San Joaquin County Employees' Retirement Association

Experience Study

January 1, 2010 through December 31, 2012

Produced by Cheiron

November 1, 2013

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LETTER OF TRANSMITTAL

November 1, 2013

Retirement Board of San Joaquin
County Employees' Retirement Association
6 South El Dorado Street, Suite 400
Stockton, CA 95202

Dear Members of the Board:

At your request, we have completed an experience study of the assumptions used in the valuations of the San Joaquin County Employees' Retirement Association (SJCERA). The economic assumptions studied were inflation, real wage growth, real investment returns and COLA growth. The demographic analysis compares assumed versus actual experience for the three-year period from January 1, 2010 through December 31, 2012.

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

We hereby certify that, 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 which 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 San Joaquin 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 study.

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 study is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for the San Joaquin County Employees' Retirement Association (SJCERA), 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 SJCERA'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, 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 inflation, COLA increases, investment return, active payroll growth and administrative expense assumptions. 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 assumptions of a nominal 7.75% annual rate of return and a 3.25% annual rate of inflation should be lowered to 7.50% and 3.00% respectively.

We have performed additional analyses based on the near- to mid-term future expectations of the Plan's investment consultant. 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 3.25% to 3.00%, and retain a 4.25% real return assumption, resulting in a reduction of the nominal return assumption from 7.75% to 7.50%. Accordingly, we are recommending a reduction in the payroll growth assumption from 3.50% to 3.25%, and a revised

rate of expected COLA growth (2.6%), which is derived from simulations of the future level of inflation and is below the 3% COLA cap.

We are also recommending that SJCERA 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 costs and 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, vested termination deferral ages, terminal pay loads 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 termination and mortality rates.

The current assumptions for termination from active employment are set by years of service. Most studies have found, including this one, that rates of termination from active employment are much higher in the first few years of service. We are proposing increasing General termination rates for an employee with between one and three years of service, and lowering rates for General employees with eight or more years of service and for Safety employees with between five and nine years of service.

Mortality rates and the tools used to analyze them have continued to improve. As such, 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 move from using Projection Scale AA to a static date toward using Projection Scale BB with generational mortality. This change is discussed in further detail in Section III.

We are also recommending minor adjustments to the retirement rates, reductions to the Safety and General female disability rates, and modifications to the likelihood of contribution withdrawal among terminations. We are not recommending any changes to the General male disability rates, family composition assumptions, deferral ages, merit salary increases or terminal pay loads.

COST OF ECONOMIC AND DEMOGRAPHIC ASSUMPTION CHANGES

The table 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 January 1, 2013 before Study	36.19%
Termination Rates	+0.58%
Disability Rates	-0.31%
Retirement Rates	+0.06%
Vested Deferral Age	-0.17%
Family Composition	-0.04%
Mortality Rates	+3.91%
Economic Assumptions	+2.35%
Employee Contributions with Assumption Changes	-0.44%
Total	+5.94%
Employer Contribution Rate as of January 1, 2013 after Study	42.13%

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

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.

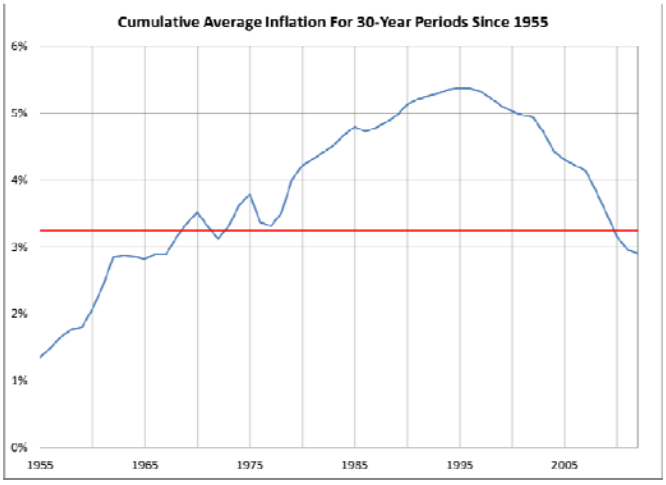
While we look to the past for indications of future economic behavior, we must also consider how the future may be expected to be different. In order to reflect the long-term nature of defined benefit plan funding in the development of these economic assumptions, it is appropriate to focus on long term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

Chart II-1 below shows the average rate of inflation over rolling 30-year periods, with the earliest such period ending in 1955 and the latest ending in 2012. 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 considerable potential for inflation to be quite high, exceeding 4% to 5% annually.

Chart II-1: Average Past Inflation



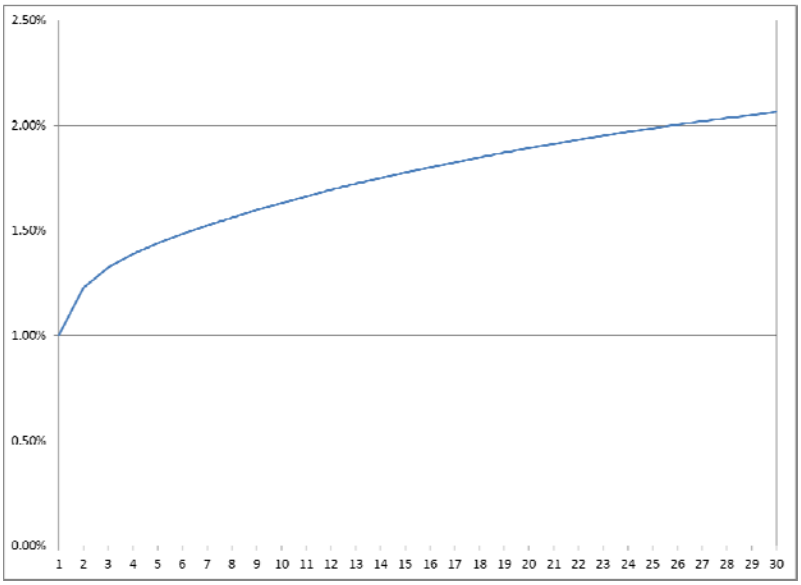
However, there are a number of reasons to believe that future inflation levels will not be as high as some of the periods reflected in Chart II-1 would seem to suggest.

- 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.
- 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 following 30-year projection of expected inflation rates.

- SIS, the investment consultant retained by SJCERA, bases their capital market assumptions on an assumption that average inflation over the next 10 years will be 2.40%.

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.

Chart II-2: Expected Inflation



(Source: Cleveland Federal Reserve website. As of July 1, 2013)

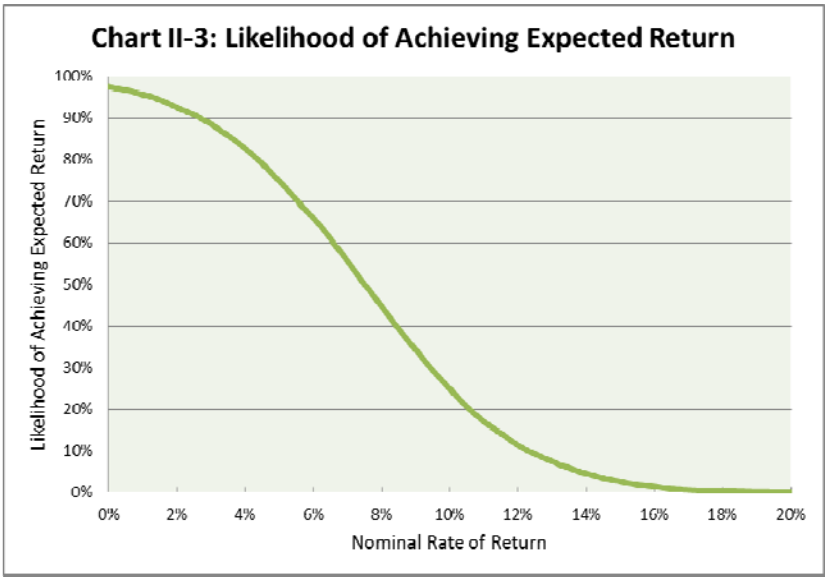
A change from the current 3.25% assumption to an assumption below 3.0% would represent a larger change than may be advisable in one step. Therefore, we recommend reducing the inflation assumption from 3.25% to 3.0%, a moderate but still significant reduction. This represents a substantial decline in the inflation assumption over the past several years – from 4.5% in the 2000 valuation to the current recommendation of 3.0%. If, at the time of the next experience study, the markets and forecasters continue to indicate lower expectations of future inflation, further reductions in the assumption could be considered.

