%	1.06	80	25.520%	1.16
100+	31	11	35.484%	11	35.432%	1.00	11	35.024%	1.01
Totals:	**95,710**	**2,956**	**3.088%**	**2,672**	**2.792%**	**1.11**	**2,477**	**2.588%**	**1.19**
Female Service Retiree Mortality Experience									
Under 50	5	0	0.000%	0	0.110%	0.00	0	0.000%	
50-54	1,662	8	0.481%	3	0.186%	2.58	6	0.340%	1.42
55-59	8,419	52	0.618%	29	0.341%	1.81	38	0.450%	1.37
60-64	17,414	147	0.844%	111	0.640%	1.32	115	0.661%	1.28
65-69	18,458	208	1.127%	208	1.128%	1.00	189	1.022%	1.10
70-74	14,880	300	2.016%	279	1.878%	1.07	244	1.637%	1.23
75-79	11,016	368	3.341%	336	3.054%	1.09	296	2.687%	1.24
80-84	9,138	559	6.117%	465	5.091%	1.20	417	4.566%	1.34
85-89	6,504	625	9.609%	581	8.935%	1.08	515	7.919%	1.21
90-94	3,264	488	14.951%	479	14.677%	1.02	442	13.555%	1.10
95-99	1,058	264	24.953%	215	20.340%	1.23	225	21.312%	1.17
100+	123	45	36.585%	31	24.923%	1.47	38	31.281%	1.17
Totals:	**91,941**	**3,064**	**3.333%**	**2,738**	**2.979%**	**1.12**	**2,526**	**2.747%**	**1.21**
Grand Totals:	**187,651**	**6,020**	**3.208%**	**5,411**	**2.883%**	**1.11**	**5,002**	**2.666%**	**1.20**

