**Merced County
Employees' Retirement
Association**

Experience Analysis

Produced by Cheiron

March 6, 2014

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CHEIRON

LETTER OF TRANSMITTAL

March 6, 2014

Retirement Board of Merced
County Employees' Retirement Association
3916 State Street, Suite 210
Merced, CA 93105

Dear Members of the Board:

At your request, we have completed an experience analysis of the actuarial assumptions used in the valuation of the Merced County Employees' Retirement Association (MCERA). The economic assumptions studied were the investment return, administrative expenses and wage, payroll and cost-of-living inflation. The demographic analysis compares assumed with actual experience for the three-year period from July 1, 2010 through June 30, 2013.

This report presents the results of our analysis as well as recommendations for the assumptions to be used in performing the July 1, 2013 actuarial valuation. In preparing our report, we relied without audit, on information (some oral and some written) supplied by MCERA. This information includes, but is not limited to, the plan provisions, employee data, and financial information.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

Cheiron's experience study was prepared exclusively for the Retirement Board of Merced County Employees' Retirement Association for a specific and limited purpose. It is not for the use or benefit of any third party for any purpose. Any third party recipient of Cheiron's work product (other than the Fund's auditor, attorney, third party administrator or other professional when providing professional services to the fund or any governmental agency to which this certification is required to be submitted by law or regulation) who desires professional guidance should not rely upon Cheiron's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

We are available to answer any questions about the contents of this report or the process used in our analysis.

Sincerely,

Cheiron

Robert T. McCrory, FSA, EA, MAAA
Principal Consulting Actuary

Graham A. Schmidt, ASA, MAAA
Consulting Actuary

EXECUTIVE SUMMARY

PURPOSE

Actuarial assumptions (economic and demographic) are intended to be long-term in nature, and should be both individually reasonable and consistent in the aggregate. The purpose of this experience analysis is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for the Merced County Employees' Retirement Association (MCERA), and if not, then recommend any adjustments that might be needed. It is important to note that frequent and significant changes in the actuarial assumptions from year-to-year are not typically implemented, unless there are known fundamental changes in expectations of the economy, or with respect to MCERA's membership or assets, that would warrant such frequent or significant change.

The plan's economic assumptions were reviewed. The economic assumptions include the assumed rates of inflation, cost of living adjustment (COLA) increases, investment return, active payroll growth and administrative expense assumptions.

The Plan's demographic experience – observed rates of retirement, withdrawal, termination, disability, and death, as well as other assumptions – is compared with the experience expected under the actuarial assumptions currently used to determine Plan liabilities and cost, and revised assumptions are recommended as appropriate.

SUMMARY OF ECONOMIC ASSUMPTION ANALYSIS

The specific economic assumptions analyzed in this report are wage inflation, investment return, administrative expense assumptions, payroll growth, and COLA growth. These assumptions have a significant impact on the contribution rates in the short-term and the risk of negative outcomes in the long-term.

A review of the Plan's economic assumptions based on the allocation of Plan assets and the history of the financial markets indicates that the current economic assumption of a nominal 7.75% annual rate of return should be retained. However, we recommend that the current 3.75% assumed annual rate of inflation be lowered to 3.00%.

We have performed additional analyses based on the future expectations of the Plan's investment consultant, as well as other investment consultants. We have also reviewed market expectations for inflation as revealed in the Inflation Curve published by the Federal Reserve Bank of Cleveland, and we are familiar with the economic assumptions being adopted by pension plans nationwide.

This evidence further strengthens our belief that the Retirement Board should reduce the assumed inflation rate from 3.75% to 3.00%. Accordingly, we are recommending a reduction in the payroll growth assumption from 3.75% to 3.0%, and a revised rate of expected COLA growth (2.60%), which is derived from simulations of the future level of inflation and is below the 3% COLA cap.

We are also recommending that MCERA include an additional cost item for expected annual administrative expenses in the actuarial cost calculation. In addition to providing a more transparent approach for determining plan costs, this change also has the benefit of bringing the determination of Plan liabilities in line with new GASB accounting standards.

SUMMARY OF DEMOGRAPHIC ASSUMPTION ANALYSIS

The specific demographic assumptions analyzed in this report are merit salary increases, retirement rates, mortality rates, disability rates, termination rates, refund rates, reciprocity percentage and family composition. The details of the analysis for each of these assumptions are provided later in the report, but the most significant recommended changes are for disability, termination and mortality rates.

Overall, the recommended changes in the demographic assumptions other than mortality resulted a very small increase in the employer contribution rate – about 0.4%. However, the recommended change in expected rates of death – the mortality assumption – was much more significant, increasing the employer contribution rate by about 4% of payroll.

Mortality rates and the tools used to analyze them have improved. Based on the experience of the Plan, we are recommending changes to the mortality assumptions. We are proposing to continue using the Retired Pensioner (RP) 2000 Tables, published by the Society of Actuaries, but to increase future member life expectancy by projecting future reductions in mortality rates using Projection Scale BB published by the Society of Actuaries. This change is discussed in further detail in Section III.

COST OF ECONOMIC AND DEMOGRAPHIC ASSUMPTION CHANGES

The table below summarizes the estimated cost impact of the recommended changes to economic and demographic assumptions.

Employer Contribution Rate Increase Recommended Assumption Changes	
Assumption	**Total**
Employer Contribution Rate as of July 1, 2013 before Study	45.13%
Termination Rates	-0.17%
Disability Rates	-0.08%
Retirement Rates	+0.67%
Mortality Rates	+3.98%
Economic Assumptions	+0.17%
Subtotal	+4.57%
Impact of Assumption Changes on Employee Contribution Rates	+0.30% [1]
Employer Contribution Rate as of July 1, 2013 after Study	50.00%

The body of this report provides additional detail and support for our conclusions and recommendations.

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[1] Assumes cost of Administrative expenses split between Employees and Employers based on current ratio.

ECONOMIC ASSUMPTIONS

INTRODUCTION

Economic assumptions utilized in the development of actuarial liabilities and costs for a defined benefit plan include:

- The inflation assumption;

- The real investment return assumption;

- The real growth in pay relative to inflation; and

- COLA increases relative to inflation.

While we look to the past for indications of future economic behavior, we must also consider how the future may be expected to be different. In order to reflect the long-term nature of defined benefit plan funding in the development of these economic assumptions, it is appropriate to focus on long term trends.

INFLATION

While historical trends are not entirely indicative of the future, they do serve as a useful guide in the determination of assumptions. However, there are elements of the future economic environment that may differ from the past due to structural changes. An important and fundamental case in point is the rate of inflation, which underlies each of the four elements of economic assumptions listed above.

Chart II-1 on the next page shows the average rate of inflation over 30-year periods, with the earliest such period ending in 1955 and the latest ending in 2013. The current inflation assumption of 3.75% is shown as a red line for reference. We note in the chart that inflation seemed to be increasing steadily until the 1990's when it leveled off and began to decrease. Examination of Chart II-1 may lead to the conclusion that there is a potential for inflation to be quite high, exceeding 4% to 5% annually.

**Chart II-1: Average Past Inflation**
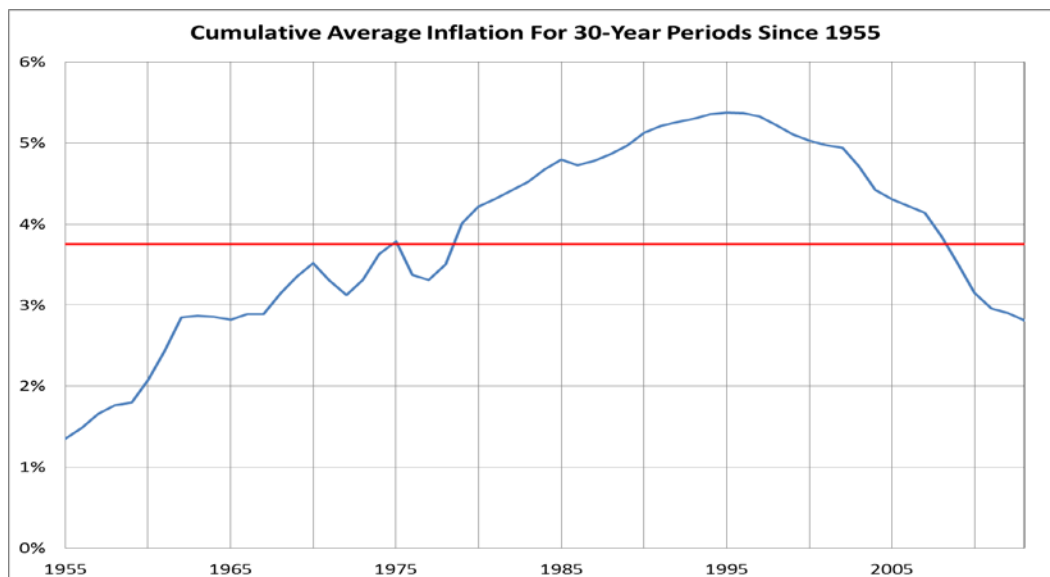
Cumulative Average Inflation For 30-Year Periods Since 1955

However, there are a number of reasons to believe that future inflation levels will not be as high as Chart II-1 might seem to suggest.

- An important reason for the high rate of inflation in the averages above is the nine-year period 1973-81 when inflation averaged 9.2% per year.

- The years 1973-81 featured unprecedented levels of household formation. The demand for new houses, cars, office space and equipment caused by the maturation of the post-war baby boom may have largely been responsible for the inflation during these years. Since 1983, increases have been in the range 0.1% to 4.6% with one exception (6.1% in 1990), producing a compounded average of 2.90% per year.

- The population of the United States is aging, which implies a greater likelihood of low inflation in the future. This has been observed in other countries with aging populations, such as Japan.

- Currently, the Federal Open Market Committee has policies in place to control inflation, making future levels more likely to remain relatively low.

- Experience during the current Great Recession has included very low inflation rates. During calendar year 2013, the overall rate of inflation for Urban Workers (CPI-U) was just 1.2%.

- The Survey of Professional Forecasters, a quarterly publication of the Research Department of the Philadelphia Reserve Bank, indicates that national inflation levels are expected to be 2.30% on average over the next ten years.

- Financial markets offer evidence of what investors expect inflation to be in future years. Various securities, such as Treasury inflation-protected securities (TIPS), provide the necessary data for these analyses.

As an example, a recent publication by the Federal Reserve Bank of Cleveland attempts to incorporate some of this market data. It contained the term structure of expected inflation rates shown in Chart II-2. This chart shows the consensus expected inflation for periods of one to 30 years from December, 2013.

Chart II-2: Term Structure of Expected Inflation
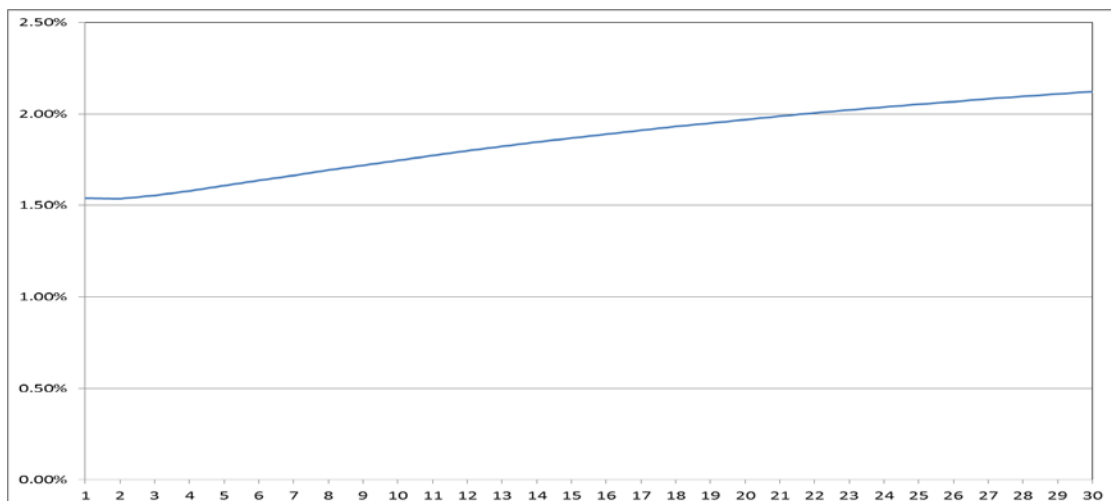
(Source: Cleveland Federal Reserve website. As of December 1, 2013)

- Strategic Investment Solutions (SIS), the investment consultant retained by MCERA, bases their capital market assumptions on an assumption that average inflation over the next 20 years will be 2.30%.