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 below, we have simulated the return derived using SJCERA's actual target allocation (as of June 30, 2013) of 16.25% domestic equity, 16.25% international equity, 1.5% global equity, 24.0% fixed income, 2.5% real estate, 7.5% private real estate, 7.0% real assets, 10.0% risk parity, and 15.0% global opportunistic. The simulated returns are derived using the following algorithm:

1. The expected returns, standard deviation and correlation matrix for each asset class were provided by the investment consultant (SIS).
2. The expected returns for each class were modified to adjust for the difference in the inflation assumption used by the investment consultant (2.4%) and the proposed inflation assumption used for actuarial purposes (3.0%).
3. 10,000 simulation trials for repeated ten year periods were run, and the mean geometric return was computed for each of the ten year periods.
4. Given the distribution of returns, we have created a chart that shows the likelihood of the geometric mean return for a specific trial exceeding a specified nominal return assumption over a ten year period.



The mean return from this simulation was 7.51%, for a real return of 4.51%. Note that the curve crosses the 50% likelihood threshold right around this point, meaning that chances are about even that a 7.5% return will be achieved over a ten year period.

To obtain another data point we simulated the return of the SJCERA asset allocation using the capital market assumptions adopted by CalPERS. The mean compound return, after adjusting for the differing inflation assumptions, was 6.56%, a real return rate of 3.56%, almost a full percentage point below the SIS assumptions in use at SJCERA.

Such differences in expected future returns are neither new nor alarming and, in fact, are expected. However, both sets of assumptions – those from SIS and from CalPERS – suggest that an assumed return rate below the current level of 7.75% is now appropriate. Given that the 7.51% from the simulation using the SIS assumptions is the mean, and there is no margin for adverse experience, we believe an assumption lower than the current assumption of 7.75% is desirable.

We recommend a nominal annual return assumption of 7.50%, representing a reduction of 0.25% in the return assumption, with the exception that the return assumption is no longer expected to be net of administrative expenses as described below. As discussed above, this recommendation represents a return corresponding to the mean and median of the inflated-adjusted assumptions provided by the investment advisor. It does not contain a margin for adverse experience.

ADMINISTRATIVE EXPENSES

The returns discussed above are expected to be net of investment expenses; administrative expenses are not addressed. According to Section 31580.2 of the CERL, 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 0.19% 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 SJCERA begin to include an additional cost item for expected annual administrative expenses in the actuarial cost calculation. For the valuation as of January 1, 2013, we recommend an assumption of $4 million, based on an analysis of administrative expense items that have been paid out of Plan assets over the past few years. This represents a cost of approximately 1.1% of payroll, which will be allocated to the members and employers in the same ratio as under the prior approach.

PAYROLL GROWTH

Components of the payroll growth assumptions are:

- Inflation, and
- Payroll growth above inflation that is not offset by salary reductions from replacement of terminating employees with new entrants.

Such payroll growth is often attributed to productivity gains. Other factors contributing to non-inflationary 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 CPI (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 Northern California.

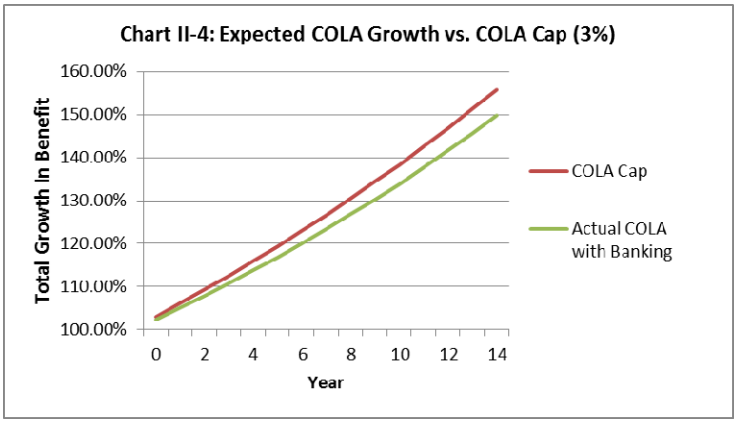
For SJCERA, Cheiron recommends maintaining a non-inflationary base payroll growth assumption of 0.25% annually. Therefore, the annual expected increase in base payroll would be 3.25%, reduced from 3.50% in the most recent valuation. This increase will be applied to all continuing active members and to starting pay for new entrants when projections of future populations are required.

COLA GROWTH

The members of SJCERA are eligible to receive automatic Cost of Living Adjustments (COLAs), based on the change in the Bay Area Consumer Price Index (CPI) and reflecting a 3% cap on the annual COLA. 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%.

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.

We have produced statistical simulations of inflation, similar to our modeling of the investment return assumption, and then modeled how the COLA maximum and the banking process interact with the changes in CPI. Chart II-4 below 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 is because if 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, this shortfall will not be made up in future years.



Based on a 3.0% recommended inflation assumption that is lower than the current 3.25%, we recommend reducing the current assumed COLA growth rate from 2.7% to 2.6% per year.

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 next two 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 SJCERA as of January 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 (red line) compared to the actual experience (blue dots) for General employees.