Graph V(a) - Male



Graph V(a) - Female

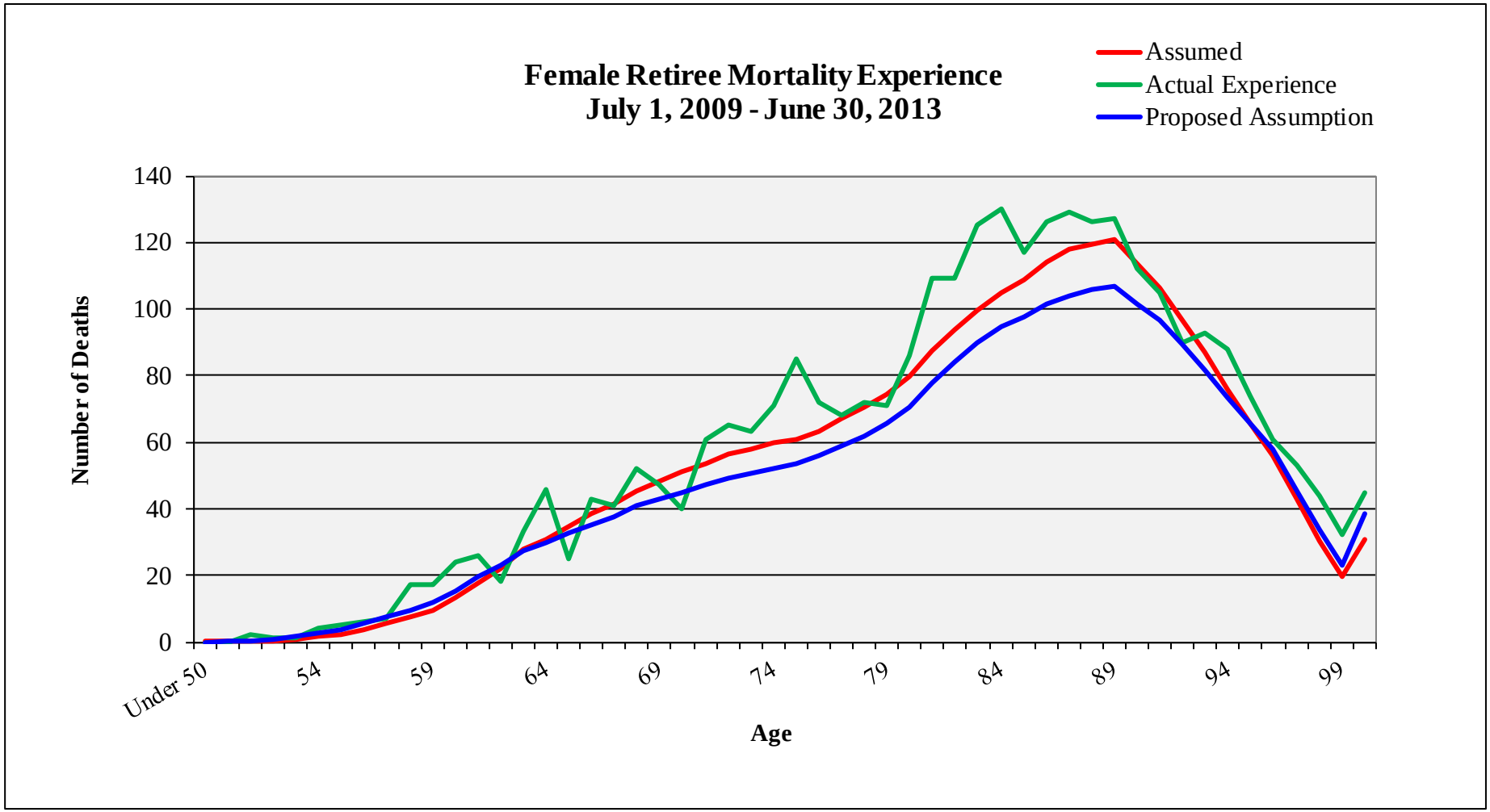
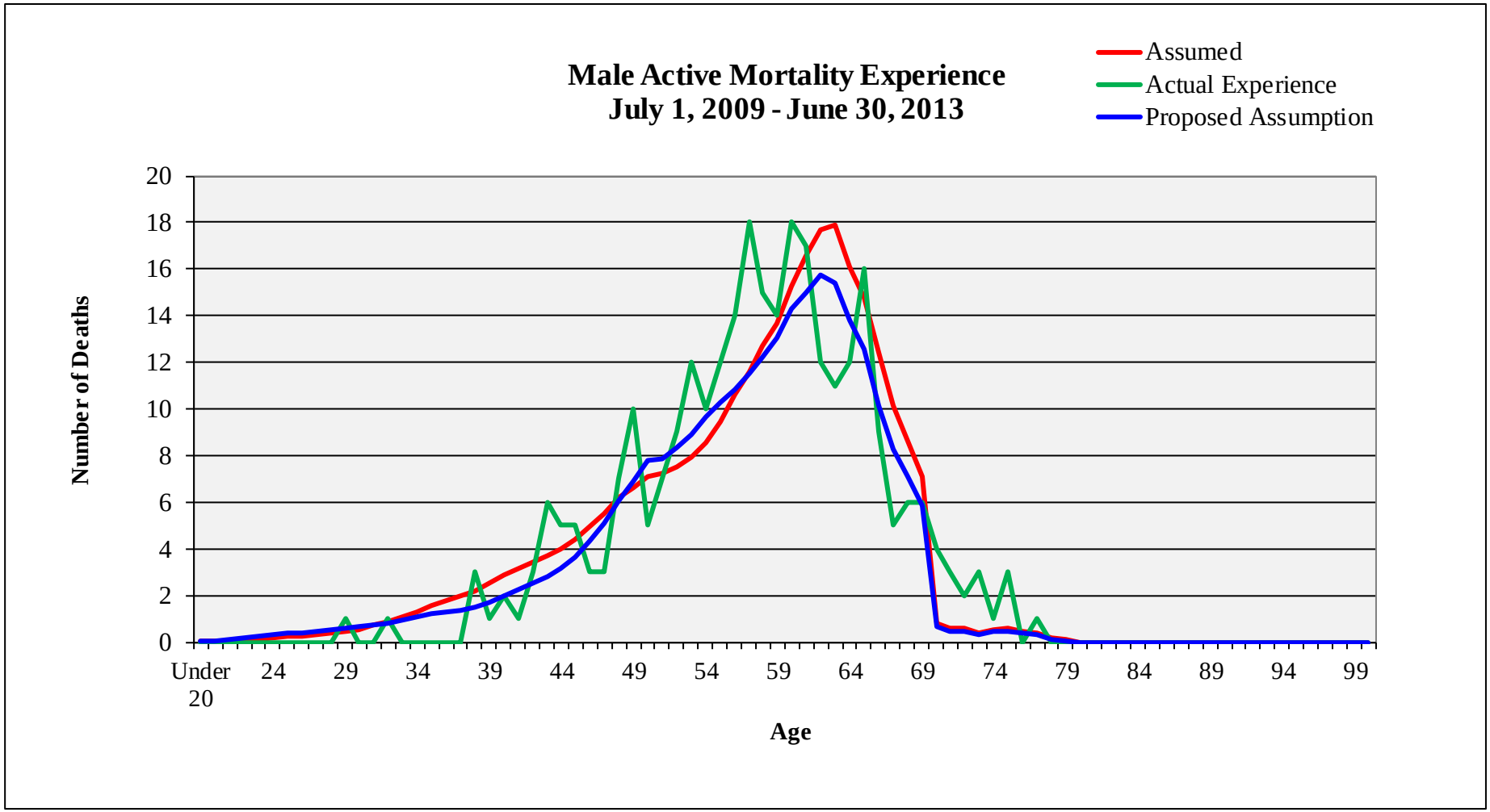