An assumption of below 3% may appear to match well with current market and professional expectations. However, the predictions of future inflation by experts are not unanimous. Some commentators note that the large current and expected future deficits increase the likelihood of higher levels of inflation in the future. Also, historical data shows that periods of higher inflation can and do occur.

A change from the current 3.75% assumption to an assumption *below* 3.0% would represent a larger change than may be advisable in one step. Therefore, we recommend reducing the inflation assumption from 3.75% to 3.0%, which is a significant change. As with all economic and demographic assumptions, the rate of inflation will continue to be monitored in our actuarial experience studies.

INVESTMENT RETURN

The investment return assumption depends on the anticipated average level of inflation and the anticipated average *real rate of return.* The real rate of return is the investment return in excess of underlying inflation. The expected average real rate of return is heavily dependent on asset mix.

In Chart II-3 on the next page, we have simulated the real return derived using MCERA's recently adopted actual target allocation as recommended by SIS. The simulated real returns are derived using the following algorithm:

1. The expected returns, standard deviation and correlation matrix for each asset class were gathered from two sources: The SIS capital market assumptions and from the consensus estimates prepared by CalPERS.

2. 10,000 simulation trials for repeated ten year periods were run, and the mean geometric real return was computed for each of the ten year periods.

3. The distribution of real rates of return based on the SIS assumptions is shown below in Chart II-3.

The mean real return from this simulation was 5.2%, for a nominal return of 7.5% with the 2.3% inflation rate assumed by SIS. However, also note that while investment expenses have been subtracted from the simulated returns, administrative expenses have not. Therefore, as discussed below, administrative expenses must be handled as a separate line item.

Chart II-3: Distribution of Simulated Real Returns
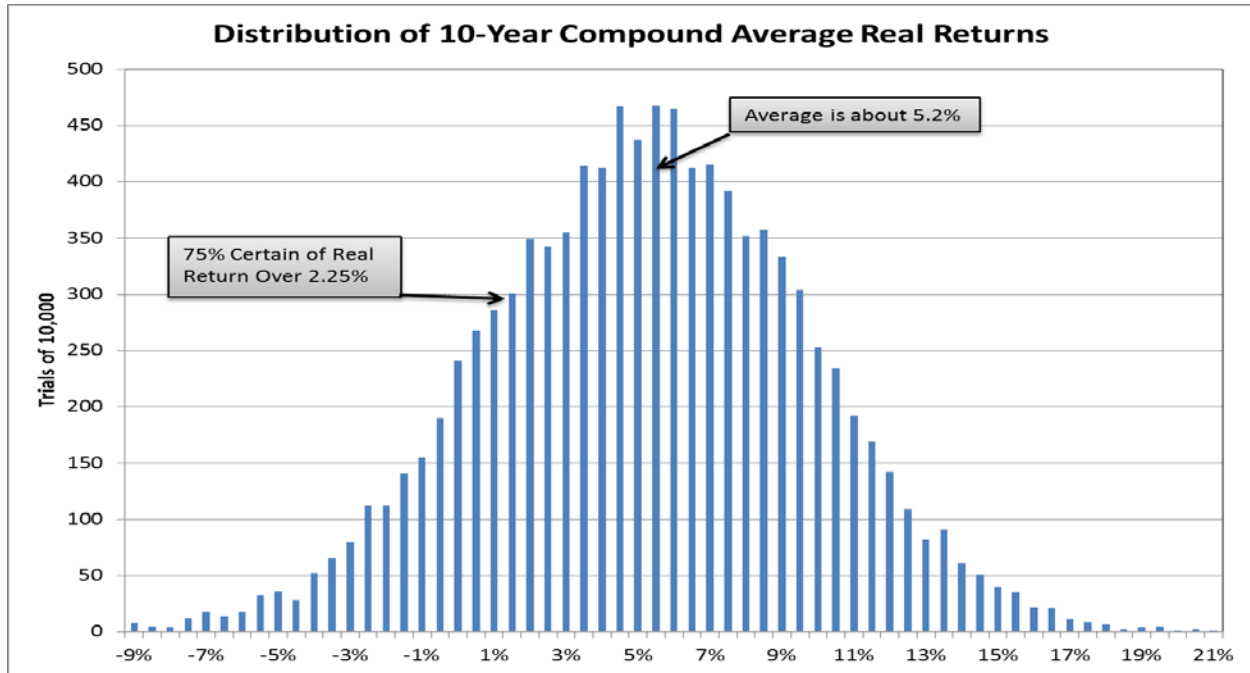
To obtain another data point we simulated the return of the MCERA asset allocation using the capital market assumptions adopted by CalPERS. The mean compound real return was 4.35%, well below the 5.2% discussed above based on the SIS assumptions.

Such differences in expected future returns are neither new nor alarming and, in fact, are expected. The combined results of the simulations from the two sets of independent assumptions – those from the investment consultant and from CalPERS – suggest that an assumed real return rate between 4% and 5% is now appropriate.

Accordingly, we recommend increasing the real return assumption from its current level of 4.0% (7.75% nominal returns minus 3.75% inflation) to 4.75%. There are several reasons for the change:

- The higher real return assumption reflects the restructuring of the MCERA investment portfolio with a new investment consultant. The revised portfolio reflects a significantly more aggressive allocation: the investment advisor estimates an increase in the real return of 0.6% - accompanied by an increase in the expected standard deviation from 12.32% to 14.08% - based on a lower allocation to fixed income.

- The recommended assumed real rate of return is between the simulated results from the CalPERS (4.35%) and SIS (5.2%) assumptions (in fact, it is almost exactly the average of the two.

- A 4.75% real return rate is within the range of assumptions adopted by public sector pension plans generally.

The combination of a 4.75% assumed real return and a 3% assumed rate of inflation will result in a nominal annual return assumption of 7.75%, which is the current assumption. However, the return assumption is no longer expected to be net of administrative expenses, as described below.

ADMINISTRATIVE EXPENSES

The returns discussed above are expected to be net of investment expenses; administrative expenses are not addressed. According to Article 31580.2 of the '37 Act, administrative expenses (excluding certain technology expenses) may not exceed 0.21% of the *accrued liabilities* of the retirement system. Over the past three years, administrative expenses have averaged about 0.28% of the *average assets* of the retirement system.

Changes to the GASB accounting statements require that the discount rate for accounting purposes will be determined net of investment, but not administrative, expenses in future years; a separate line item for administrative expenses will be included in the determination of pension expense.

Accordingly, we recommend that MCERA begin to include an additional cost item for expected annual administrative expenses in the actuarial cost calculation. For the valuation as of July 1, 2013, we recommend an assumption of $1.25 million, based on an analysis of administrative expense items that have been paid out of Plan assets over the past three years. This represents a cost of approximately 1.1% of payroll. Counsel for another '37 Act system has recommended that the members should be charged a portion of the administrative expenses equal to the percentage of the overall contributions paid by the members.

PAYROLL GROWTH

The payroll growth assumption affects both the assets and the liabilities of the Plan. Growth of member salaries is reflected in the projection of future benefit payments and hence in the calculation of Plan liabilities. In addition, the payroll growth assumption is used to estimate the future member payroll available to amortize the unfunded actuarial liability of the Plan.

Components of the payroll growth assumptions are:

- Inflation, and

- Payroll growth above inflation often attributed to productivity gains.

Factors other than productivity contributing to base salary increases include growth in the active workforce, bargaining pressures, competition among local employers, and workforce demographic issues.

The inflationary component is the assumed rate of inflation, with a recommended rate of 3.0%. In general we recommend that long range gains due to productivity, the collective bargaining process or other pressures should be assumed to be zero or minimal. While productivity tends to increase in many sectors of the economy, any long-term assumption of salary growth beyond inflation carries with it an assumed improvement in *relative* standard of living.

It is acceptable to assume some additional level of base payroll increase beyond general inflation. Potential reasons contributing to the increase may include the presence of strong union

representation in the collective bargaining process, competition in hiring among other similar employers, and regional factors – such as the local inflation index exceeding the national average, as has proven the case in parts of California.

However, unprecedented pressures on government budgets from reduced revenues during the Great Recession and political resistance to increased taxes has held recent increases in pay among public sector employees to levels below the rate of inflation.

On balance, for MCERA Cheiron recommends maintaining the current assumption that member pay will increase at the rate of inflation. Therefore, the annual expected increase in base payroll would be 3.00%, reduced from 3.75% in the most recent valuation. This increase will be applied to all continuing active members, and to starting pay for new entrants when projections of future populations are required. This increase will also be used in the calculation of the unfunded liability amortization payment as a level percentage of payroll.

COLA GROWTH

The members of MCERA are eligible to receive automatic Cost of Living Adjustments (COLAs), based on the growth in the Bay Area Consumer Price Index (CPI) and reflecting a 3% cap on the annual COLA increase. Any increase in the CPI above the 3% maximum increase can be banked for future years in which the change in the CPI is below 3%.

Chart II-4: Expected COLA Growth vs. COLA Cap (3%)
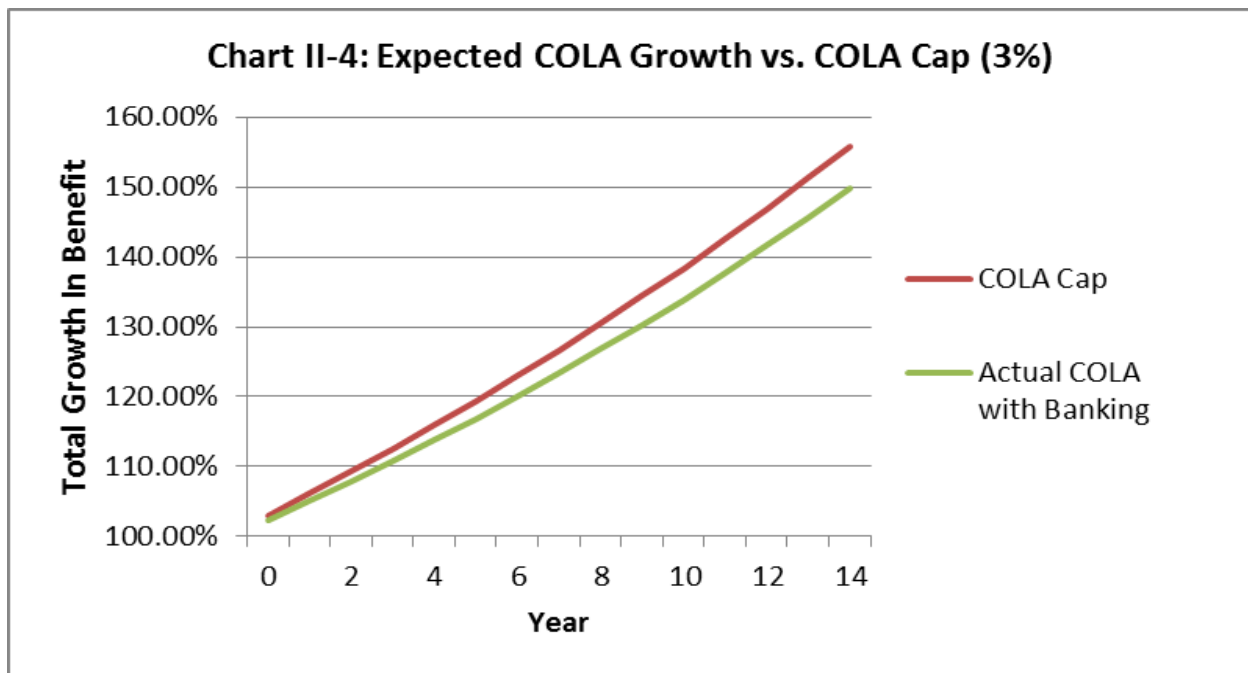
It is necessary to determine an assumed rate of COLA growth, reflecting both inflation (i.e. the growth in the CPI) and the interaction of the CPI with the 3% COLA cap. Therefore, we have produced statistical simulations of inflation, similar to our modeling of the investment return assumption, and then modeled how the COLA maxima and the banking process interact with the changes in CPI.