Chart III-1

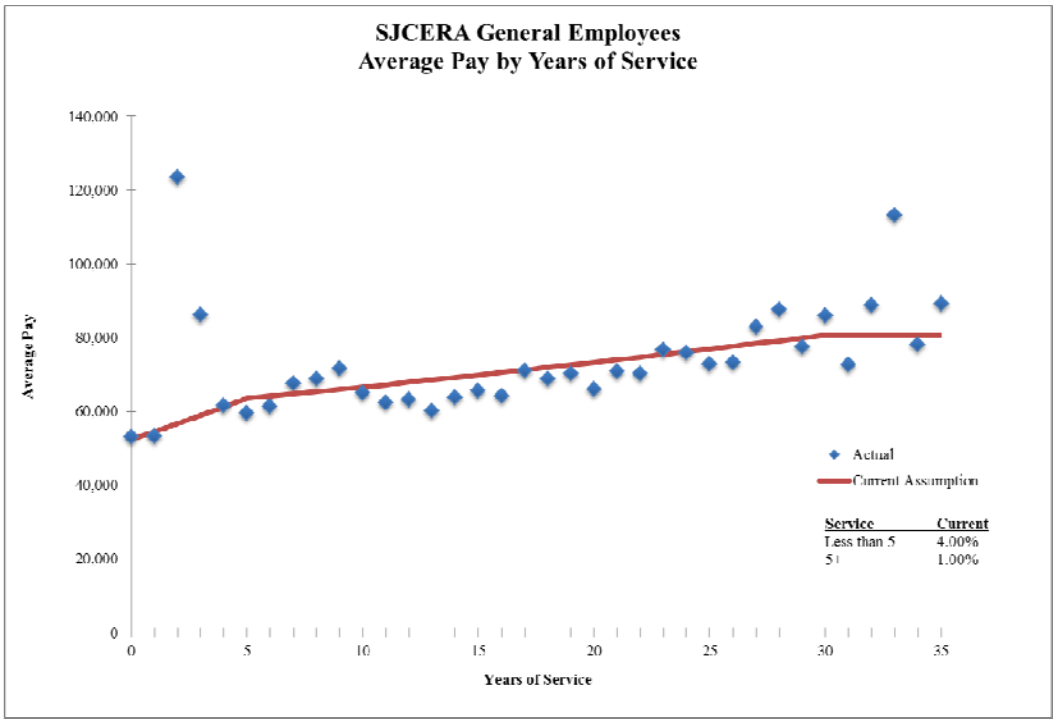
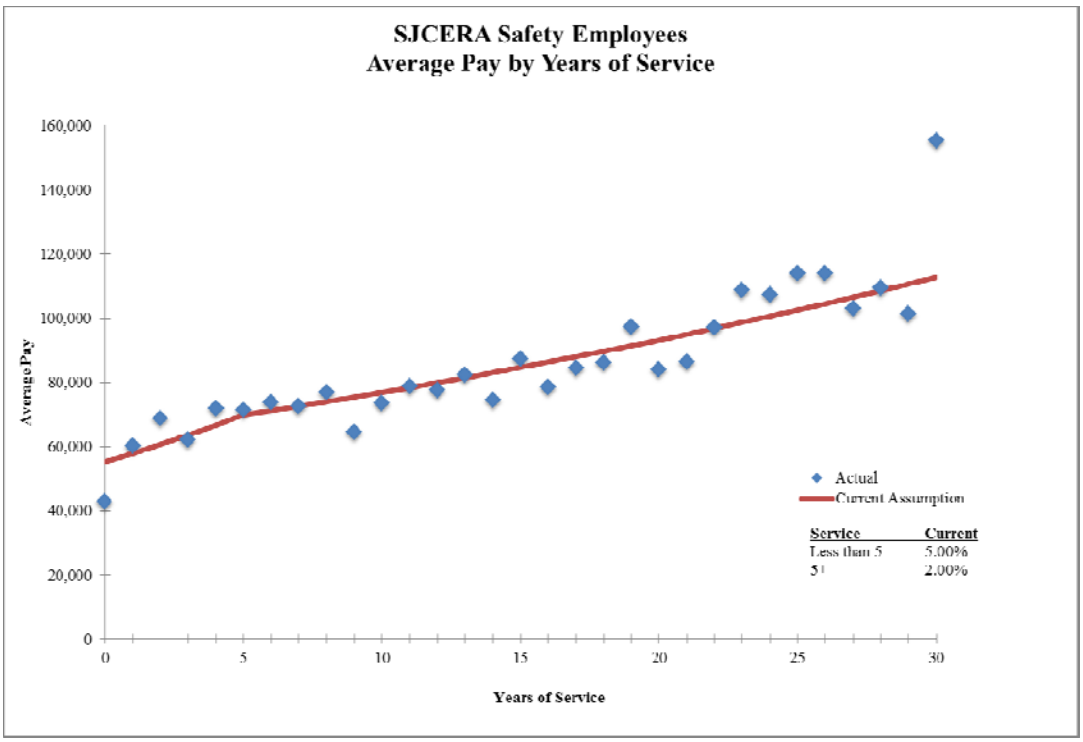


Chart III-2



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.

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 and within each service category compared to the expected number of retirements. If the assumption is perfect, this ratio will be 100%.

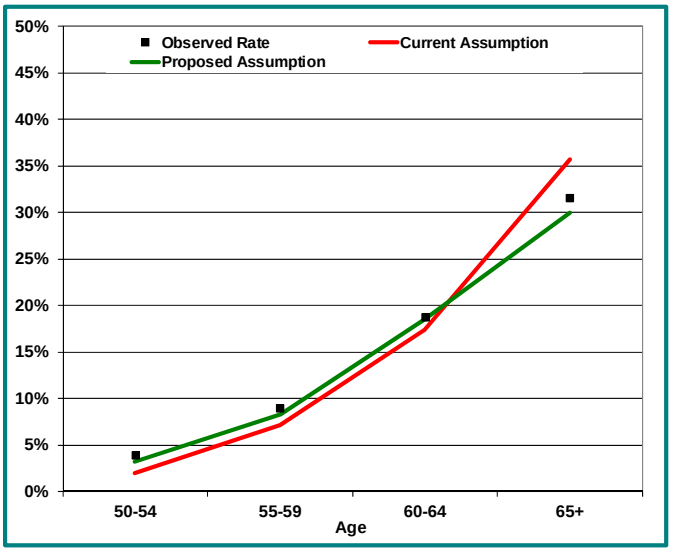
Adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption.

Normal Retirement assumptions for General members start at age 50 with 5 years of service or at any age with 30 years of service. Normal Retirement assumptions for Safety members start at age 50 with 5 years of service or at any age with 20 years of service. Once an SJCERA employee reaches age 70, we assume 100% probability of retirement.

Chart III-3 shows a graphical comparison of the actual, current and proposed rates of retirement for General female members, and Table III-3 shows the more detail on these calculations, including actual to expected ratios.

The data shows slightly higher actual retirement rates than expected under the current assumption. We have recommended increases to the retirement rates below ten years of service, along with reductions to the rates at higher ages for those with 10-29 years of service. The recommended assumption reduces the aggregate A/E ratio prior to age 70 from 1.163 to 1.069.

Chart III-3: Retirement Rates, General Female Members



Current A/E Ratio: 1.163 Proposed A/E Ratio: 1.069

	Current (Years of Service)			Proposed (Years of Service)		
Age	5-9	10-29	30+	5-9	10-29	30+
50	0.0%	2.0%	7.0%	5.0%	2.0%	7.0%
51	0.0%	2.0%	7.0%	5.0%	2.0%	7.0%
52	0.0%	2.0%	7.0%	5.0%	2.0%	7.0%
53	0.0%	2.0%	7.0%	5.0%	2.0%	7.0%
54	1.0%	3.0%	7.0%	5.0%	3.0%	7.0%
55	1.0%	4.0%	15.0%	5.0%	4.0%	15.0%
56	1.0%	7.0%	15.0%	5.0%	7.0%	15.0%
57	1.0%	7.0%	15.0%	5.0%	7.0%	15.0%
58	1.0%	7.0%	20.0%	5.0%	10.0%	20.0%
59	1.0%	10.0%	25.0%	5.0%	10.0%	25.0%
60	1.0%	10.0%	25.0%	7.5%	10.0%	25.0%
61	1.0%	15.0%	35.0%	7.5%	15.0%	35.0%
62	1.0%	25.0%	35.0%	7.5%	25.0%	35.0%
63	1.0%	25.0%	35.0%	7.5%	25.0%	35.0%
64	1.0%	25.0%	35.0%	7.5%	25.0%	35.0%
65	5.0%	50.0%	50.0%	15.0%	25.0%	50.0%
66	5.0%	50.0%	50.0%	15.0%	25.0%	50.0%
67	5.0%	40.0%	40.0%	15.0%	35.0%	40.0%
68	5.0%	30.0%	30.0%	15.0%	35.0%	30.0%
69	5.0%	30.0%	30.0%	15.0%	35.0%	30.0%
70+	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