Table V(b)

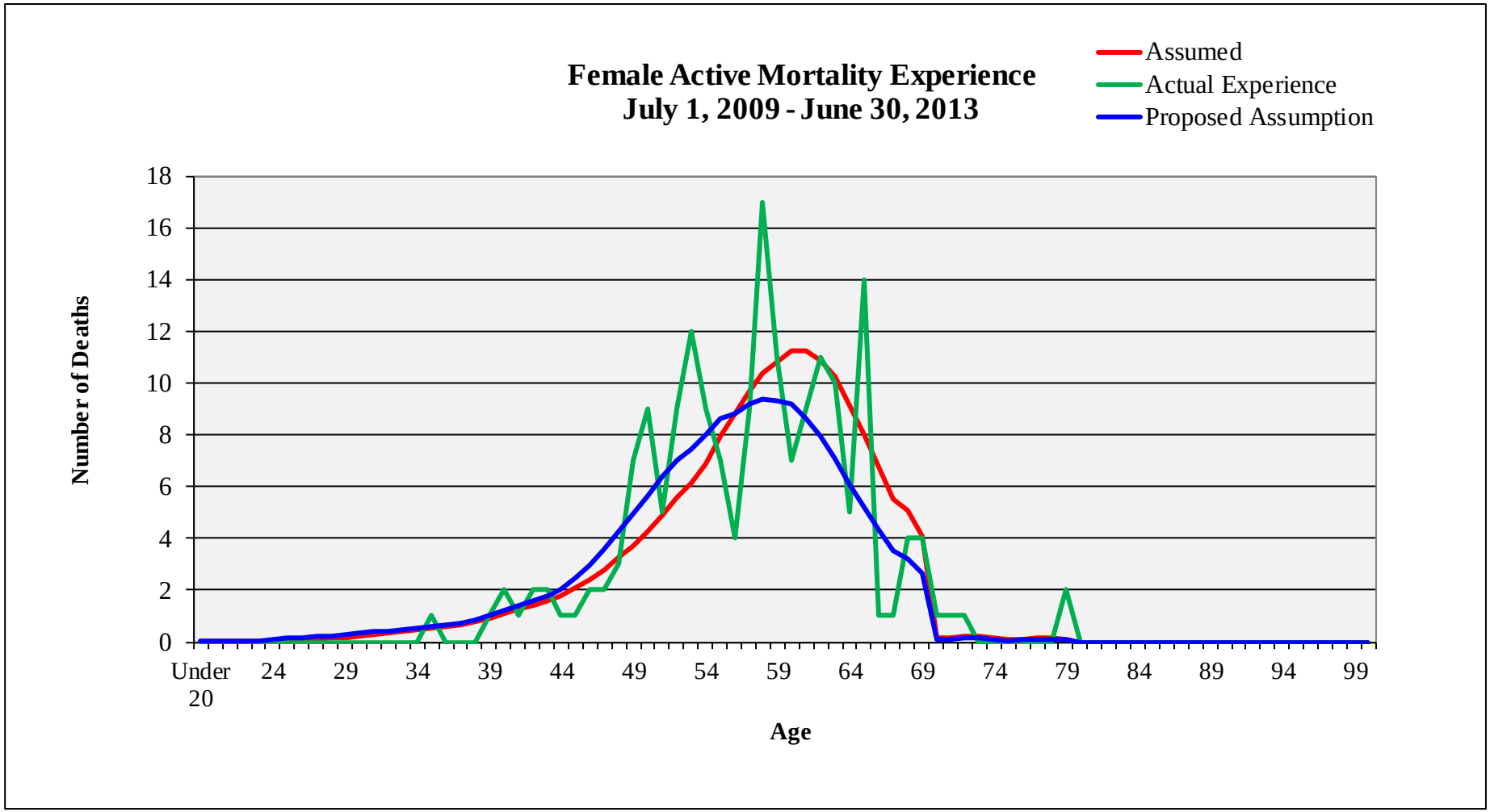
Pre-Retirement Mortality Experience

Male Active Mortality Experience									
	Actual Experience			Current Assumptions			Proposed Assumptions		
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 30	7,599	1	0.013%	2	0.029%	0.46	3	0.041%	0.32
30-39	23,789	5	0.021%	14	0.061%	0.35	11	0.047%	0.44
40-49	42,380	45	0.106%	45	0.106%	1.01	39	0.092%	1.16
50-59	41,630	116	0.279%	96	0.231%	1.20	100	0.241%	1.15
Over 60	19,468	129	0.663%	141	0.724%	0.92	122	0.625%	1.06
Totals:	**134,866**	**296**	**0.219%**	**299**	**0.221%**	**0.99**	**275**	**0.204%**	**1.07**
Less than 60:	**115,398**	**167**	**0.145%**	**158**	**0.137%**	**1.06**	**154**	**0.133%**	**1.09**
Female Active Mortality Experience									
Age	Exposures	Deaths	Actual Rate	Expected Deaths	Assumed Rate	Actual / Expected	Expected Deaths	Proposed Rate	Actual / Expected
Under 30	6,274	0	0.000%	1	0.013%	0.00	1	0.020%	0.00
30-39	18,714	2	0.011%	5	0.028%	0.38	6	0.032%	0.33
40-49	34,502	23	0.067%	21	0.062%	1.08	26	0.076%	0.88
50-59	45,035	92	0.204%	75	0.167%	1.22	80	0.177%	1.15
Over 60	16,634	71	0.427%	84	0.503%	0.85	59	0.353%	1.21
Totals:	**121,159**	**188**	**0.155%**	**186**	**0.154%**	**1.01**	**172**	**0.142%**	**1.09**
Less than 60:	**104,525**	**117**	**0.112%**	**103**	**0.098%**	**1.14**	**113**	**0.108%**	**1.03**
Grand Totals:	**256,025**	**484**	**0.189%**	**485**	**0.189%**	**1.00**	**447**	**0.175%**	**1.08**
Less than 60:	**219,923**	**284**	**0.129%**	**260**	**0.118%**	**1.09**	**267**	**0.121%**	**1.06**

Graph V(b) – Male



Graph V(b) – Female



Marriage Assumption

85.0 percent of active male participants and 65.0 percent of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees. This assumption was confirmed as part of this experience study.

Social Security Offset for Survivor Benefits

No offset assumption for male surviving spouses because it is assumed their own PIA is as great as their spouses' PIA. Sixty percent of married male members are assumed to have a dual income household. For the dual income household, it is assumed the offset at age 60 is 45.0 percent of the original survivor benefit. It is assumed the offset at age 62 is 10.0 percent of the original survivor benefit. Furthermore, it is assumed that 50 percent of retirees on or after July 1, 2009, will elect to remove the offset provision. As mandated by Statute, in exchange for the removal, the member's retirement annuity is reduced by 3.825 percent monthly, as mandated by Statute. This assumption was not reviewed as part of this experience study.

Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to have the same demographic profile as new entrants in the 15 years prior to the valuation date. The average increase in uncapped payroll for the projection period is 3.5 percent, per annum.