Chart II-4 above demonstrates how the expected growth in the COLA is expected to be below the cap, even if the expected increase in the CPI (3.0% based on our earlier recommendation) is higher than the cap itself (3.0% in this example). This result occurs when there is not a significant bank already in existence (such as in the early years of retirement) and there are years in which inflation is below the cap; in that event the shortfall will not be made up in future years.

Based on a 3.0% recommended inflation assumption, we recommend an assumed COLA growth rate of 2.60% per year. This represents a reduction from the current COLA growth assumption of 2.70% per year, which reflects the expected growth under the current 3.75% inflation assumption.

DEMOGRAPHIC ASSUMPTIONS

MERIT SALARY INCREASES

Salary increases consist of three components: Increases due to cost of living maintenance (inflation), increases related to non-inflationary pressures on base pay (such as productivity increases), and increases in individual pay due to merit, promotion, and longevity. Increases due to cost of living and non-inflationary base pay factors were addressed in an earlier section of this report.

Charts III-1 and III-2 on the following pages compare the current pay patterns for General and Safety members compared to the current pay data. Only increases due to merit (promotion and longevity) are considered here. In the graphs, the average pay of the active members of MCERA as of July 1, 2013 is plotted against service. A curve is then fitted to the average pay data, and this curve is used to determine a pay increase due to merit.

This is a *transverse* study of longevity and promotion pay increases: Salaries are examined at one point in time (the valuation date), as opposed to being observed over a number of years (a *longitudinal* study). For a more detailed description of this type of study and its advantages, see the Methodology section at the end of this report.

Chart III-1 below shows the average pay by years of service under the current assumption (green line) compared to the actual experience (blue dots) for General employees.

Chart III-1

MCERA General Employees
Average Pay by Years of Service
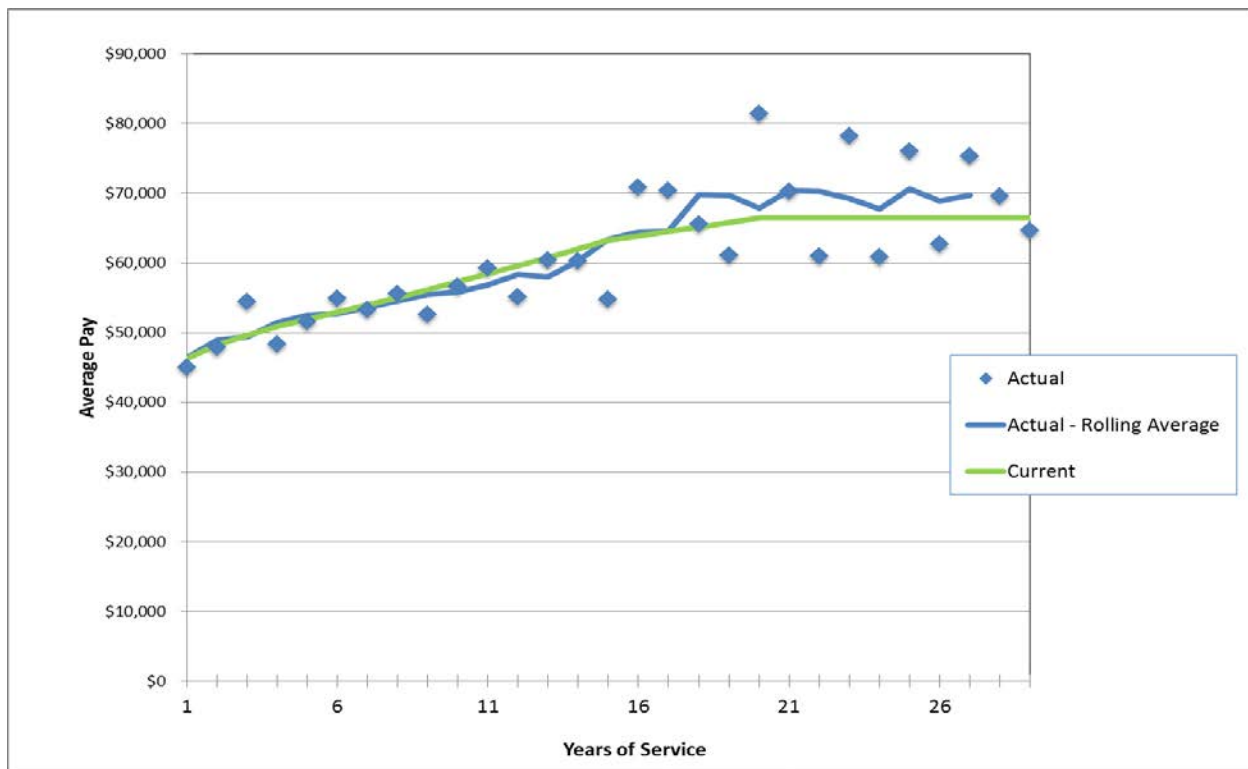
Chart III-2 below shows the average pay by years of service under the current assumption (green line) compared to the actual experience (blue dots) for Safety employees.

Chart III-2

MCERA Safety Employees
Average Pay by Years of Service
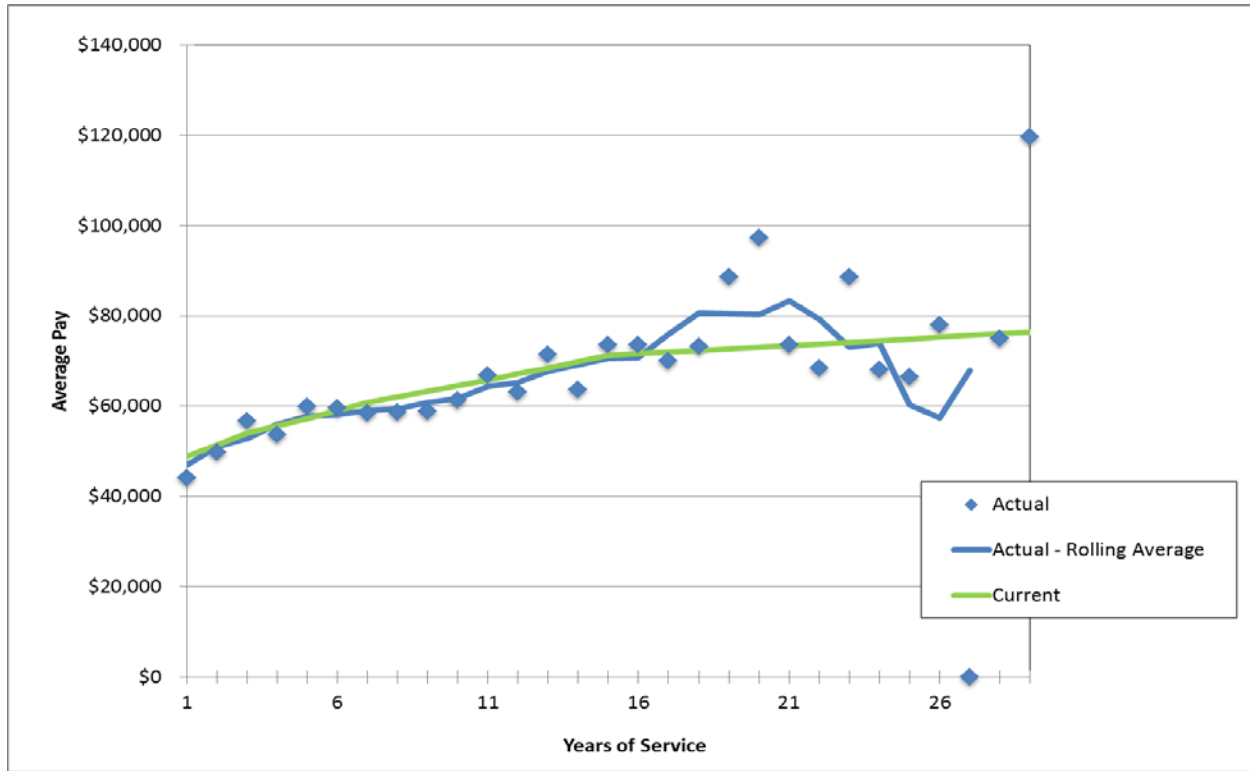
Since the actual pay data is in close accord with the assumed rates of merit increase for both General and Safety employees, no change to the assumed rates is recommended.

TERMINAL (VENTURA) PAY LOAD

Under the Ventura Settlement, members are able to cash out some or all of their leave time (up to 160 hours) in the year prior to retirement; the cashed out pay then gets included in the members' final average compensation.

The current actuarial assumptions include a load of 6.92% for Tier 1 members and 2.31% for Tier 2 members to Final Average Compensation to account for this cash out. This is equivalent to assuming that members will cash out 90% of the maximum allowable time in the year of retirement: 90% x 160 hours / 2080 hours worked per year = 6.92% for Tier 1. The load is divided by 3 for Tier 2 (6.92% / 3 = 2.31%) to account for the fact that these members use three year averaging for their final compensation.

We performed an analysis of the retirement calculations which occurred during the prior year. As part of this analysis, we compared the final average compensation in the actual benefit calculations to the expected final compensation based on the rate of pay from the prior valuation data and any known pay raises that occurred during the year.

For the 30 Tier 1 members who retired from active status for whom we had prior year pay information, the actual final average compensation exceeded the expected value by around 6.4%. For 30 Tier 2 members, the figure was 3.0%. Therefore, we believe the current terminal pay loads (6.92% to Tier 1, 2.31% for Tier 2) are reasonable and recommend that they be retained.

These terminal pay loads will continue to be applied only to retirement benefits. We recommend that a load equal to the Tier 2 load (2.31%) be applied to the retirement benefits of the new Tier 3 members. We recommend that no load be applied to the benefits of the new Tier 4 (PEPRA) members, as they are not eligible to receive the final compensation cash-outs.

We will continue to monitor terminal pay experience and adjust this assumption as necessary. Modifications may also be necessary if there are any changes to the terminal payout policies, or if there are any changes to the policies which govern the accumulation of leave. We understand that there are ongoing court cases which may impact this assumption.

RATES OF RETIREMENT

In this section, we develop our analysis of rates of retirement. For each membership group studied, we determined the ratio of the actual number of retirements at each age compared to the expected number of retirements. If the assumption is perfect, this ratio will be 100%. In addition, we compare the average ages of retirees. Male and female experience is reviewed separately.

General members are currently eligible to retire at age 50 (age 55 for Tier 2) with 10 years of membership (though only five years of benefit service is necessary) or at any age with 30 or more years of Eligibility Service.

We excluded the exposures and decrements for those above age 70 from this analysis, as all members over age 70 are assumed to retire immediately.

Table III-1: Summary of General Retirement Experience versus Current Assumptions
(Ages 50-70)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	487	70	69.4	100.9%
Females	862	130	103.4	125.8%
Combined	**1,349**	**200**	**172.7**	**115.8%**

	Actual Average Age	Expected Average Age
Males	59.0	59.3
Females	58.6	58.7
Combined	**58.7**	**58.9**

In Table III-1 above, we note that male retirement experience for the last three years was in close accord with experience: The actual to expected number of retirements was 100.9%, while the average age of actual retirements was within a year of expectations.