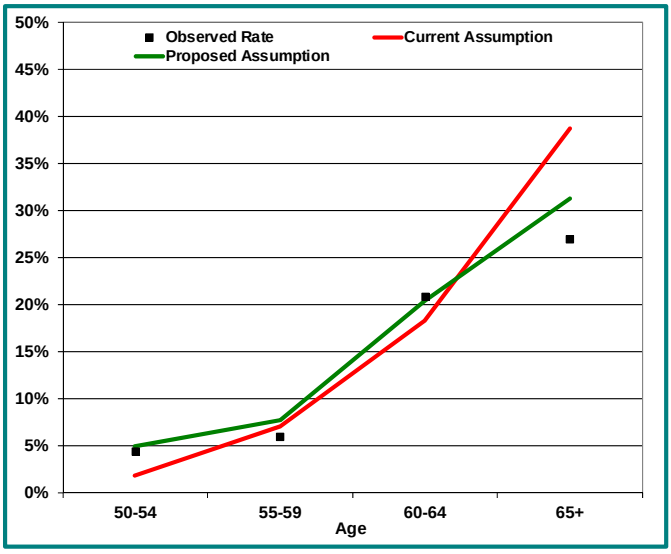
Table III-3: Retirement Rates, General Female Members

Age	Exposures	Total Actual Retirements	Actual Rates	Current Expected Retirements	Proposed Expected Retirements	Current A/E Ratio	Proposed A/E Ratio
50	280	11	3.93%	4.2	8.4	265%	131%
51	261	14	5.36%	4.4	7.7	317%	183%
52	255	9	3.53%	4.8	7.8	188%	115%
53	282	12	4.26%	5.3	8.4	226%	143%
54	313	9	2.88%	9.0	12.1	100%	74%
55	318	17	5.35%	13.9	17.0	123%	100%
56	313	22	7.03%	20.8	23.6	106%	93%
57	294	33	11.22%	20.2	22.4	164%	147%
58	267	27	10.11%	20.9	28.2	129%	96%
59	242	30	12.40%	26.7	28.4	112%	106%
60	203	29	14.29%	23.2	25.2	125%	115%
61	185	34	18.38%	28.7	30.9	118%	110%
62	163	37	22.70%	35.9	37.8	103%	98%
63	137	31	22.63%	28.2	30.1	110%	103%
64	90	15	16.67%	19.0	20.1	79%	75%
65	70	21	30.00%	26.9	17.2	78%	122%
66	52	15	28.85%	18.4	12.8	82%	117%
67	42	9	21.43%	11.9	12.0	76%	75%
68	32	17	53.13%	8.1	10.0	210%	171%
69	13	5	38.46%	3.7	4.4	137%	115%
70	9	2	22.22%	9.0	9.0	22%	22%
TOTAL	3,821	399	10.44%	343.1	373.4	116%	107%

Chart III-4 shows a graphical comparison of the actual, current and proposed rates of retirement for General male members, and Table III-4 shows the more detail on these calculations, including actual to expected ratios.

We have recommended minor modifications to the rates at various age and service levels. In particular, the recommended assumptions increase the assumed rates of retirement for members with less than 30 years of service who are below age 62. For those above age 62, we have recommended increases to the rates for those with less than 10 years of service, and reductions for those with 10-29 years of service. The net impact of the changes is to reduce the A/E ratio from 1.037 to 0.924.

Chart III-4: Retirement Rates, General Male Members



	Current (Years of Service)			Proposed (Years of Service)		
Age	5-9	10-29	30+	5-9	10-29	30+
50	0.0%	2.0%	5.0%	5.0%	5.0%	5.0%
51	0.0%	2.0%	5.0%	5.0%	5.0%	5.0%
52	0.0%	2.0%	5.0%	5.0%	5.0%	5.0%
53	0.0%	3.0%	5.0%	5.0%	5.0%	5.0%
54	1.0%	3.0%	5.0%	5.0%	5.0%	5.0%
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56	1.0%	5.0%	15.0%	5.0%	5.0%	15.0%
57	1.0%	5.0%	15.0%	5.0%	5.0%	15.0%
58	1.0%	7.5%	20.0%	5.0%	7.5%	20.0%
59	1.0%	7.5%	25.0%	5.0%	7.5%	25.0%
60	1.0%	7.5%	25.0%	7.5%	15.0%	25.0%
61	1.0%	7.5%	35.0%	7.5%	20.0%	35.0%
62	1.0%	40.0%	40.0%	7.5%	25.0%	40.0%
63	1.0%	25.0%	35.0%	7.5%	25.0%	35.0%
64	1.0%	25.0%	35.0%	7.5%	25.0%	35.0%
65	5.0%	50.0%	50.0%	15.0%	30.0%	50.0%
66	5.0%	50.0%	50.0%	15.0%	30.0%	50.0%
67	5.0%	40.0%	40.0%	15.0%	30.0%	40.0%
68	5.0%	30.0%	30.0%	15.0%	30.0%	30.0%
69	5.0%	30.0%	30.0%	15.0%	30.0%	30.0%
70+	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

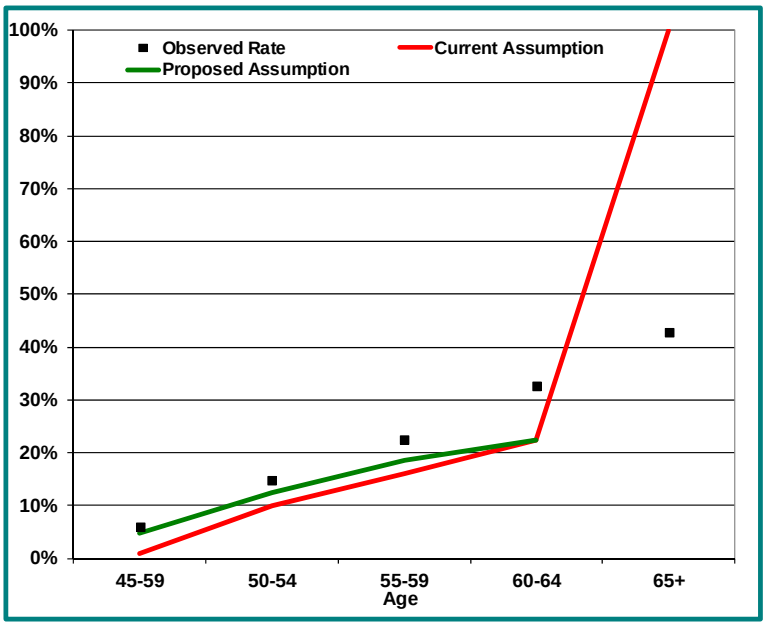
Table III-4: Retirement Rates, General Male Members

Age	Exposures	Total Actual Retirements	Actual Rates	Current Expected Retirements	Proposed Expected Retirements	Current A/E Ratio	Proposed A/E Ratio
50	109	4	3.67%	1.5	5.5	274%	73%
51	123	7	5.69%	1.7	6.2	424%	114%
52	114	2	1.75%	1.7	5.7	118%	35%
53	126	10	7.94%	3.1	6.3	326%	159%
54	115	3	2.61%	3.1	5.8	98%	52%
55	121	7	5.79%	6.0	6.7	117%	105%
56	122	5	4.10%	6.6	7.4	76%	68%
57	139	10	7.19%	8.1	9.0	124%	112%
58	132	5	3.79%	11.6	12.5	43%	40%
59	113	11	9.73%	12.1	12.7	91%	87%
60	107	15	14.02%	10.2	16.5	148%	91%
61	107	19	17.76%	11.6	20.7	164%	92%
62	100	24	24.00%	33.0	24.7	73%	97%
63	87	20	22.99%	17.5	19.0	114%	105%
64	67	20	29.85%	13.4	14.5	150%	138%
65	49	11	22.45%	20.0	14.2	55%	77%
66	30	12	40.00%	12.3	8.7	98%	138%
67	20	6	30.00%	5.6	5.3	108%	114%
68	10	1	10.00%	2.0	2.4	50%	42%
69	7	1	14.29%	1.4	1.7	74%	61%
70	6	2	33.33%	6.0	6.0	33%	33%
TOTAL	1,804	195	10.81%	188.1	211.0	104%	92%

Chart III-5 shows a graphical comparison of the actual, current and proposed rates of retirement for Safety members, and Table III-5 shows the more detail on these calculations, including actual to expected ratios.