Expenses

As estimated and advised by SERS staff, based on current expenses and are expected to increase in relation to the projected capped payroll.

Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

Children

It is assumed that married members have 2.2 children, one year apart in age.

The age of the youngest child of a deceased employee at his date of death is assumed to be as follows:

Age at Death of Employee	Age of Youngest Child	Age at Death of Employee	Age of Youngest Child
20	2	40	6
25	3	45	8
30	4	50	10
35	5	55	12
		60	14

Overtime, Shift Differentials and Unused Sick Leave

Reported earnings include base pay alone. It is assumed that overtime and shift differentials will increase total payroll by 3.5 percent over reported earnings. There were no indications of excessive gains to losses due to overtime or shift differentials.

An explicit assumption for unused sick leave is not made in the valuation because we observed low incidence of unused sick leave in the data and there is new legislation with the intent of limiting future sick leave accruals.

Load for Inactive Members Eligible for Deferred Vested Pension Benefits

We recommend adding an assumption to the valuation to account for the increase in liability that has been observed when a member transitions from inactive to retiree. For these members, benefits as retirees can increase due to an increase in final average salary as a result of service in a reciprocal system. This loss is partially offset each year by portion of these members taking a refund which results in a gain to the system. We are recommending adding load of 15 percent to the liability attributable to inactive members eligible for deferred vested pension benefits.

Missing Data

If earnings were not available, the annual rate of pay is assumed to be the rate of pay for the population as a whole on the valuation date. If a birth date was not available, the member was assumed to be age 35.

Decrement Timing

All decrements are assumed to occur mid-year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Assumptions as a result of Public Act 96-0889

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this System provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon total pay.

SECTION III

COST IMPACT

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS
COST IMPACT OF RECOMMENDED CHANGES

The impact of adopting the recommended assumptions is summarized in the table below and on the following pages. The results are based on the June 30, 2013, valuation and plan provisions in effect as of June 30, 2013.