For female General members, actual retirements exceeded expectations by a bit over 25%, even though the average age of the female retirees was about as expected. This means that, while the age pattern of the female retirements was as expected, the rates at most ages were higher than expected.

Accordingly, we are proposing an increase in the assumed retirement rates for female General members. This represents a departure from the prior assumptions, wherein the same retirement rates were used for males and females. The experience data compared with the proposed assumptions is shown in Table III-2 below.

Charts III-3 and III-4 show the observed, current, and proposed retirement rates by age. These are composite rates reflecting all service levels. No change is proposed for General males; an increase is recommended in the retirement rates for General females from their mid-fifties to mid-sixties to bring assumptions in line with experience.

Table III-2: Summary of General Retirement Experience versus Proposed Assumptions
(Ages 50-70)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	487	70	69.4	100.9%
Females	862	130	129.2	100.6%
Combined	**1,349**	**200**	**198.6**	**100.7%**

	Actual Average Age	Expected Average Age
Males	59.0	59.3
Females	58.6	58.3
Combined	**58.7**	**58.6**

Table III-3: Comparison of Current and Proposed Assumptions for General Members
(Ages 50-70)

Service: Age	Current Rates (Male and Female)			Proposed Female Rates		
	10 – 19 Years	20 – 29 Years	30+ Years	10 – 19 Years	20 – 29 Years	30+ Years
50	2.5%	5.0%	7.5%	2.5%	10.0%	10.0%
51	2.5%	5.0%	7.5%	2.5%	10.0%	10.0%
52	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
53	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
54	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
55	9.0%	18.0%	27.0%	9.0%	35.0%	35.0%
56	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
57	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
58	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
59	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
60	25.0%	25.0%	37.5%	25.0%	30.0%	35.0%
61	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
62	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
63	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
64	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
65	40.0%	40.0%	40.0%	40.0%	50.0%	50.0%
66	45.0%	45.0%	45.0%	45.0%	50.0%	50.0%
67	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
68	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
69	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
70+	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

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Charts III-3 and III-4: Comparison of Actual, Current and Proposed General Retirement Rates
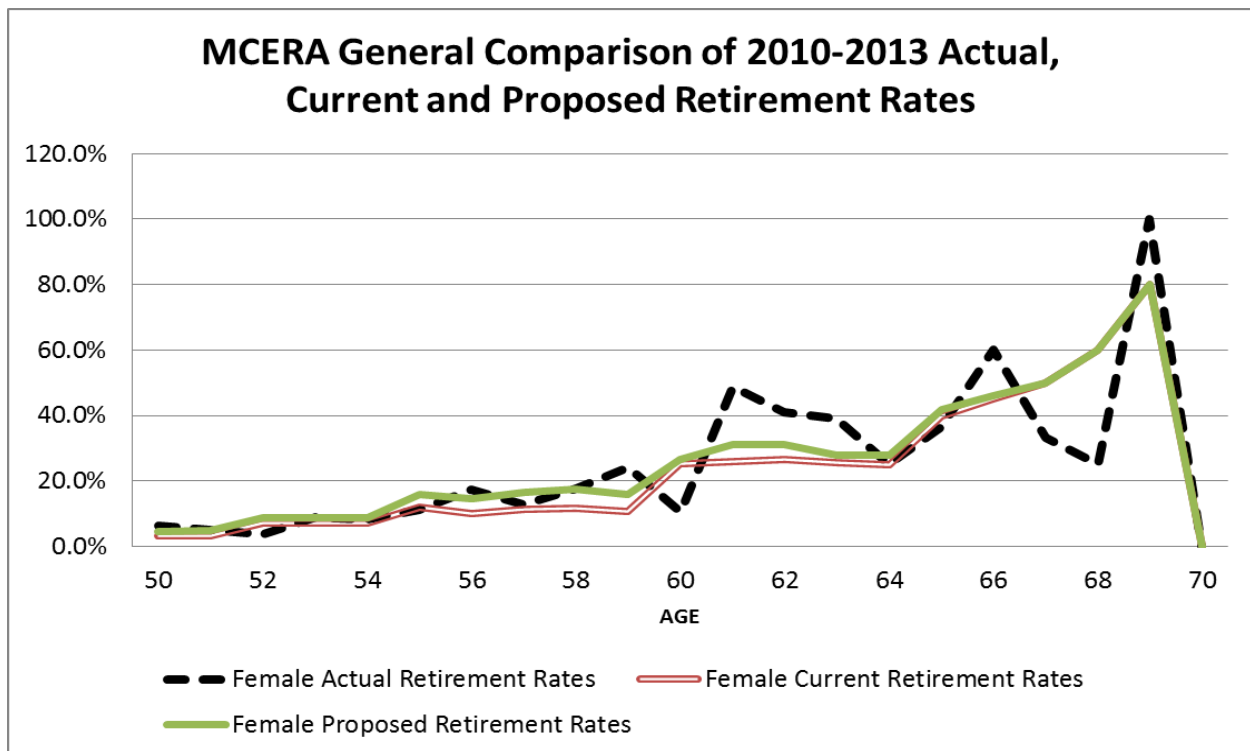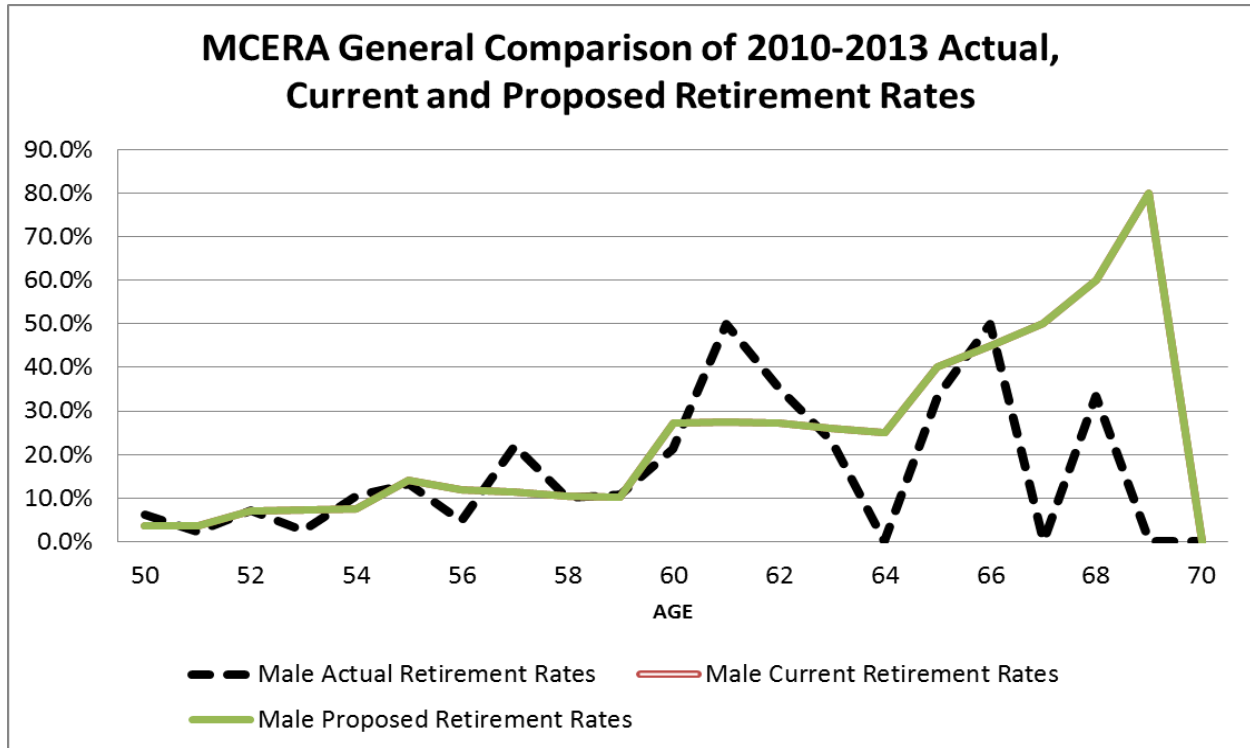
Safety members are currently eligible to retire at age 50 with 10 years of service or at any age with 20 or more years of service. We excluded the exposures and decrements for those above age 60 from this analysis, as most Safety members retire before this age and we therefore assume immediate retirement for Safety members over age 60.

Because there were comparatively few safety members eligible to retire, we combined experience from the 2007-10 Experience Analysis with the similar data collected for this Analysis to achieve a more representative sample, resulting in Table III-4 below. On the combined basis, there were almost 50% more retirements than expected. However, the average age of the retiring members was about what was expected.

Table III-4: Summary of Safety Retirement Experience versus Current Assumptions
(Ages 50-60)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	213	35	23.7	147.7%
Females	45	8	5.6	143.5%
Combined	**258**	**43**	**29.3**	**146.9%**

	Actual Average Age	Expected Average Age
Males	51.8	52.0
Females	53.5	51.9
Combined	**52.1**	**52.0**

Accordingly, we are proposing an increase in the assumed retirement rates for Safety members. The experience data compared with the proposed assumptions is shown in Table III-5 below.

Table III-5: Summary of Safety Retirement Experience versus Proposed Assumptions
(Ages 50-60)

	Eligible Exposure	Actual Retirements	Expected Retirements	Actual to Expected Ratio
Males	213	35	33.2	105.3%
Females	45	8	7.8	103.1%
Combined	**258**	**43**	**41.0**	**104.9%**

	Actual Average Age	Expected Average Age
Males	51.8	52.0
Females	53.5	52.0
Combined	**52.1**	**52.0**

Charts III-5 and III-6 show the observed, current, and proposed retirement rates by age for Safety males and females combined. The current and proposed retirement rates are compared below in Table III-6. A lack of a large enough sample prevents us from studying female retirement rates separately.

Table III-6: Comparison of Current and Proposed Assumptions for Safety Members
(Ages 40-60)

Service:	Current Rates		Proposed Rates	
Age	10 – 19 Years	20+ Years	10 – 19 Years	20+ Years
40	0.00%	2.50%	0.00%	3.10%
41	0.00%	2.50%	0.00%	3.10%
42	0.00%	2.50%	0.00%	3.10%
43	0.00%	2.50%	0.00%	3.10%
44	0.00%	2.50%	0.00%	3.10%
45	0.00%	5.00%	0.00%	7.60%
46	0.00%	5.00%	0.00%	7.60%
47	0.00%	5.00%	0.00%	7.60%
48	0.00%	5.00%	0.00%	7.60%
49	0.00%	5.00%	0.00%	7.60%
50	7.50%	25.00%	12.75%	32.90%
51	7.50%	25.00%	12.75%	32.90%
52	7.50%	25.00%	12.75%	32.90%
53	7.50%	25.00%	12.75%	32.90%
54	7.50%	25.00%	12.75%	32.90%
55	7.50%	25.00%	12.75%	32.90%
56	7.50%	25.00%	12.75%	32.90%
57	7.50%	25.00%	12.75%	32.90%
58	7.50%	25.00%	12.75%	32.90%
59	7.50%	25.00%	12.75%	32.90%
60	100.00%	100.00%	100.00%	100.00%

We have not proposed separate retirement rates for General and Safety PEPRA members, except that we have recommended that the rates described above should be applied once these members are eligible to retire (General PEPRA members can retire at age 52 with 5 years of service, and Safety PEPRA members can retire at age 50 with 5 years of service). There is some expectation that PEPRA members may retire later than those in other tiers due to their lower benefit levels. However, there is no data that yet exists regarding these members' retirement behavior and our initial analysis of the PEPRA normal cost rates showed little impact if the retirement rates were adjusted to assume later retirements.