We have recommended an increase in the retirement rate at age 55, due the presence of a consistent spike in the rates during this experience period, as well as the prior period. We have also recommended higher rates at ages 45-52 for those with at least 20 years of service. We continue to recommend a single set of rates for both males and females due to the limited amount of female experience. The recommended assumptions reduce the A/E ratio from 1.468 to 1.169.

Chart III-5: Retirement Rates, Safety Members



Current A/E Ratio: 1.468 Proposed A/E Ratio: 1.169

	Current (Yrs of Svc)		Proposed (Yrs of Svc)	
Age	10-19	20+	10-19	20+
45	0.0%	1.0%	0.0%	5.0%
46	0.0%	1.0%	0.0%	5.0%
47	0.0%	1.0%	0.0%	5.0%
48	0.0%	1.0%	0.0%	5.0%
49	0.0%	1.0%	0.0%	5.0%
50	10.0%	10.0%	10.0%	15.0%
51	5.0%	5.0%	5.0%	10.0%
52	5.0%	5.0%	5.0%	10.0%
53	5.0%	20.0%	5.0%	20.0%
54	5.0%	20.0%	5.0%	20.0%
55	5.0%	20.0%	5.0%	30.0%
56	5.0%	20.0%	5.0%	20.0%
57	5.0%	20.0%	5.0%	20.0%
58	5.0%	20.0%	5.0%	20.0%
59	5.0%	20.0%	5.0%	20.0%
60	5.0%	20.0%	5.0%	20.0%
61	25.0%	25.0%	25.0%	25.0%
62	25.0%	50.0%	25.0%	50.0%
63	25.0%	50.0%	25.0%	50.0%
64	25.0%	50.0%	25.0%	50.0%
65+	100.0%	100.0%	100.0%	100.0%

Table III-5: Retirement Rates, Safety Members

Age	Exposures	Total Actual Retirements	Actual Rates	Current Expected Retirements	Proposed Expected Retirements	Current A/E Ratio	Proposed A/E Ratio
45	27	0	0.00%	0.2	1.2	0%	0%
46	36	5	13.89%	0.3	1.7	1471%	294%
47	28	1	3.57%	0.3	1.4	370%	74%
48	43	0	0.00%	0.4	2.0	0%	0%
49	48	5	10.42%	0.5	2.3	1087%	217%
50	69	10	14.49%	6.9	9.5	145%	106%
51	59	7	11.86%	3.0	5.2	237%	135%
52	53	8	15.09%	2.7	4.6	302%	174%
53	50	7	14.00%	8.2	8.2	85%	85%
54	46	9	19.57%	7.1	7.1	127%	127%
55	39	13	33.33%	6.6	9.7	197%	134%
56	26	6	23.08%	4.3	4.3	140%	140%
57	17	3	17.65%	2.7	2.7	113%	113%
58	18	2	11.11%	2.7	2.7	74%	74%
59	16	2	12.50%	2.3	2.3	87%	87%
60	14	4	28.57%	1.6	1.6	250%	250%
61	11	2	18.18%	2.8	2.8	73%	73%
62	10	3	30.00%	2.8	2.8	109%	109%
63	9	5	55.56%	2.8	2.8	182%	182%
64	2	1	50.00%	0.5	0.5	200%	200%
65+	7	3	42.86%	7.0	7.0	43%	43%
TOTAL	**628**	**96**	**15.29%**	**65.4**	**82.1**	**147%**	**117%**

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.

We generally propose assumption changes when the A/E ratio for the current 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 assumptions will automatically become more conservative each year. We also generally try to recommend the same or a related table for active employees and healthy annuitants.

In the prior study, SJCERA adopted the following assumptions:

Healthy active members, retirees and beneficiaries	RP 2000 Combined Healthy mortality tables, projected to 2010 with Scale AA, setback one year for females
Disabled members	RP 2000 Combined Healthy mortality tables, projected to 2010 with Scale AA, set-forward five years for males and set-forward six years for females

Since the prior study, the Society of Actuaries' Retirement Plans Experience Committee (RPEC) has released a new mortality improvement scale, Scale BB. The mortality improvements included in the currently used projection scale - Scale AA - were found to produce some unsatisfactory results in projecting mortality. Scale BB reflects more up-to-date data, approximately 20 years more current than that used in the development of Scale AA, and it includes 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 suggest that using generational mortality is a preferable approach, as it allows for an explicit declaration of the amount of future mortality

improvement included in the assumptions. Finally, SJCERA's experience over the past three years matches extremely closely with using the latest mortality tables (RP2000) in conjunction with the most recent projection scale (Scale BB) under a generational approach. As such, we are recommending the following assumptions:

Healthy active members, retirees and beneficiaries	RP 2000 Combined Healthy Generational Mortality with Scale BB
Disabled members	RP 2000 Combined Healthy Generational Mortality with Scale BB, set-forward eight years for males and females

As shown in Table III-6 below, mortality rates for healthy annuitants are approximately equal to the current assumptions and our proposed assumptions. Our proposed Disabled mortality rates, shown in Table III-7 below, are slightly higher than current experience. However, given the small amount of disability-related mortality experience available, and given the use of generational mortality improvements, we feel comfortable with an assumption that is slightly less conservative than indicated by recent experience.

Table III-6: Healthy Member Mortality

	Exposures	Total Actual Deaths	Actual Rates	Current Expected Deaths	Proposed Expected Deaths	Current A/E Ratio	Proposed A/E Ratio
Active							
General (M)	4,244	12	0.28%	12.6	13.6	95%	88%
General (F)	9,793	14	0.14%	19.5	19.5	72%	72%
Safety (M)	1,869	2	0.11%	2.9	2.9	70%	70%
Safety (F)	708	0	0.00%	0.7	0.7	0%	0%
	16,614	28	0.17%	35.7	36.7	78%	76%
Retired and Surviving Spouses							
General (M)	3,423	100	2.92%	115.2	109.3	87%	91%
General (F)	6,496	196	3.02%	178.8	184.2	110%	106%
Safety (M)	1,143	25	2.19%	20.2	19.6	124%	127%
Safety (F)	616	9	1.46%	10.5	10.8	86%	83%
	11,678	330	2.83%	324.7	324.0	102%	102%
TOTAL	**28,292**	**358**	**1.27%**	**360.4**	**360.7**	**99%**	**99%**

Table III-7: Disabled Member Mortality

	Exposures	Total Actual Deaths	Actual Rates	Current Expected Deaths	Proposed Expected Deaths	Current A/E Ratio	Proposed A/E Ratio
General (M)	431	16	3.71%	10.4	13.5	154%	118%
General (F)	704	22	3.13%	18.0	20.0	122%	110%
Safety (M)	422	7	1.66%	10.6	13.7	66%	51%
Safety (F)	136	0	0.00%	1.3	1.6	0%	0%
TOTAL	1,693	45	2.66%	40.4	48.8	111%	92%

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 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.