			Experience Study		
		Valuation Baseline	**7.75% DR**	**7.50% DR**	**7.25% DR**
1	Actuarial Liability—Annuitants				
	a. Current Benefit Recipients:				
	i. Retirement annuities	$20,547,950,302	$20,658,133,054	$21,145,567,540	$21,653,540,948
	ii. Survivor annuities	1,118,925,564	1,148,510,591	1,172,497,286	1,197,475,390
	iii. Disability annuities	419,283,907	442,714,682	460,299,542	478,805,212
	b. Eligible for Deferred Benefits:				
	i. Retirement annuities	8,153,163	8,127,895	8,357,270	8,597,716
	ii. Survivor annuities	8,524,216	8,574,935	8,820,031	9,077,826
	c. Total	$22,102,837,152	$22,266,061,157	$22,795,541,669	$23,347,497,092
2	Actuarial Liability—Inactive Members				
	a. Eligible for Deferred Vested Pension Benefits	$454,454,809	$525,689,550	$546,385,441	$568,271,371
	b. Eligible for Return of Contributions Only	31,477,673	31,477,673	31,477,673	31,477,673
	c. Total	$485,932,482	$557,167,223	$577,863,114	$599,749,044
3	Actuarial Liability— Active Members				
	a. Pension Benefits	$8,615,811,633	$8,717,768,612	$9,060,280,410	$9,422,204,205
	b. Cost-of-Living Adjustments	3,052,423,268	3,222,084,922	3,416,729,334	3,625,794,509
	c. Death Benefits				
	i. Occupational	$16,527,647	$13,588,060	$14,006,612	$14,446,726
	ii. Non-occupational	168,477,747	130,258,788	133,991,510	137,922,129
	iii. Refund	30,710,004	22,436,266	22,515,260	22,595,297
	iv. Total	$215,715,398	$166,283,114	$170,513,382	$174,964,152
	d. Withdrawal	248,044,624	279,696,508	293,804,799	309,183,895
	e. Total	$12,131,994,923	$12,385,833,156	$12,941,327,925	$13,532,146,761
4	Total Actuarial Liability (1 + 2 + 3)	$34,720,764,557	$35,209,061,536	$36,314,732,708	$37,479,392,897
5	Market Value of Assets (MVA)	$12,400,300,474	$12,400,300,474	$12,400,300,474	$12,400,300,474
6	Unfunded Actuarial Liability Based on MVA (4 – 5)	$22,320,464,083	$22,808,761,062	$23,914,432,234	$25,079,092,423
7	Funded Percentage Based on MVA (5 ÷ 4)	35.71%	35.22%	34.15%	33.09%
8	Actuarial Value of Assets (AVA)	$11,877,418,896	$11,877,418,896	$11,877,418,896	$11,877,418,896
9	Unfunded Actuarial Liability Based on AVA (4 – 8)	$22,843,345,661	$23,331,642,640	$24,437,313,812	$25,601,974,001
10	Funded Percentage Based on AVA (8 ÷ 4)	34.21%	33.73%	32.71%	31.69%
11	Total Normal Cost	$792,270,174	$799,672,971	$834,797,398	$872,348,825
12	Employee Contributions	$241,218,378	$241,218,378	$241,218,378	$241,218,378
13	Annual Employer Normal Cost	$551,051,796	$558,454,593	$593,579,020	$631,130,447
	(% payroll)	13.01%	13.18%	14.01%	14.90%

Impact on the FY 2015 GASB No. 25 Annual Required Contribution and FY 2015 Statutory Contribution

	Valuation Baseline	Experience Study FY 2015		
	FY 2015	7.75% DR	7.50% DR	7.25% DR
1. Employer normal cost	$551,051,796	$558,454,593	$593,579,020	$631,130,447
2. Initial amount to amortize the unfunded liability over 30 years as a level percentage of capped payroll	1,432,937,187	1,531,480,678	1,561,255,640	1,591,324,093
3. ARC [(1) + (2)]	$1,983,988,983	$2,089,935,271	$2,154,834,660	$2,222,454,540
4. ARC as a percentage of payroll	45.925%	48.377%	49.879%	51.445%
5. Estimated statutory contribution	$1,748,430,000	$1,841,143,000	$1,889,490,000	$1,939,380,000
6. Estimated statutory contribution as a percentage of payroll	40.472%	42.618%	43.737%	44.892%

Required State Contribution

Determined at June 30, 2013 [a]