Charts III-5 and III-6: Comparison of Actual, Current and Proposed Safety Retirement Rates
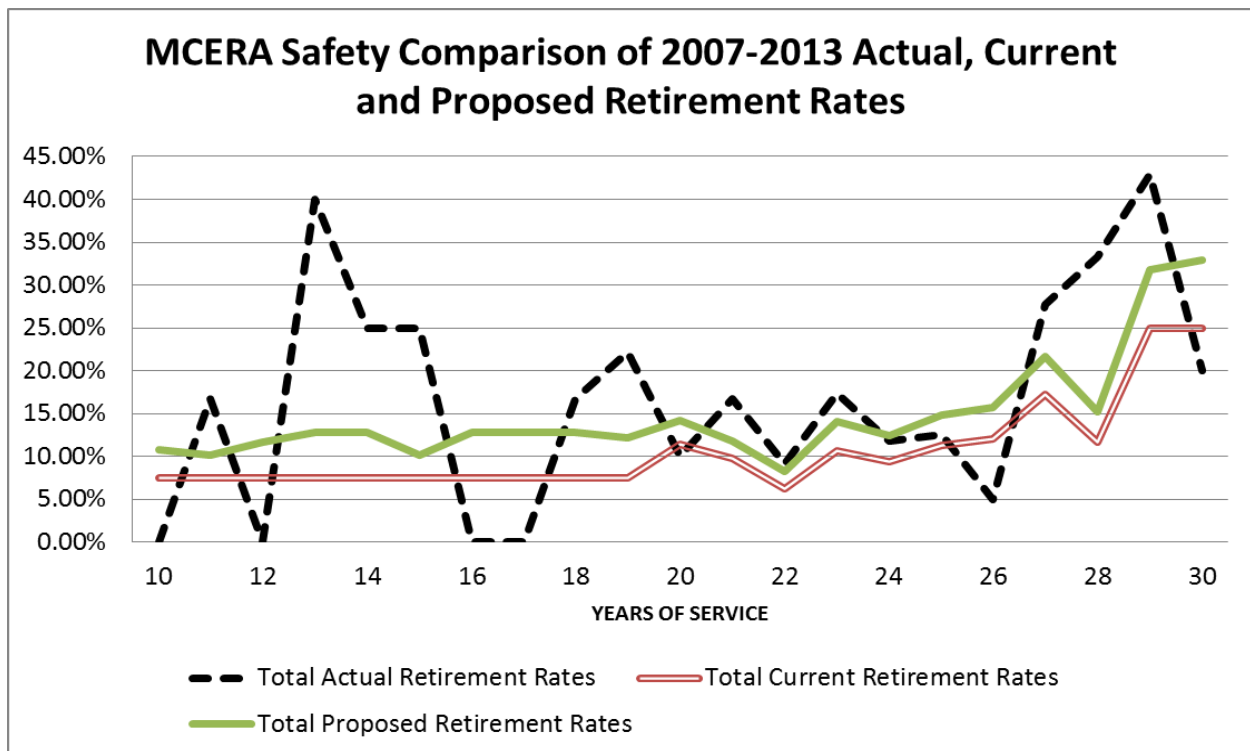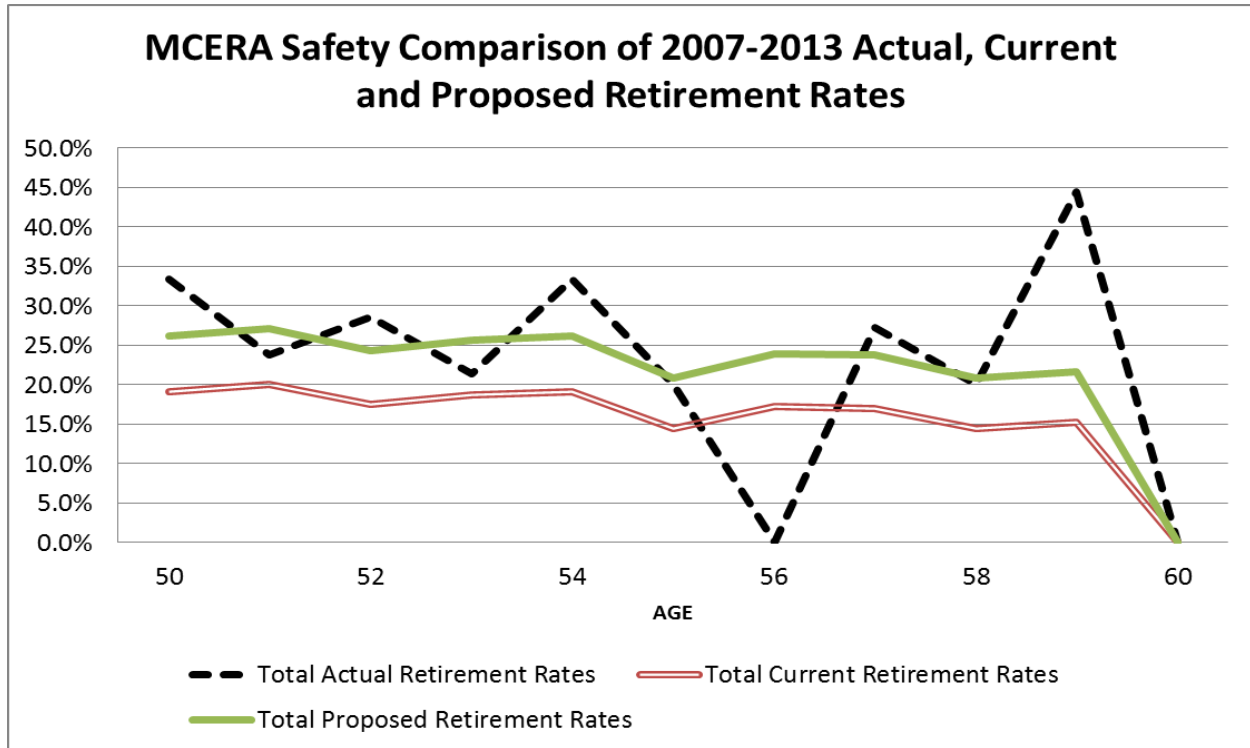
MCERA Safety Comparison of 2007-2013 Actual, Current and Proposed Retirement Rates

MCERA Safety Comparison of 2007-2013 Actual, Current and Proposed Retirement Rates

MORTALITY RATES

Mortality assumptions are developed separately for active employees, healthy annuitants, and disabled annuitants. Within each of these groups, mortality rates are developed separately for males and females. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables are used with standard modifications so that the aggregate experience matches the plan's experience.

In analyzing mortality rates, we inspect the ratio of actual deaths to the number of expected deaths – the actual/expected or A/E ratio. Having an A/E ratio below 100% for deaths means that fewer members are dying than expected, which means that benefits are being paid longer than expected, and the Plan is suffering an actuarial loss. Consequently, we generally propose assumption changes when the A/E ratio for the current mortality assumption is less than 100% for active employees or less than 110% for annuitants.

However, for this Study we are recommending a change in this approach going forward, where the proposed assumptions are intended to track closely to actual experience (i.e. an A/E ratio close to 100%, but with a ratio slightly less than 100% still being reasonable). However, as described below, this new approach also includes an expectation that the mortality rates will continue to improve in each future year.

We also generally try to recommend the same or a related table for active employees and healthy annuitants, which has been the current practice for MCERA. In addition, we recommend continuing the current practice of using the same assumptions for General and Safety members, as the experience for the Safety members is quite limited.

In the prior study, MCERA adopted the following assumptions:

Healthy active members, retirees and beneficiaries	RP 2000 Combined Healthy mortality setback two years for males and with no setback for females
Disabled members	RP 2000 Combined Healthy mortality with a three year set forward for both males and females

Since the prior study, the Society of Actuaries' Retirement Plans Experience Committee (RPEC) has reviewed mortality data, with a particular emphasis on mortality improvement patterns. The Committee concluded that longevity among pension plan members has improved in the past and is likely to continue to improve in the future.

As a result, the Committee has released a mortality improvement scale, Scale BB. Scale BB reflects up-to-date data, approximately 20 years more current than that used in the development of the older Scale AA, and it was reviewed against a significant amount of data drawn from California public plan experience. It also represents the Society of Actuaries' most advanced actuarial methodology in incorporating mortality improvement trends with actual recent mortality rates.

Scale BB was designed with the intent of being applied to calendar year 2000 mortality on a generational basis. The effect of this is to build in an automatic expectation of future improvements in mortality. This is a different approach from building in a margin for conservatism in the current rates to account for the expectation that the same rates will be applied in future years, when mortality experience has improved.

Recent changes to Actuarial Standards of Practice require an explicit declaration of the amount of future mortality improvement included in the assumptions. Reports issued by the Society of Actuaries also indicate that generational mortality is now the preferred approach.

MCERA's experience over the past three years matches extremely closely with the latest mortality tables (RP2000 Combined Healthy) in conjunction with the most recent projection scale (Scale BB) under a generational approach. However, there are administrative reasons why using a generational mortality table would prove difficult to implement currently, based on the requirements of the Plan's benefit administration software.

Fortunately, it is possible to approximate the use of a generational mortality table by the use of a standard static table, and projecting mortality improvement from the base period to the average duration of the projected benefit payments. For Merced, the average duration of the benefit payments is currently 14 years, so a generational mortality table for the 2013 valuation could be approximated by projecting the RP2000 mortality table to the year 2027 using Scale BB.

As such, we are recommending the following assumptions:

Healthy active members, retirees and beneficiaries	RP 2000 Combined Healthy Mortality, projected to 2027 with Scale BB
Disabled members	RP 2000 Combined Healthy Generational Mortality, projected to 2027 with Scale BB, set forward three years for males and females

Table III-7 on page 22 shows the A/E ratios for the current and proposed mortality assumptions, by member status, sex, and by the years of mortality experience measured. The experience under the proposed assumptions was computed by projecting the RP2000 tables to the mid-point of the appropriate experience study period.

We note that combined mortality with the current assumption for all statuses, both sexes, and all years of experience averaged 97.6% of expected levels. This suggests that some actuarial losses have been realized, and that more and larger losses can be expected in the future as longevity increases.

As a result, we recommend adoption of a generational mortality table, with a built in factor for improvement. The A/E ratio improves slightly to 98.6%, but this ratio is more likely to remain stable and prevent an increasing pattern of losses with the mortality improvement now part of the assumption.

Actual and proposed figures for disabled members are also included in Table III-7. The smaller amount of data for this group warrants some additional margin for error, so the recommended assumption produces an A/E ratio of 110%.

Table III-8 shows the mortality experience weighted by the dollars of benefits paid. This shows the possible financial impact of mortality rates on the Plan. Typically, members with higher pay and larger benefits tend to outlive their colleagues with smaller pay and benefits, and that typical pattern manifests itself in Table III-8. Even with the change in assumptions, the combined mortality A/E ratio is only 83%, and for retirees and survivors about 90%.

The figures in Table III-8 indicate that mortality losses may continue to be realized in the future, if the current patterns of significantly lower mortality for higher-paid employees continue. This experience will have to be monitored as the mortality assumption improves automatically under Scale BB; further reductions in assumed rates of death may have to be considered.