Because the number of disability retirements is generally low we have included analyses for both the last three and six years of experience.

As shown in Table III-8 below, the incidence of disability for all groups except General male members is lower than the current assumptions, and we have recommended reducing General female and all Safety assumptions by 30%, while retaining the current relationship between the ratio of expected service-related to non-service connected disabilities.

Applying the proposed assumptions yields a proposed actual to expected ratio (A/E ratio) of 86%, but when aggregated with the prior study's data, the proposed A/E ratio is 101%, as shown in Table III-9.

Table III-8: Disability Rates (2010 - 2012)

	Exposures	Total Actual Disabilities	Actual Rates	Current Expected Disabilities	Proposed Expected Disabilities	Current A/E Ratio	Proposed A/E Ratio
General (M)	4,244	18	0.42%	16.6	16.6	108%	108%
General (F)	9,793	24	0.25%	43.7	30.6	55%	78%
Safety (M)	1,869	10	0.54%	19.3	13.5	52%	74%
Safety (F)	708	5	0.71%	8.0	5.6	63%	90%
TOTAL	**16,614**	**57**	**0.34%**	**87.6**	**66.3**	**65%**	**86%**

Table III-9: Disability Rates (2007 - 2012)

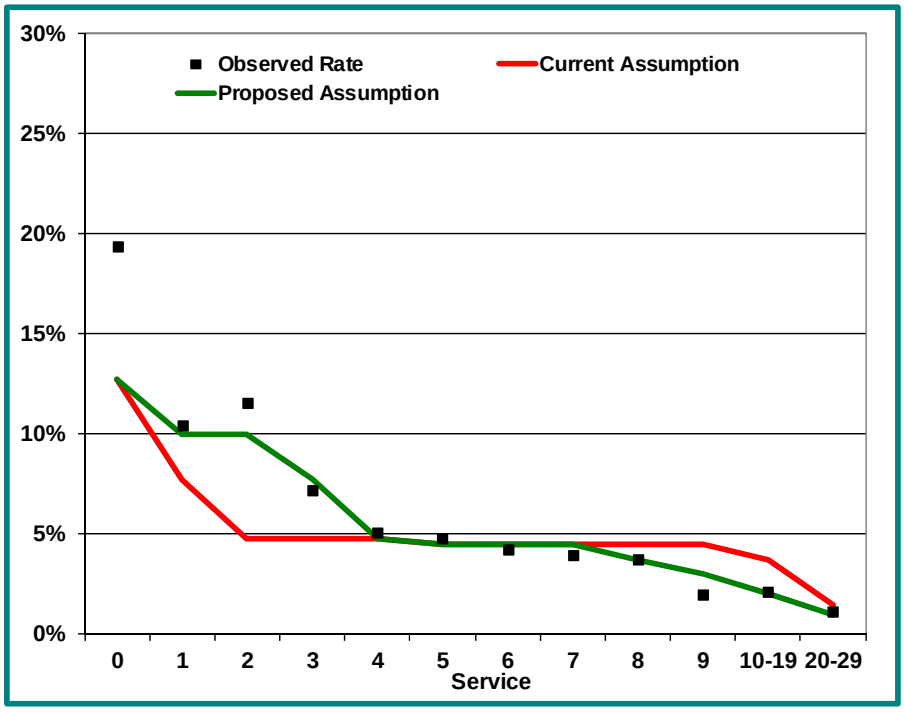
	Exposures	Total Actual Disabilities	Actual Rates	Current Expected Disabilities	Proposed Expected Disabilities	Current A/E Ratio	Proposed A/E Ratio
General (M)	9,065	36	0.40%	34.2	34.2	105%	105%
General (F)	20,738	63	0.30%	87.2	61.1	72%	103%
Safety (M)	3,724	26	0.70%	39.0	27.3	67%	95%
Safety (F)	1,444	10	0.69%	16.0	11.2	63%	89%
TOTAL	**34,971**	**135**	**0.39%**	**176.4**	**133.7**	**77%**	**101%**

TERMINATION RATES

Rates of termination from active employment for causes other than retirement, disability or death have a significant impact on the cost of the plan. We analyzed and recommend separate rates across all years of employment. In the prior experience study we analyzed vested termination and withdrawal rates separately. For the purposes of this study we have combined the prior vested termination and withdrawal decrements into one rate, and have developed withdrawal rates as a percentage of total terminations.

The tables and charts below show the actual experience compared to the current and recommended assumptions. Termination rates for General members were higher than expected over the first three years of service, and lower than expected thereafter. We have suggested changes to the rates that lower the A/E ratio for General members from 118.6% to 107.2%.

Chart III-10: Termination Rates, General Members



Svc	Current	Proposed
0	12.75%	12.75%
1	7.75%	10.00%
2	4.75%	10.00%
3	4.75%	7.75%
4	4.75%	4.75%
5	4.50%	4.50%
6	4.50%	4.50%
7	4.50%	4.50%
8	4.50%	3.75%
9	4.50%	3.00%
10	3.75%	2.00%
11	3.75%	2.00%
12	3.75%	2.00%
13	3.75%	2.00%
14	3.75%	2.00%
15	3.75%	2.00%
16	3.75%	2.00%
17	3.75%	2.00%
18	3.75%	2.00%
19	3.75%	2.00%
20+	1.50%	1.00%

Current A/E Ratio: 1.186 Proposed A/E Ratio: 1.072

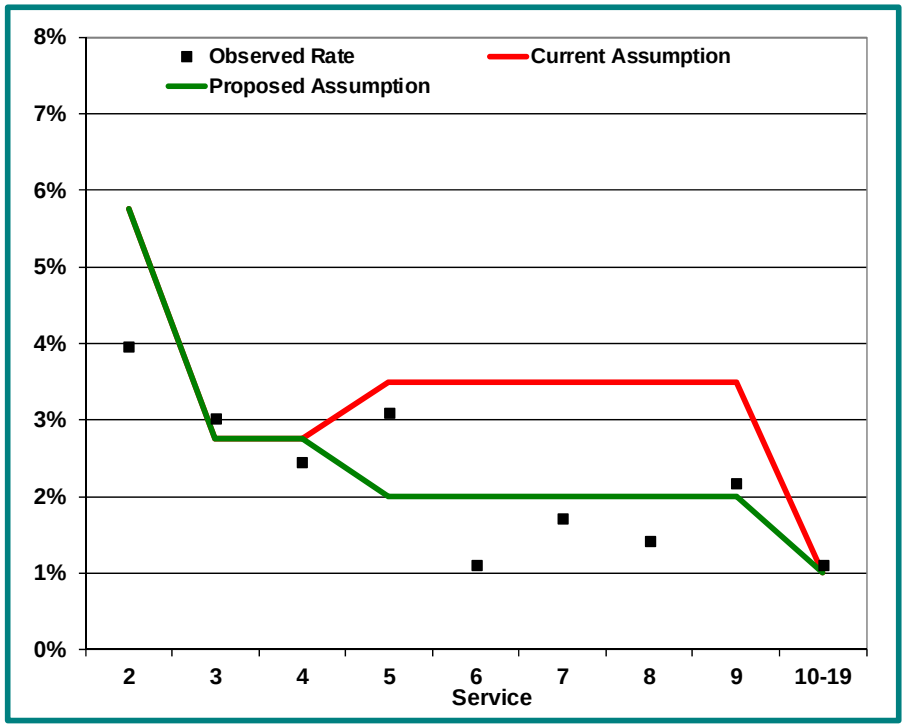
Table III-10: Termination Rates, General Members