	Contribution Dollar (in thousands)				Contribution Percent			
	Valuation	Experience Study			Valuation	Experience Study		
Year	Baseline	7.75% DR	7.50% DR	7.25% DR	Baseline	7.75% DR	7.50% DR	7.25% DR
2014	$ 1,662,667	$ 1,662,667	$ 1,662,667	$ 1,662,667	38.435%	38.435%	38.435%	38.435%
2015	1,748,451	1,841,143	1,889,490	1,939,380	40.472%	42.897%	44.023%	45.186%
2016	1,800,672	1,878,641	1,928,805	1,980,557	40.240%	42.626%	43.764%	44.938%
2017	1,849,444	1,913,471	1,965,372	2,018,974	39.946%	42.297%	43.444%	44.629%
2018	1,912,969	1,964,120	2,017,370	2,072,304	39.984%	42.318%	43.465%	44.649%
2019	1,968,314	2,006,403	2,061,305	2,117,912	39.815%	42.122%	43.275%	44.463%
2020	2,028,298	2,053,919	2,110,249	2,168,330	39.738%	42.026%	43.179%	44.367%
2025	2,349,818	2,318,725	2,382,957	2,449,185	39.407%	41.608%	42.760%	43.949%
2030	2,711,113	2,660,327	2,734,292	2,810,556	39.280%	41.456%	42.608%	43.797%
2035	3,345,686	3,343,634	3,443,280	3,544,391	42.468%	44.877%	46.214%	47.571%
2040	3,783,718	3,840,396	3,954,847	4,070,980	42.468%	44.877%	46.214%	47.571%
2045	4,246,757	4,367,588	4,497,750	4,629,825	42.468%	44.877%	46.214%	47.571%
Total Cont. Through 2045	$ 90,451,883	$ 91,006,489	$ 93,569,067	$ 96,189,238				
Present Value of Total Cont.	$ 28,522,603	$ 28,736,900	$ 30,360,868	$ 32,096,593				

[a] Based on the plan provisions in effect as of June 30, 2013.

Unfunded Accrued Liability and Funded Ratio

Determined at June 30, 2013 [a]

	Unfunded Accrued Liability (in thousands)				Funded Ratio			
	Valuation	Experience Study			Valuation	Experience Study		
Year	Baseline	7.75% DR	7.50% DR	7.25% DR	Baseline	7.75% DR	7.50% DR	7.25% DR
2015	$ 23,507,890	$ 23,989,874	$ 25,176,982	$ 26,423,768	37.850%	37.440%	36.290%	35.150%
2016	24,093,192	24,521,764	25,724,207	26,985,629	38.890%	38.570%	37.440%	36.330%
2017	24,509,504	24,886,799	26,102,544	27,376,318	40.270%	40.000%	38.880%	37.780%
2018	25,039,597	25,367,850	26,595,136	27,879,381	41.290%	41.030%	39.930%	38.860%
2019	25,558,044	25,840,497	27,077,135	28,369,506	42.260%	41.980%	40.900%	39.850%
2020	26,056,623	26,297,528	27,541,409	28,839,618	43.180%	42.850%	41.800%	40.770%
2025	28,043,330	28,162,603	29,404,408	30,690,817	47.380%	46.480%	45.550%	44.660%
2030	28,602,676	28,732,513	29,892,192	31,082,511	51.500%	49.850%	49.080%	48.360%
2035	26,333,052	26,504,594	27,458,342	28,428,224	57.840%	55.880%	55.340%	54.860%
2040	19,309,976	19,408,993	20,001,904	20,603,253	69.740%	68.390%	68.140%	67.940%
2045	6,440,808	6,240,127	6,375,793	6,521,987	90.000%	90.000%	90.000%	90.000%

[a] Based on the plan provisions in effect as of June 30, 2013.

SECTION IV

RECOMMENDED ASSUMPTIONS

Actuarial Methods and Assumptions

Actuarial Cost Method Adopted June 30, 1989, by Statute

The projected unit credit normal cost method is used. Under this method, the projected pension at retirement age is first calculated and the value thereof at the individual member's current or attained age is determined. The normal cost for the member for the current year is equal to the value so determined divided by the member's projected service at retirement. The normal cost for the plan for the year is the sum of the individual normal costs.

The actuarial liability at any point in time is the value of the projected pensions at that time less the value of future normal costs.

For ancillary benefits for active members, in particular death and survivor benefits, termination benefits, and the postretirement increases, the same procedure as outlined above is followed.

Estimated annual administrative expenses are added to the normal cost.

For valuation purposes, as well as projection purposes, an actuarial value of assets is used.

Proposed Actuarial Assumptions to be Adopted for the June 30, 2014, Valuation

Mortality

Post-Retirement Mortality

105 percent of the RP2014 Healthy Annuitant mortality table, sex distinct, with rates projected to 2015. No adjustment is made for post-disabled mortality. The mortality table used is a static table and provides and estimated margin of 20 percent for future mortality improvement.

Pre-Retirement Mortality, including terminated vested members prior to attaining age 50

Based on a percentage of 90 percent for males and 110 percent for females of the RP2014 Total Employee mortality table. Five percent of deaths among active employees are assumed to be in the performance of their duty.

Interest

7.50 percent or 7.25 percent per annum, compounded annually.

General Inflation

3.00 percent per annum, compounded annually.