Table III-7
(Mortality by Lives)

Active Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	2,226	1	4.5	22.5%	5.2	19.2%
2010-2012 Female	3,693	6	6.6	90.7%	6.1	97.9%
2007-2010 Male	2,543	5	4.8	103.7%	5.7	87.5%
2007-2010 Female	4,211	7	7.5	93.1%	7.1	98.5%
Total	12,673	19	23.4	81.2%	24.2	78.7%

Retired Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	1,928	61	55.4	110.1%	59.2	103.1%
2010-2012 Female	2,450	45	58.6	76.8%	52.0	86.6%
2007-2010 Male	1,714	54	50.4	107.2%	55.8	96.7%
2007-2010 Female	2,023	56	50.4	111.2%	46.1	121.4%
Total	8,115	216	214.7	100.6%	213.1	101.4%

Survivor Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	158	6	6.3	95.0%	6.7	89.4%
2010-2012 Female	625	29	29.3	98.9%	26.1	111.2%
2007-2010 Male	453	22	24.4	90.1%	26.9	81.9%
2007-2010 Female	571	24	25.5	93.9%	23.4	102.4%
Total	1,807	81	85.6	94.6%	83.1	97.5%

Combined Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	4,312	68	66.2	102.7%	71.1	95.7%
2010-2012 Female	6,768	80	94.5	84.6%	84.2	95.0%
2007-2010 Male	4,710	81	79.6	101.8%	88.4	91.6%
2007-2010 Female	6,805	87	83.4	104.3%	76.7	113.5%
Total	22,595	316	323.7	97.6%	320.3	98.6%

Disabled Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	343	8	8.4	95.5%	7.2	111.4%
2010-2012 Female	199	5	4.8	104.5%	4.2	118.0%
2007-2010 Male	344	8	6.7	119.0%	6.0	132.8%
2007-2010 Female	190	3	4.7	63.8%	4.3	69.2%
Total	1,076	24	24.6	97.6%	21.8	110.2%

Table III-8
(Mortality by Benefits)

Active Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	145,981,116	44,867	326,961.5	13.7%	381,700.2	11.8%
2010-2012 Female	193,224,043	253,324	355,917.3	71.2%	329,979.1	76.8%
2007-2010 Male	143,341,851	203,004	310,065.1	65.5%	368,527.4	55.1%
2007-2010 Female	190,222,799	290,396	357,535.1	81.2%	337,981.5	85.9%
Total	672,769,808	791,591	1,350,479.0	58.6%	1,418,188.1	55.8%

Retired Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	66,546,851	1,366,748	1,525,299.8	89.6%	1,636,684.8	83.5%
2010-2012 Female	53,355,701	663,260	1,001,431.1	66.2%	887,242.5	74.8%
2007-2010 Male	49,621,693	1,227,444	1,190,549.9	103.1%	1,324,940.1	92.6%
2007-2010 Female	35,419,684	786,528	746,421.8	105.4%	683,598.4	115.1%
Total	204,943,930	4,043,980	4,463,702.6	90.6%	4,532,465.7	89.2%

Survivor Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	1,472,214	39,904	52,149.7	76.5%	55,297.3	72.2%
2010-2012 Female	9,063,529	287,037	390,025.5	73.6%	347,943.8	82.5%
2007-2010 Male	5,022,641	249,288	241,174.6	103.4%	265,386.3	93.9%
2007-2010 Female	7,063,876	278,424	277,317.9	100.4%	254,626.7	109.3%
Total	22,622,261	854,653	960,667.6	89.0%	923,254.1	92.6%

Combined Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	214,000,181	1,451,519	1,904,410.9	76.2%	2,073,682.3	70.0%
2010-2012 Female	255,643,274	1,203,621	1,747,373.9	68.9%	1,565,165.4	76.9%
2007-2010 Male	197,986,185	1,679,736	1,741,789.5	96.4%	1,958,853.7	85.8%
2007-2010 Female	232,706,359	1,355,348	1,381,274.9	98.1%	1,276,206.5	106.2%
Total	900,335,999	5,690,224	6,774,849.2	84.0%	6,873,907.9	82.8%

Disabled Mortality	Exposure	Actual	Current Expected	A/E Ratio	Proposed Expected	A/E Ratio
2010-2012 Male	8,923,932	179,450	213,084.6	84.2%	183,254.2	97.9%
2010-2012 Female	3,233,313	52,653	64,651.0	81.4%	57,193.3	92.1%
2007-2010 Male	7,960,231	170,136	153,767.6	110.6%	137,806.1	123.5%
2007-2010 Female	2,803,025	26,376	54,246.3	48.6%	49,909.9	52.8%
Total	22,920,500	428,615	485,749.5	88.2%	428,163.5	100.1%

DISABILITY RATES

This section analyzes the incidence of disability by the age of the employee. We determined the ratio of the actual number of disabilities at each age compared to the expected number of disabilities. If the assumption is perfect, this A/E ratio will be 100%. However, adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption. In some cases the historical experience has been explicitly included in our analysis.

General Members, Ordinary Disability

In the last experience study, for the years from July 1, 2007 through June 30, 2010, there was very little disability experience to base rates upon, so we recommended that the then-current rates be retained. In this Study, we combined the 2007-10 experience data with that for 2010-13. The combined data is hardly extensive, but actual disabilities continue to be fewer than expected – a pattern which was also reflected in the experience study performed by the prior actuary (Buck Consultants) from 2004-2007. Accordingly, we are recommending a one-third reduction in male ordinary disability rates, and a two-thirds reduction in female rates.

Table III-9: Summary of General Ordinary Disability Experience vs Current Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	2,404	4	5.9	68.3%
Females	5,211	3	8.4	35.8%
Combined	**7,615**	**7**	**14.2**	**49.1%**

	Actual Average Age	Expected Average Age
Males	51.8	52.6
Females	47.3	54.1
Combined	**49.9**	**53.5**

Table III-10: General Ordinary Disability Experience vs Proposed Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	2,404	4	3.9	102.4%
Females	5,211	3	2.8	107.3%
Combined	**7,615**	**7**	**6.7**	**104.5%**

	Actual Average Age	Expected Average Age
Males	51.8	52.6
Females	47.3	54.1
Combined	**49.9**	**53.2**

As shown in Table III-9 and Table III-10 above, the revised ordinary disability rates bring General member experience into better accord with assumptions. However, the experience data is quite limited, and we can expect future changes in this assumption as we gather more data.

General Members, Duty Disability

In the last experience study, for the years from July 1, 2007 through June 30, 2010, there was very little duty disability experience to base rates upon, but the number of duty disabilities was well below that expected. As a result, we recommended that the then-current rates be cut in half, and that future experience studies combine duty disability experience with the then current study.

In this Study, we combined the 2007-10 experience data with that for 2010-13. The combined data is still limited, but actual duty disabilities continue to be fewer than expected for male members, and in line with expectations for females. Again, this pattern was also reflected in the experience study performed by the prior actuary (Buck Consultants) from 2004-2007. Therefore, we are recommending a one-third reduction in male duty disability rates, and no change in female rates.

Table III-11: Summary of General Duty Disability Experience vs Current Assumptions (Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	3,338	2	2.8	71.9%
Females	7,344	4	3.8	106.6%
Combined	**10,682**	**6**	**6.5**	**91.8%**

	Actual Average Age	Expected Average Age
Males	53.0	51.8
Females	51.3	52.5
Combined	**51.8**	**52.2**

Table III-12: General Duty Disability Experience vs Proposed Assumptions (Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	3,338	2	1.9	107.9%
Females	7,344	4	3.8	106.6%
Combined	**10,682**	**6**	**5.6**	**107.0%**

	Actual Average Age	Expected Average Age
Males	53.0	51.8
Females	51.3	52.5
Combined	**51.8**	**52.3**

As shown in Table III-11 and Table III-12 above, the revised duty disability rates bring General member experience into better accord with assumptions. However, again the experience data is quite limited, and we can expect future changes in this assumption as we accumulate more data.

Safety Members, Ordinary Disability

For the years from July 1, 2007 through June 30, 2013, there was only one Safety member who incurred an ordinary disability. In the absence of any data, we recommend that the current ordinary disability assumption for Safety members remain unchanged.

Table III-13: Summary of Safety Ordinary Disability Experience vs Current Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	876	1	0.7	145.8%
Females	315	0	0.2	0.0%
Combined	**1,191**	**1**	**0.9**	**112.7%**

	Actual Average Age	Expected Average Age
Males	42.0	45.0
Females		42.2
Combined	**42.0**	**44.4**

Safety Members, Duty Disability

For the years from July 1, 2007 through June 30, 2013, there were 10 Safety members who incurred a duty disability. Given the small numbers involved, this was reasonably close to expectations, and we recommend that the current duty disability assumption for Safety members remain unchanged.

Table III-14: Summary of Safety Duty Disability Experience vs Current Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Disabilities	Expected Disabilities	Actual to Expected Ratio
Males	1,397	9	8.6	104.2%
Females	525	1	2.9	34.1%
Combined	**1,922**	**10**	**11.6**	**86.4%**

	Actual Average Age	Expected Average Age
Males	44.3	40.9
Females	31.0	38.2
Combined	**43.0**	**40.2**

TERMINATION RATES

Rates of termination from active employment have a significant impact on the cost of the plan. For this assumption, we have included analyses for the last six years of experience (from 2007-2013), rather than reviewing the information over the past three years. This allows us to formulate a larger, more robust dataset, and will also mitigate the impact of any unusual termination experience which may have happened over the past few years.

To make the best use of the available member data, we study all terminations together – vested terminations, terminating members who withdraw their contributions, and members who transfer to a reciprocal pension plan – to determine an overall termination rate. We then analyze the percentages of terminating members who withdraw their contributions, transfer, or are eligible for a vested benefit.

Tables III-15 and III-16 below show the overall termination experience for General Members compared with both the current assumed rates and a proposed set of rates.

Table III-15: Summary of General Termination Experience vs Current Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	2,383	202	210.5	96.0%
Females	5,662	447	462.4	96.7%
Combined	**8,045**	**649**	**672.9**	**96.5%**

	Actual Average Age	Expected Average Age
Males	41.3	41.2
Females	40.5	38.9
Combined	**40.8**	**39.6**

Table III-16: Summary of General Termination Experience vs Proposed Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	2,383	202	187.7	107.6%
Females	5,662	447	404.5	110.5%
Combined	**8,045**	**649**	**592.2**	**109.6%**

	Actual Average Age	Expected Average Age
Males	41.3	41.3
Females	40.5	39.8
Combined	**40.8**	**40.3**

We note in the above tables that actual experience has been in fairly close accord with assumptions. However, fewer terminations occurred than expected, which tends to produce

actuarial losses – typically small ones. To add some conservatism, assumed termination rates were reduced for both males and females. The comparison is shown in the Charts below.