Service	Exposures	Total Actual Terminations	Actual Rates	Current Expected Terminations	Proposed Expected Terminations	Current A/E Ratio	Proposed A/E Ratio
0	335	65	19.40%	42.7	42.7	152%	152%
1	490	51	10.41%	38.0	49.0	134%	104%
2	866	100	11.55%	41.1	86.6	243%	115%
3	1,038	75	7.23%	49.3	80.4	152%	93%
4	829	42	5.07%	39.4	39.4	107%	107%
5	516	25	4.84%	23.2	23.2	108%	108%
6	427	18	4.22%	19.2	19.2	94%	94%
7	452	18	3.98%	20.3	20.3	88%	88%
8	503	19	3.78%	22.6	18.9	84%	101%
9	504	10	1.98%	22.7	15.1	44%	66%
10	433	15	3.46%	16.2	8.7	92%	173%
11	318	7	2.20%	11.9	6.4	59%	110%
12	231	5	2.16%	8.7	4.6	58%	108%
13	186	1	0.54%	7.0	3.7	14%	27%
14	147	4	2.72%	5.5	2.9	73%	136%
15	108	1	0.93%	4.1	2.2	25%	46%
16	92	3	3.26%	3.5	1.8	87%	163%
17	83	1	1.20%	3.1	1.7	32%	60%
18	104	1	0.96%	3.9	2.1	26%	48%
19	128	1	0.78%	4.8	2.6	21%	39%
20-29	429	5	1.17%	6.4	4.3	78%	117%
TOTAL	**8,219**	**467**	**5.68%**	**393.7**	**435.8**	**119%**	**107%**

Termination rates for Safety members were substantially higher than expected during the first two years of service, and were less than expected between four and nine years of service. Because of the high number of terminations in the first two years and the low number of exposures, we have prepared the analysis both with and without consideration of the first two years of terminations. We believe the heavy rate of termination in the first two years of service is likely to be an anomaly based on particular circumstances of employment patterns over the past few years. Therefore we recommend no change to these rates until experience has confirmed an underlying change in their behavior.

Lowering Safety member termination rates from five to nine years of service increases the A/E ratio from 74.1% to 91.5% (excluding data for those terminated in the first two years of service.) If we look at the effect of this change for all Safety members, the A/E ratio increases from 125.6% under current assumptions to 147.5% using the proposed assumptions. We believe these A/E ratios strike a conservative balance, given the data provided.

Chart III-11: Termination Rates, Safety Members



Svc	Current	Proposed
0	8.75%	8.75%
1	7.75%	7.75%
2	5.75%	5.75%
3	2.75%	2.75%
4	2.75%	2.75%
5	3.50%	2.00%
6	3.50%	2.00%
7	3.50%	2.00%
8	3.50%	2.00%
9	3.50%	2.00%
10+	1.00%	1.00%

Current A/E Ratio: 0.741 Proposed A/E Ratio: 0.915

Table III-11: Termination Rates, Safety Members

Service	Exposures	Total Actual Terminations	Actual Rates	Current Expected Terminations	Proposed Expected Terminations	Current A/E Ratio	Proposed A/E Ratio
0	46	16	34.78%	4.0	4.0	398%	398%
1	116	24	20.69%	9.0	9.0	267%	267%
2	177	7	3.95%	10.2	10.2	69%	69%
3	198	6	3.03%	5.4	5.4	110%	110%
4	163	4	2.45%	4.5	4.5	89%	89%
5	97	3	3.09%	3.4	1.9	88%	155%
6	91	1	1.10%	3.2	1.8	31%	55%
7	116	2	1.72%	4.1	2.3	49%	86%
8	141	2	1.42%	4.9	2.8	41%	71%
9	138	3	2.17%	4.8	2.8	62%	109%
10-19	540	6	1.11%	5.4	5.4	111%	111%
2-19 YOS	1,661	34	2.05%	45.9	37.2	74%	91%
TOTAL	1,823	74	4.06%	58.9	50.2	126%	147%

WITHDRAWAL RATES AND RECIPROCITY

When a vested member terminates employment, they have 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, the employee's retirement benefit is ultimately based on the employee's service with SJCERA and Final Compensation based on employment with any reciprocal employer.

Table III-12 below shows the results of our analysis of withdrawal and reciprocal transfers.

The left half of Table III-12 presents the portion of total terminations that result in contribution withdrawals. Based on recent experience, we are recommending that 50% of all General terminations and 20% of all Safety terminations before five years of service be valued as withdrawals of contributions. We also recommend that 35% of all General terminations and 10% of all Safety terminations between five and fifteen years of service be valued as withdrawals of contributions, and that no terminations from fifteen years of service onward be assumed to result in a withdrawal of contributions.

The right half of Table III-12 presents the portion of vested deferred members who have established reciprocity with another employer. The current assumption is that 25% of General and 50% of Safety non-withdrawal terminating employees work for reciprocal employers and receive salary increases equal to the payroll growth assumption. We propose maintaining this reciprocity assumption based on recent experience.

Table III-12: Withdrawal Rates and Reciprocity

Service	Withdrawals	Total Terminations	% of Total	Reciprocal Transfers	Non-Withdrawal Terminations	% of Total
General						
0-4	169	336	50.3%	44	167	26.3%
5-14	63	193	32.6%	18	130	13.8%
15+	2	18	11.1%	1	16	6.3%
Total	**234**	**547**	**42.8%**	**63**	**313**	**20.1%**
Safety						
0-4	12	53	22.6%	22	41	53.7%
5-14	2	21	9.5%	6	19	31.6%
15+	0	2	0.0%	1	2	50.0%
Total	**14**	**76**	**18.4%**	**29**	**62**	**46.8%**

FAMILY COMPOSITION

Members who are married at least one year prior to the date of retirement are entitled to an 60% joint and survivor annuity without reduction of the member's allowance. The analysis show in Table III-13 below examines the data for all retirements since January 1, 2010.

Table III-13: Family Composition

New Retirees and Disabilities						
	Males			Females		
Calendar Year	Members with Spouses	Total Retiree and Disability Count	Percent Eligible for Unreduced J&S	Members with Spouses	Total Retiree and Disability Count	Percent Eligible for Unreduced J&S
2010	86	111	77.5%	81	181	44.8%
2011	60	95	63.2%	88	162	54.3%
2012	83	118	70.3%	106	201	52.7%
	229	**324**	**70.7%**	**275**	**544**	**50.6%**

The current assumption is that 70% of male and 50% of female service or disabled retirees have an eligible spouse. We recommend maintaining that assumption.

SICK LEAVE BANK CONVERSION

SJCERA employees who were on the County payroll as of August 27, 2001 were offered an election to be able to convert their accumulated sick leave hours at retirement to Credited service. There are 248 members who made this election and are on County payroll as of January 1, 2013. Table III-14 below shows the results of this analysis. Because the number of members eligible to convert sick leave is limited, and since the average amount eligible to be converted is small, we are not recommending any load be made for these employees.