Marriage Assumption

85.0 percent of active male participants and 65.0 percent of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

Social Security Offset for Survivor Benefits

No offset assumption for male surviving spouses because it is assumed their own PIA is as great as their spouses' PIA. Sixty percent of married male members are assumed to have a dual income household. For the dual income household, it is assumed the offset at age 60 is 45.0 percent of the original survivor benefit. It is assumed the offset at age 62 is 10.0 percent of the original survivor benefit. Furthermore, it is assumed that 50 percent of retirees on or after July 1, 2009, will elect to remove the offset provision. In exchange for the removal, the member's retirement annuity is reduced by 3.825 percent monthly as mandated by Statutes.

Termination

Illustrative rates of withdrawal from the System are as follows:

Service Based Withdrawal				
	Regular Formula Employees		Alternate Formula Employees	
Service (Beginning of Year)	Males	Females	Males	Females
0	0.2300	0.2300	0.0325	0.0600
1	0.1200	0.1200	0.0325	0.0450
2	0.0950	0.0850	0.0325	0.0450
3	0.0700	0.0650	0.0200	0.0400
4	0.0625	0.0500	0.0175	0.0300
5	0.0425	0.0475	0.0175	0.0300
6	0.0425	0.0350	0.0175	0.0300
7	0.0350	0.0350	0.0175	0.0200
8	0.0300	0.0300	0.0150	0.0200
9	0.0250	0.0250	0.0150	0.0200
10	0.0250	0.0250	0.0150	0.0200
11	0.0200	0.0200	0.0125	0.0175
12	0.0200	0.0200	0.0125	0.0175
13	0.0200	0.0200	0.0100	0.0150
14	0.0150	0.0150	0.0100	0.0150
15	0.0150	0.0150	0.0100	0.0150
16	0.0150	0.0150	0.0100	0.0150
17	0.0150	0.0150	0.0100	0.0150
18	0.0150	0.0150	0.0100	0.0150
19	0.0150	0.0150	0.0100	0.0150
20	0.0150	0.0100	0.0100	0.0150
21	0.0150	0.0100	0.0100	0.0150
22	0.0150	0.0100	0.0100	0.0150
23	0.0150	0.0100	0.0100	0.0150
24	0.0150	0.0100	0.0100	0.0150
25	0.0150	0.0100	0.0100	0.0150
26	0.0150	0.0100	0.0100	0.0150
27	0.0150	0.0100	0.0100	0.0150
28	0.0150	0.0100	0.0100	0.0150
29	0.0150	0.0100	0.0100	0.0150
30+	0.0150	0.0100	0.0100	0.0150

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Salary Increases

Illustrative rates of increase per individual employee per annum, compounded annually:

Age	Annual Increase
25	7.92%
30	6.45%
35	5.55%
40	5.22%
45	4.83%
50	4.51%
55	4.30%
60	4.10%
65	3.72%
70	3.50%

These increases include a component for inflation of 3.0 percent per annum.

Disability

Because members who receive disability benefits typically spend less than one year on disability, they are considered active members. Therefore a load of 1.34 percent of pay on the normal cost is applied to reflect the near-term cash flow. This assumption is based on 110 percent of the most recent disability benefit payment information as a percent of payroll and will be updated at each valuation date as experience emerges.

Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the valuation date. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have the same demographic profile as new entrants in the 15 years prior to the valuation date. The average increase in payroll for the projection period is 3.5 percent per annum.

New Entrant Benefit Group	Average Age	Average Pay (2013 Dollars)
New entrants eligible for Regular Formula Benefits that are covered by Social Security.	37.47	$48,473
New entrants eligible for Regular Formula Benefits that are not covered By Social Security.	37.30	$47,536
New entrants in positions formerly eligible for Alternate Formula Benefits that are covered by Social Security that are now eligible for Regular Formula Benefits.	37.71	$54,672
New entrants eligible for Alternate Formula Benefits that are covered by Social Security	32.05	$50,259
New entrants in positions formerly eligible for Alternate Formula Benefits that are not covered by Social Security that are now eligible for Regular Formula Benefits.	28.54	$62,670
New entrants eligible for Alternate Formula Benefits that are not covered by Social Security	28.74	$40,218

Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates for Regular Formula Employees		
	Males	Females
50	15.00%	25.00%
51	15.00%	25.00%
52	25.00%	30.00%
53	25.00%	25.00%
54	20.00%	20.00%
55	17.50%	16.00%
56	17.50%	16.00%
57	15.00%	16.00%
58	15.00%	16.00%
59	15.00%	16.00%
60	10.00%	16.00%
61	10.00%	12.50%
62	20.00%	20.00%
63	17.50%	17.50%
64	15.00%	17.50%
65	20.00%	25.00%
66	25.00%	20.00%
67	20.00%	20.00%
68	20.00%	20.00%
69	17.50%	20.00%
70	17.50%	20.00%
71	17.50%	15.00%
72	15.00%	20.00%
73	17.50%	20.00%
74	20.00%	20.00%
75	100.00%	100.00%