Charts III-7 and III-8: Comparison of Actual, Current and Proposed General Termination Rates for Males and Females
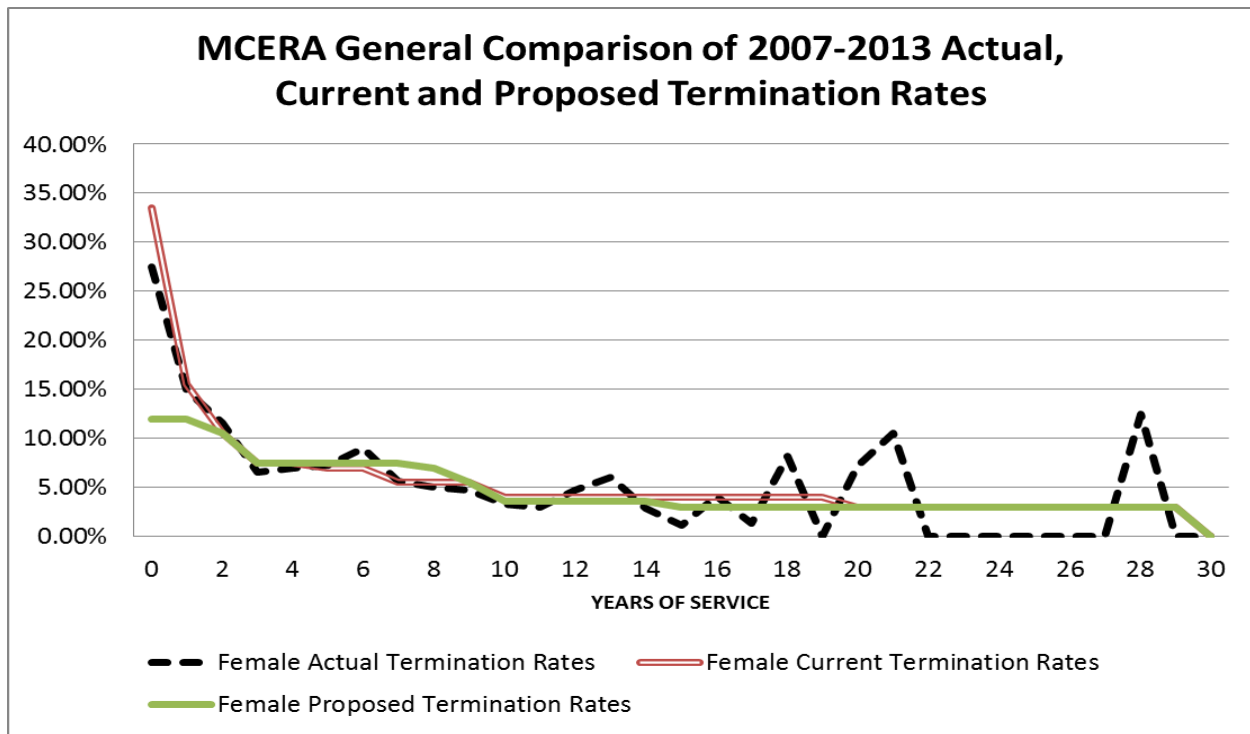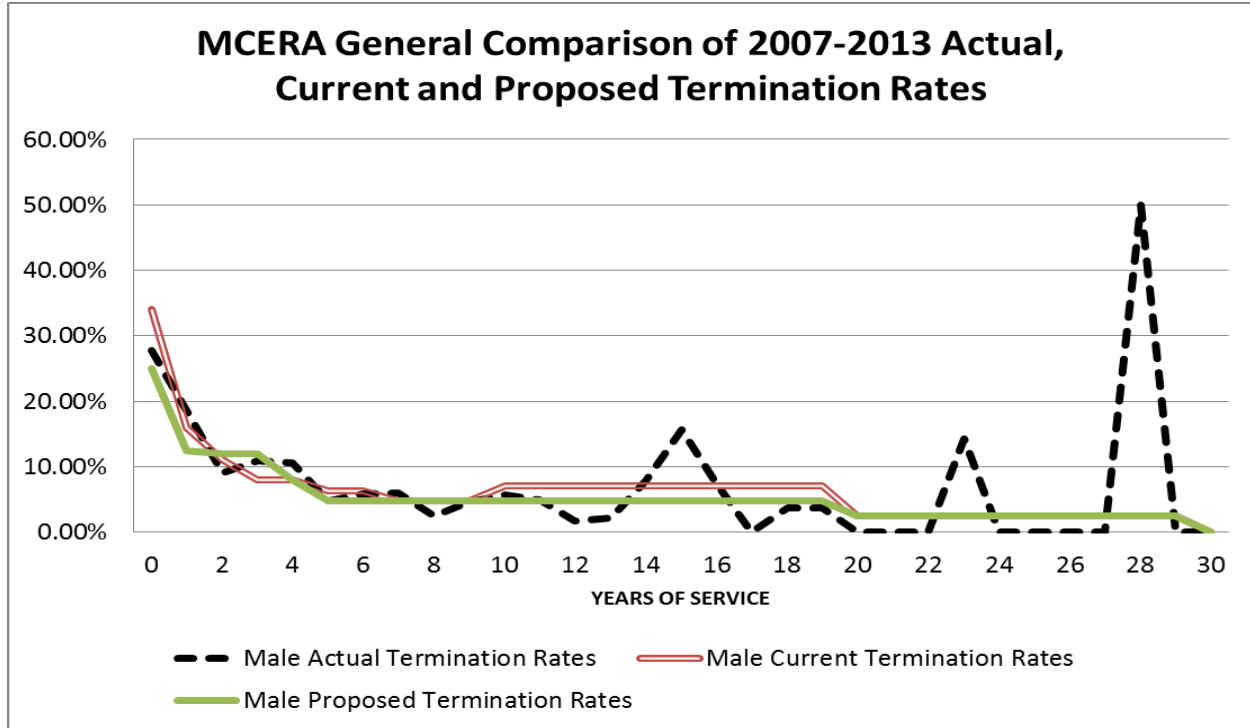
Tables III-17 and III-18 below show the overall termination experience for Safety Members compared with both the current assumed rates and a proposed set of rates. Because of the limited actuarial experience for female members, male and female experience is combined and a total termination rate is used for both sexes.

We note in the tables below that actual experience has resulted in fewer terminations than expected under the current assumption: About 12% fewer Safety members terminated than expected. As noted above, this patter tends to produce actuarial losses. To match experience more closely, assumed termination rates were reduced. The comparison is shown in Chart III-9 below.

Table III-17: Summary of Safety Termination Experience vs Current Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	1,184	66	81.6	80.9%
Females	480	37	34.9	106.2%
Combined	**1,664**	**103**	**116.4**	**88.5%**

	Actual Average Age	Expected Average Age
Males	33.0	32.2
Females	31.6	32.2
Combined	**32.5**	**32.2**

Table III-18: Summary of Safety Termination Experience vs Proposed Assumptions
(Experience from July 1, 2007 through June 30, 2013)

	Eligible Exposure	Actual Terminations	Expected Terminations	Actual to Expected Ratio
Males	1,184	66	75.3	87.7%
Females	480	37	31.3	118.3%
Combined	**1,664**	**103**	**106.6**	**96.6%**

	Actual Average Age	Expected Average Age
Males	33.0	32.6
Females	31.6	32.3
Combined	**32.5**	**32.5**

Charts III-9: Comparison of Actual, Current and Proposed Safety Termination Rates
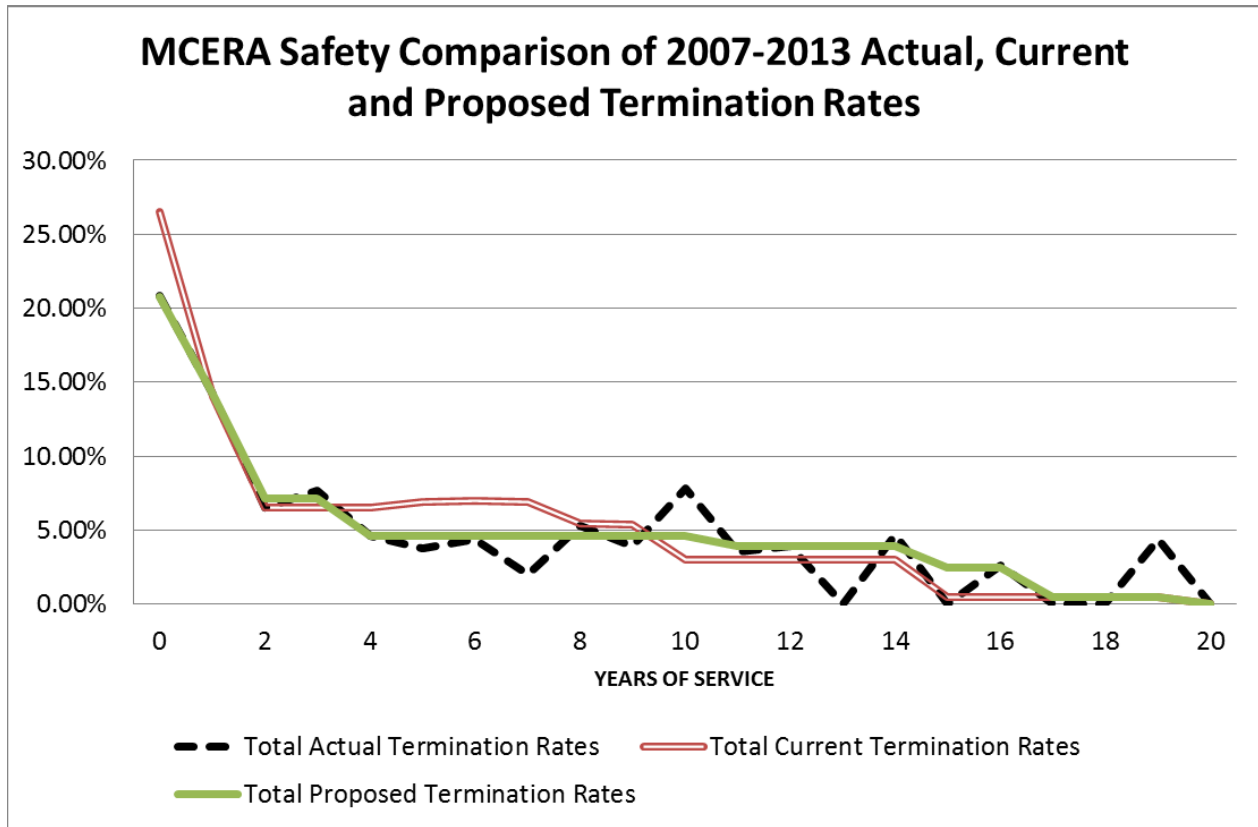
REFUND RATES AND RECIPROCITY

When a vested member terminates employment, the member has the option of receiving a refund of contributions with interest or a deferred annuity. If an employee terminates employment and works for a reciprocal employer (also referred to as a transfer), the employee's retirement benefit is based on the employee's service with MCERA and Final Compensation based on employment with the reciprocal employer.

Tables III-19 and III-20 below show the results of our analysis of terminations for General and Safety members, as well as our recommendations regarding rates of withdrawal, vested termination and transfer.

Table III-19: Analysis of Terminations for General Members

	Years of Service				
	0-4	**5-9**	**10-14**	**15+**	**Total**
Total Terminations	392	179	48	30	649
Withdrawals	245	73	18	3	339
Non-Vested Terminations	117	0	0	0	117
Total Withdrawals	362	73	18	3	456
Observed Rate	*92%*	*40%*		*10%*	
Proposed Rate	*90%*	*40%*		*10%*	
Other Terminations	30	106	30	27	193
Transfers	22	16	8	3	49
Observed Rate	*6%*	*11%*		*10%*	
Proposed Rate	*10%*	*12%*		*10%*	
Vested Terminations	8	90	22	24	144
Observed Rate	*2%*	*49%*		*80%*	
Proposed Rate	*0%*	*48%*		*80%*	

Table III-20: Analysis of Terminations for Safety Members

	Years of Service				
	0-4	**5-9**	**10-14**	**15+**	**Total**
Total Terminations	71	20	11	1	103
Withdrawals	47	3	2	1	53
Non-Vested Terminations	16	0	0	0	16
Total Withdrawals	63	3	2	1	69
Observed Rate	*89%*	*19%*			
Proposed Rate	*90%*	*15%*			
Other Terminations	8	17	9	0	34
Transfers	8	7	5	0	20
Observed Rate	*11%*	*38%*			
Proposed Rate	*10%*	*42.5%*			
Vested Terminations	0	10	4	0	14
Observed Rate	*0%*	*44%*			
Proposed Rate	*0%*	*42.5%*			

FAMILY COMPOSITION

Members who are married at the time of retirement are entitled to an unreduced 60% joint and survivor annuity.

An analysis of all retired General members showed that 76% of males are married and 58% of females are married. We recommend maintaining the assumption that for future General retirees that 80% of males and 50% of females are married.

An analysis of all retired Safety members showed that 82% are married. We recommend maintaining the assumption that 90% of future Safety retirees are married.

We recommend maintaining the assumption that males are three years older than their spouse.

PROPOSED ASSUMPTIONS

1. Rate of Return

Assets are assumed to earn 7.75% net of investment expenses.

2. Administrative Expenses

Administrative expenses are assumed to be $1.25 million for the next year, to be split between employees and employers.

3. Cost of Living

The cost of living as measured by the Consumer Price Index (CPI) will increase at the rate of 3.00% per year.

4. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.60% per year.

5. Family Composition

Percentage married for all active members who retire, become disabled or die during active service is shown in the following Table IV-2. Male members are assumed to be three years older than their spouses and female members are assumed to be three years younger than their spouses.