Table III-14: Sick Leave Bank Conversion Analysis

Active Employees as of January 1, 2013					
	Count	Avg Years of Service	Avg Sick Leave Hours	Avg Add'l Service	Percent Increase
Eligible	248	17.5	607	0.3	1.67%
Ineligible	5,047	11.7	0	0	0.00%
Total	**5,295**	**12.0**	**28**	**0.0**	**0.11%**

PROPOSED ASSUMPTIONS

1. Rate of Return

Assets are assumed to earn 7.50% net of investment expenses.

2. 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.

3. Post Retirement COLA

Benefits are assumed to increase after retirement at the rate of 2.6% per year.

4. Increases in Pay

Assumed pay increases for active Members consist of increases due to base salary adjustments plus service-based increase due to longevity and promotion, as shown below:

Table IV-1
Pay Increases

	Years of Service		
	<5	5-29	30+
Base Increase	3.25%	3.25%	3.25%
Longevity & Promotion			
General	3.86%	0.96%	0.00%
Safety	4.83%	1.93%	1.93%
Total (Compound)			
General	7.24%	4.24%	3.25%
Safety	8.24%	5.24%	5.24%

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. Women are assumed to be three years younger than men.

Table IV-2
Percentage Married

Gender	Percentage
Males	70%
Females	50%

6. Rates of Termination

Sample rates of termination are show in the following Table IV-3.

Table IV-3
Rates of Termination

Years of Service	General	Safety
0	12.75%	8.75%
1	10.00%	7.75%
2	10.00%	5.75%
3	7.75%	2.75%
4	4.75%	2.75%
5	4.50%	2.00%
6	4.50%	2.00%
7	4.50%	2.00%
8	3.75%	2.00%
9	3.00%	2.00%
10-19	2.00%	1.00%
20-29	1.00%	0.00%
30+	0.00%	0.00%

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

7. Withdrawal

Rates of withdrawal apply to active Members who terminate their employment and withdraw their member contributions, forfeiting entitlement to future Plan benefits.

50% of all General Member terminations with less than five years of service are assumed to take a refund of contributions, as well as 35% of those with five to fourteen years of service.

20% of all Safety Member terminations with less than five years of service are assumed to take a refund of contributions, and 10% of those between five and fourteen years are assumed to take a refund.

8. Vested Termination and Reciprocal Transfers

Rates of vested termination apply to active Members who terminate their employment and leave their member contributions on deposit with the Plan.

50% of all General Member terminations with less than five years of service are assumed to leave their contributions on deposit, as well as 65% of those with five to fourteen years of service, and 100% of those with fifteen or more years of service.

80% of all Safety Member terminations with less than five years of service are assumed to leave their contributions on deposit, as well as 90% of those between five and fourteen years of service and 100% of those with fifteen or more years of service.

Vested terminated General Members are assumed to begin receiving benefits at age 58; terminated Safety Members are assumed to begin receiving benefits at age 53.

25% of vested terminated General Members and 50% of vested terminated Safety Members are assumed to be reciprocal.

9. Rates of Service-Connected Disability

Sample service-connected disability rates of active participants are provided in Table IV-4.

Table IV-4
Rates of Svc Disability

Age	General Male	General Female	Safety
22	0.066%	0.022%	0.050%
27	0.066%	0.030%	0.088%
32	0.066%	0.051%	0.165%
37	0.066%	0.073%	0.302%
42	0.380%	0.094%	0.566%
47	0.380%	0.123%	0.995%
52	0.226%	0.159%	1.713%
57	0.226%	0.204%	2.633%
62	0.226%	0.249%	0.000%

10. Rates of Nonservice-Connected Disability

Sample nonservice-connected disability rates of active participants are provided in Table IV-5.

Table IV-5
Rates of Non-Svc Disability

Age	General Male	General Female	Safety Male	Safety Female
22	0.051%	0.053%	0.000%	0.000%
27	0.068%	0.067%	0.003%	0.006%
32	0.086%	0.081%	0.005%	0.010%
37	0.108%	0.102%	0.009%	0.019%
42	0.138%	0.138%	0.028%	0.057%
47	0.178%	0.197%	0.082%	0.164%
52	0.225%	0.267%	0.167%	0.334%
57	0.286%	0.337%	0.265%	0.529%
62	0.362%	0.408%	0.000%	0.000%

11. 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, with Generational Projection using Projection Scale BB.

12. Rates of Mortality for Retired Disabled Lives

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

13. Rates of Mortality for Calculating Employee Contributions

Mortality rates for calculating employee contributions use the same base mortality tables as those used for healthy and retired disabled lives, projected to 2036 using Projections Scale BB.

14. Rates of Retirement

Rates of retirement are based on age according to the following Table IV-6.

Table IV-6
Rates of Retirement

	General Male Years of Service			General Female Years of Service			Safety Years of Service	
Age	5-9	10-29	30+	5-9	10-29	30+	10-19	20+
45	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%
46	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%
47	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%
48	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%
49	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.00%
50	5.00%	5.00%	5.00%	5.00%	2.00%	7.00%	10.00%	15.00%
51	5.00%	5.00%	5.00%	5.00%	2.00%	7.00%	5.00%	10.00%
52	5.00%	5.00%	5.00%	5.00%	2.00%	7.00%	5.00%	10.00%
53	5.00%	5.00%	5.00%	5.00%	2.00%	7.00%	5.00%	20.00%
54	5.00%	5.00%	5.00%	5.00%	3.00%	7.00%	5.00%	20.00%
55	5.00%	5.00%	15.00%	5.00%	4.00%	15.00%	5.00%	30.00%
56	5.00%	5.00%	15.00%	5.00%	7.00%	15.00%	5.00%	20.00%
57	5.00%	5.00%	15.00%	5.00%	7.00%	15.00%	5.00%	20.00%
58	5.00%	7.50%	20.00%	5.00%	10.00%	20.00%	5.00%	20.00%
59	5.00%	7.50%	25.00%	5.00%	10.00%	25.00%	5.00%	20.00%
60	7.50%	15.00%	25.00%	7.50%	10.00%	25.00%	5.00%	20.00%
61	7.50%	20.00%	35.00%	7.50%	15.00%	35.00%	25.00%	25.00%
62	7.50%	25.00%	40.00%	7.50%	25.00%	35.00%	25.00%	50.00%
63	7.50%	25.00%	35.00%	7.50%	25.00%	35.00%	25.00%	50.00%
64	7.50%	25.00%	35.00%	7.50%	25.00%	35.00%	25.00%	50.00%
65	15.00%	30.00%	50.00%	15.00%	25.00%	50.00%	100.00%	100.00%
66	15.00%	30.00%	50.00%	15.00%	25.00%	50.00%	100.00%	100.00%
67	15.00%	30.00%	40.00%	15.00%	35.00%	40.00%	100.00%	100.00%
68	15.00%	30.00%	30.00%	15.00%	35.00%	30.00%	100.00%	100.00%
69	15.00%	30.00%	30.00%	15.00%	35.00%	30.00%	100.00%	100.00%
70	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	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 and the anticipated rates of increase in the Consumer Price Index (CPI), wages and COLAs. 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 refund of contributions),
- Probability of disability among active employees (either occupational or total and permanent),
- Family composition,
- Probability of death among active employees, and
- Rates of mortality among retired and 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 3.2% and the employee receives a 4.7% 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.

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.

A unique challenge is presented by members who are on Active Leave as of the date of each annual valuation. These members have an uncertain status each year, since some will have applications for retirement or disability that are pending. For purposes of this Study, these members are included in the total exposures (i.e. active members) and are recognized as a decrement based on the final resolution of their status when their applications for disability or retirement have been fully adjudicated.

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 (for instance, for disability rates), 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.