Early Retirement Rates for Regular Formula Employees		
Age	Males	Females
55	4.50%	4.50%
56	6.00%	4.00%
57	5.00%	7.00%
58	7.50%	9.50%
59	9.50%	12.00%

Retirement Rates for Alternate Formula Employees				
	Eligible for Alternate Formula Benefits Only		Eligible for Regular Formula Benefits Only	
Age	Males	Females	Males	Females
50	60.00%	40.00%	N/A	N/A
51	45.00%	40.00%	N/A	N/A
52	45.00%	35.00%	N/A	N/A
53	40.00%	30.00%	N/A	N/A
54	40.00%	25.00%	N/A	N/A
55	35.00%	30.00%	N/A	N/A
56	35.00%	25.00%	N/A	N/A
57	27.50%	20.00%	N/A	N/A
58	30.00%	20.00%	N/A	N/A
59	25.00%	25.00%	N/A	N/A
60	30.00%	30.00%	5.00%	8.00%
61	25.00%	20.00%	5.00%	8.00%
62	45.00%	45.00%	10.00%	8.00%
63	40.00%	35.00%	10.00%	12.50%
64	30.00%	40.00%	10.00%	12.50%
65	55.00%	40.00%	20.00%	17.50%
66	50.00%	60.00%	20.00%	15.00%
67	50.00%	50.00%	20.00%	40.00%
68	30.00%	15.00%	17.50%	30.00%
69	35.00%	35.00%	17.50%	20.00%
70	50.00%	60.00%	17.50%	25.00%
71	30.00%	50.00%	17.50%	30.00%
72	100.00%	100.00%	100.00%	100.00%

Assets

Assets available for benefits are used as described on page 44 of the most recent valuation report.

Expenses

As estimated and advised by SERS staff, based on current expenses and are expected to increase in relation to the projected capped payroll.

Spouse's Age

The female spouse is assumed to be three years younger than the male spouse.

Children

It is assumed that married members have 2.2 children, one year apart in age.

The age of the youngest child of a deceased employee at his date of death is assumed to be as follows:

Age at Death of Employee	Age of Youngest Child	Age at Death of Employee	Age of Youngest Child
20	2	40	6
25	3	45	8
30	4	50	10
35	5	55	12
		60	14

Overtime, Shift Differentials, and Unused Sick Leave

Reported earnings include base pay alone. It is assumed that overtime and shift differentials will increase total payroll by 3.5 percent over reported earnings.

There is a not an explicit assumption for sick leave made in the valuation.

Load for Inactive Members Eligible for Deferred Vested Pension Benefits

Load of 15 percent to the liability attributable to inactive members eligible for deferred vested pension benefits for increase in final average salary due to participation in a reciprocal system after termination.

Missing Data

If year-to-date earnings were not available, then the monthly pay rate is used. If both year-to-date earnings and the monthly pay rate are not available, the annual rate of pay is assumed to be the rate of pay for the population as a whole on the valuation date. If a birth date was not available, the member was assumed to be age 35.

Decrement Timing

All decrements are assumed to occur mid-year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Disability and turnover decrements do not operate after member reaches retirement eligibility.

Eligibility Testing

Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Assumptions as a result of Public Act 96-0889 (Adopted by the Board on July 12, 2010)

Members hired after December 31, 2010, are assumed to make contributions on salary up to the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

State contributions, expressed as a percentage of pay, are calculated based upon total pay including pay over the final average compensation cap in a given year until this plan provision or administrative procedure is clarified.

Members hired after December 31, 2010, eligible for the regular formula benefits will retire according to the following age-based retirement rates:

Retirement Rates for Regular Formula Employees			
Age	Members Eligible For Normal Retirement	Age	Members Eligible For Early Retirement
67	50.00%	62	30.00%
68	35.00%	63	15.00%
69	35.00%	64	15.00%
70	35.00%	65	15.00%
71	20.00%	66	15.00%
72	20.00%		
73	20.00%		
74	20.00%		
75	100.00%		

Members hired after December 31, 2010, eligible for the alternate formula benefits will retire according to the following age-based retirement rates:

Retirement Rates for Alternate Formula Employees		
Age	Males	Females
60	50.00%	50.00%
61	25.00%	20.00%
62	45.00%	45.00%
63	40.00%	35.00%
64	30.00%	40.00%
65	55.00%	40.00%
66	50.00%	60.00%
67	50.00%	50.00%
68	30.00%	15.00%
69	35.00%	35.00%
70	50.00%	60.00%
71	30.00%	50.00%
72	100.00%	100.00%