Percentage Married	
Gender	**Percentage**
Males, General	80%
Females, General	50%
All, Safety	90%

6. Increases in Pay

Wage inflation component: 3.00%

Additional longevity and promotion component:

Years of Service	General	Safety
0-1	4.00%	5.00%
2	3.00%	5.00%
3	2.50%	3.00%
4-6	2.00%	3.00%
7-14	2.00%	2.00%
15-19	1.00%	0.50%
20+	0.00%	0.50%

7. Rates of Termination

Sample rates of termination are shown below.

Years of Service	General Male	General Female	Safety
0	25.0%	12.0%	20.8%
1	12.5%	12.0%	14.2%
2	12.0%	10.5%	7.1%
3	12.0%	7.5%	7.1%
4	8.0%	7.5%	4.6%
5	4.8%	7.5%	4.6%
6	4.8%	7.5%	4.6%
7	4.8%	7.5%	4.6%
8	4.8%	7.0%	4.6%
9	4.8%	5.5%	4.6%
10	4.8%	3.6%	4.6%
11	4.8%	3.6%	3.9%
12	4.8%	3.6%	3.9%
13	4.8%	3.6%	3.9%
14	4.8%	3.6%	3.9%
15	4.8%	3.0%	2.5%
16	4.8%	3.0%	2.5%
17	4.8%	3.0%	0.5%
18	4.8%	3.0%	0.5%
19	4.8%	3.0%	0.5%
20	2.5%	3.0%	0.0%
21	2.5%	3.0%	0.0%
22	2.5%	3.0%	0.0%
23	2.5%	3.0%	0.0%
24	2.5%	3.0%	0.0%
25	2.5%	3.0%	0.0%
26	2.5%	3.0%	0.0%
27	2.5%	3.0%	0.0%
28	2.5%	3.0%	0.0%
29	2.5%	3.0%	0.0%
30	0.0%	0.0%	0.0%

* Termination rates do not apply once
a member is eligible for retirement

8. Withdrawal and Reciprocal Transfers

Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits. Rates of reciprocal transfer are for members who leave their member contributions on deposit and engage in employment covered by a pension plan with a reciprocal relationship with MCERA.

The table below shows the percentages of total terminations who fall into these categories.

	Years of Service		
General Service	**0-4**	**5-14**	**15+**
Withdrawals	*90%*	*40%*	*10%*
Transfers	*10%*	*12%*	*10%*
Vested Terminations	*0%*	*48%*	*80%*
Safety	**0-4**	**5+**	
Withdrawals	*90%*	*15%*	
Transfers	*10%*	*42.5%*	
Vested Terminations	*0%*	*42.5%*	

9. Rates of Disability

Separate rates of duty disability are assumed among Safety and General Members; rates for both sexes for Safety Members are combined. Below are sample rates:

	Safety	**General**	
Age	**All**	**Female**	**Male**
20	0.0000%	0.0040%	0.0027%
25	0.3625%	0.0075%	0.0053%
30	0.4190%	0.0115%	0.0133%
35	0.5063%	0.0150%	0.0240%
40	0.6375%	0.0190%	0.0320%
45	0.7815%	0.0340%	0.0480%
50	0.9940%	0.0600%	0.0640%
55	1.2625%	0.1050%	0.0800%
60	0.0000%	0.1575%	0.1120%
65	0.0000%	0.0000%	0.0000%

Separate rates of ordinary disability are assumed among Safety and General Members; rates for both sexes for Safety Members are combined. Rates are applied once members have at least five years of service. Below are sample rates:

	Safety	General	
Age	**All**	**Female**	**Male**
20	0.00%	0.0000%	0.0000%
25	0.02%	0.0033%	0.0267%
30	0.03%	0.0067%	0.0533%
35	0.04%	0.0100%	0.0533%
40	0.06%	0.0133%	0.0867%
45	0.09%	0.0300%	0.1267%
50	0.12%	0.0600%	0.1600%
55	0.16%	0.0933%	0.2133%
60	0.00%	0.1533%	0.2800%
65	0.00%	0.0000%	0.0000%

10. Rates of Mortality for Healthy Lives

Mortality rates for actives, retirees, beneficiaries, terminated vested and reciprocals are based on the sex distinct Retired Pensioner (RP) 2000 Combined Healthy Tables, published by the Society of Actuaries, projected to 2027 using Projection Scale BB.

11. Rates of Mortality for Retired Disabled Lives

Mortality rates for disabled retirees are based on the sex distinct Retired Pensioner (RP) 2000 Tables Combined Healthy Tables, published by the Society of Actuaries, projected to 2027 using Projection Scale BB, set forward three years for males and females.

Rates of Retirement

Rates of retirement for general members are based on age according to the following.

Service: Age	Male Rates			Female Rates		
	10 – 19 Years	20 – 29 Years	30+ Years	10 – 19 Years	20 – 29 Years	30+ Years
50	2.5%	5.0%	7.5%	2.5%	10.0%	10.0%
51	2.5%	5.0%	7.5%	2.5%	10.0%	10.0%
52	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
53	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
54	5.0%	10.0%	15.0%	5.0%	15.0%	20.0%
55	9.0%	18.0%	27.0%	9.0%	35.0%	35.0%
56	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
57	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
58	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
59	7.5%	15.0%	22.5%	7.5%	30.0%	35.0%
60	25.0%	25.0%	37.5%	25.0%	30.0%	35.0%
61	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
62	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
63	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
64	25.0%	25.0%	37.5%	25.0%	40.0%	45.0%
65	40.0%	40.0%	40.0%	40.0%	50.0%	50.0%
66	45.0%	45.0%	45.0%	45.0%	50.0%	50.0%
67	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
68	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
69	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
70+	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Rates of retirement for safety members are based on age according to the following.

Service:	Proposed Rates	
Age	**10 – 19 Years**	**20+ Years**
40	0.00%	3.10%
41	0.00%	3.10%
42	0.00%	3.10%
43	0.00%	3.10%
44	0.00%	3.10%
45	0.00%	7.60%
46	0.00%	7.60%
47	0.00%	7.60%
48	0.00%	7.60%
49	0.00%	7.60%
50	12.75%	32.90%
51	12.75%	32.90%
52	12.75%	32.90%
53	12.75%	32.90%
54	12.75%	32.90%
55	12.75%	32.90%
56	12.75%	32.90%
57	12.75%	32.90%
58	12.75%	32.90%
59	12.75%	32.90%
60	100.00%	100.00%

METHODOLOGY

PURPOSES OF THE EXPERIENCE STUDY

The first goal of this Experience Study is to review the recent past demographic experience of the Plan. We seek to understand the behavior of the participating members so that we can recommend actuarial assumptions concerning future demographic experience.

The second goal of this Study is to recommend economic assumptions to be used in computing liabilities and costs. These economic assumptions include the expected rate of return on Plan assets, wage growth, COLA growth and the anticipated rate of increase in the Consumer Price Index (CPI). These assumptions are determined based on the investment strategy adopted by the Plan and on the past behavior of the capital markets and the CPI, and on future expectations.

Once adopted, the assumptions recommended by this Study will be used to determine future liabilities and costs and for purposes of evaluating prospective changes in benefits, eligibility conditions, and other aspects of the Plan's operations.

SCOPE OF REPORT

Demographic assumptions relate to all behavioral characteristics of the group. Behavioral characteristics do not include the assumptions concerning future inflation, the real rates of return of the investments in the trust fund, or the anticipated growth in the underlying payroll of the members.

Demographic assumptions include the following:

- Probability of retirement from active service,

- Probability of termination of employment prior to retirement (with the member receiving a deferred vested benefit or receiving a contribution refund),

- Probability of disability among active employees (either occupational or total and permanent),

- Probability of deferred vested members working for a reciprocal employer,

- Family composition, and

- Rates of mortality among active, retired, disabled members and their beneficiaries.

In addition, demographic assumptions include the merit (longevity and promotion) component of individual pay increases. This does not include the inflationary element in pay increases. For example, if inflation is 3% and the employee receives a 4.5% pay increase, 1.5% of this increase is deemed "merit".

Economic assumptions include the rate of increase in the cost of living (inflation), which is a part of the overall pay increase assumption discussed above. In addition, a crucial economic assumption is the real rate of return on plan assets -- the return on assets above the rate of inflation.

IMPORTANCE OF RELIABLE ASSUMPTIONS

The liabilities and costs calculated in actuarial valuations and cost studies are based on a projection of future conditions. The actuary makes assumptions concerning the rates of retirement, withdrawal, termination, disability, and death among plan members. In addition, the actuary must project future earnings on plan assets, inflation, and growth in the pay of active members.

The actuary sets his assumptions based on past experience and future expectations. In setting demographic assumptions, such as rates of retirement, the past experience of the covered group of employees is often the best predictor of future behavior. When establishing economic assumptions, such as the expected return on plan assets, the historical behavior of the investment markets can serve as a guide.

Actuarial funding methods are designed so that, if the actuarial assumptions are met, plan costs will generally be a predictable percentage of member pay from year to year. If actual economic or demographic experience varies from our assumptions, plan costs will rise or fall accordingly. Therefore, it is worth the effort to make our best estimate of future conditions so that the plan costs computed by the actuary will be as stable and predictable as possible.

METHODOLOGY (ECONOMIC ASSUMPTIONS)

The Plan's economic assumptions are critically important in computing actuarial liabilities and costs. A careful determination of these assumptions requires an analysis of the past performance of the capital markets and the Plan's future investment outlook.

To this end, we proceed as follows:

- Based on a detailed analysis of recent past history and reasonable expectations for the future, a long term projection of the rate of inflation is determined.

- Based on the Plans' investment strategy and rates of return on various asset classes (provided by the investment consultant) the long term *real* rate of return on assets is simulated. This is the return on assets in excess of inflation.

- The projected rate of inflation is combined with the assumption concerning merit pay increases to project future members' pay.

- The rate of inflation is combined with the estimated real return on assets to determine the overall return on assets.

- The interaction of the rate of inflation with the COLA provisions is studied to determine the expected rate of growth in benefits post-retirement.

Any estimate of future inflation and asset returns is difficult. Over time, there will be actuarial gains and losses as experience deviates from our assumptions. As past and recent capital market experience has shown, these gains and losses can have a substantial impact on cost volatility.

METHODOLOGY (DEMOGRAPHIC ASSUMPTIONS)

One goal of this Study is to compute the probability of death, disability, retirement, withdrawal, or termination leading to a vested benefit at each age for active members and the probability of death at each age for inactive members.

To this end, we proceed as follows:

- We count the number of members leaving for each cause during the term of the Study. This is the number of decrements.

- We count the number of members who could have left for each cause during the Study. This is the exposure.

- When the exposure is sufficient, we divide the number of decrements by the exposure at each combination of age and service for an employee group to determine the probability of leaving due to the cause in question.

- Where feasible, experience has been examined separately by gender. In some cases, experience has been combined when male and female experience is similar or when there is insufficient data to produce reliable rates by sex.

When there is insufficient exposure to derive statistically reliable rates by age and service, we may combine exposures and decrements for groups of ages and service. Alternatively, we may compare the total number of actual decrements with the total number of decrements predicted by a standard actuarial table, and adopt a table that predicts decrements, in total, reasonably close to those that have been observed.

Where the rate of decrement is low and the underlying causes of the decrement in question are not expected to change significantly with time we may combine the most recent experience with data from prior experience studies.

For the study of the merit (longevity and promotion) components of individual pay increases, we generally choose to use a *transverse* study. A reliable way to assess average increases in pay due to merit is to analyze average pay versus service for the current active members of a plan. With a homogeneous group of any size at all, the pattern of promotions and longevity increases during the career of an average employee is clearly visible in this analysis. This is a transverse study of longevity and promotion pay increases: The data is taken as of a particular point in time.

Longitudinal studies, which use changes in pay collected over several years, are often unreliable when used on a stand-alone basis due to the effects of inflation, collective bargaining, and management decisions during the term of the study.