Marin County Employees' Retirement Association

Actuarial Audit of June 30, 2011 Valuation

Prepared by:

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January 28, 2013

Board of Retirement
Marin County Employees' Retirement Association
One McInnis Pkwy, Suite 100
San Rafael, CA 94903

Re: Actuarial Audit of June 30, 2011 Valuation

Dear Board Members:

The enclosed report presents the findings and comments resulting from a detailed review of the June 30, 2011 actuarial valuation performed by EFI Incorporated (EFI) for the Marin County Employees' Retirement Association (MCERA). An overview of our major findings is included in the Executive Summary section of the report. More detailed commentary on our review process is included in the latter sections.

All calculations are based on MCERA's plan provisions and the actuarial assumptions adopted by the Retirement Board. The plan provisions, assumptions and methods used are the same as those disclosed in Section 1 of EFI's June 30, 2011 actuarial valuation report. As discussed in our report, we believe the package of actuarial assumptions and methods are generally reasonable (taking into account the experience of MCERA and reasonable expectations). Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following:

- Plan experience differing from the actuarial assumptions,
- Future changes in the actuarial assumptions,
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as potential additional contribution requirements due to changes in the plan's funded status), and
- Changes in the plan provisions or accounting standards.

Due to the scope of this assignment, we did not perform an analysis of the potential range of such measurements.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by MCERA's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination of these data, we have found them to be reasonably consistent and comparable with data used for other purposes. Since the audit results are dependent on the integrity of the data supplied, the results can be expected to

differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our calculations may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

Milliman's work product was prepared exclusively for MCERA for a specific and limited purpose. It is a complex technical analysis that assumes a high level of knowledge concerning MCERA's operations and uses MCERA's data, which Milliman has not audited. It is not for the use or benefit of any third party for any purpose. Any third party recipient of Milliman's work product who desires professional guidance should not rely upon Milliman's work product, but should engage qualified professionals for advice appropriate to its own specific needs.

We would like to express our appreciation to the EFI staff, in particular Graham Schmidt, and the MCERA staff for their assistance in supplying the data and information on which this report is based.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We respectfully submit the following report, and we look forward to discussing it with you.

Sincerely,

Nick J. Collier, ASA, EA, MAAA
Consulting Actuary

Daniel R. Wade, FSA, EA, MAAA
Consulting Actuary

NJC/DRW/nlo

Marin County Employees' Retirement Association
Actuarial Audit of June 30, 2011 Valuation

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Marin County Employees' Retirement Association
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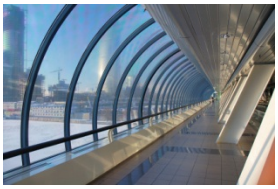
Section 1 Summary of the Findings



Purpose and Scope of the Actuarial Audit

In this actuarial audit, we independently calculate the key results from the June 30, 2011 actuarial valuation and review the actuarial assumptions used in the valuation. The purpose of this audit is to provide an opinion regarding the reasonableness and accuracy of the actuarial assumptions, actuarial cost methods, valuation results and contribution rates. The following tasks were performed in this audit:

- ✓ Evaluation of the data used in the valuation,
- ✓ Full independent replication of the key valuation results,
- ✓ Confirmation that the actuarial assumptions are reasonable and appropriate, and
- ✓ Analysis of valuation results and reconciliation of material differences (if any).

Audit Conclusion

Actuarial Valuation

Based upon our review of the June 30, 2011 actuarial valuation, we found the aggregate results were reasonable. The following table shows that our independent calculations are close to those determined by EFI based on the current methods and assumptions.

Note that we have shown the employer contribution rate and funded ratio for all employers participating in MCERA in aggregate. For key measurements, we have shown comparisons for each employer. Further analysis by agency and tier is shown in the appendices.

	EFI	Milliman
Employer Contribution Rate	31.40%	31.57%
Funded Ratio	72.1%	71.6%

We have recommended two changes that we think should be implemented in future valuations and have included several items to be considered in the future. These items are listed at the end of this section of the report.

The most significant of the recommended changes involves an issue we identified with the calculation of the COLA portion of the member contribution rates. After discussing this issue with consultants from EFI, they provided us with revised member contribution rates that we verified were reasonable. Note that changes in the member contribution rates would also have a small impact on the recommended employer contribution rates.

Legislation

It should be noted that recent legislation (AB340, which includes the California Public Employees' Pension Reform Act of 2013) was passed that affects MCERA. The main impact of this legislation is on future members, but there are some changes that could potentially affect current members, in particular a change in the Safety "industrial" disability benefit. Since the valuation was performed prior to passage of this legislation, it was not reflected in the valuation, and consequently we have not reflected it in this audit report.

Statement of Key Findings

Membership Data

We performed tests on both the raw data supplied by MCERA staff and the processed data used by EFI in the valuation. Based on this review, we feel the individual member data used is appropriate and complete. A summary is shown in the chart below:

	EFI	Milliman	Ratio EFI/Milliman
Active Members			
Total Number	2,546	2,546	100.0%
Average Age	47.8	47.8	100.0%
Average Service	11.3	11.3	100.0%
Average Compensation	$ 86,735	$ 86,431	100.4%
Retirees and Survivors			
Total Monthly Benefit (in $millions)	$ 7.70	$ 7.70	100.0%
Average Age	69.1	69.1	100.0%

Actuarial Value of Assets

We have reviewed the calculation of the actuarial value of assets used in the June 30, 2011 valuation. We found the calculations to be reasonable and the methodology to be appropriate and in compliance with actuarial standards of practice.

Actuarial Liabilities and Normal Cost

We independently calculated the normal cost and liabilities of MCERA. We found that all significant benefit provisions were accounted for in an accurate manner (with one minor exception), the actuarial assumptions and methods are being applied correctly, and that our total liabilities matched those calculated by EFI closely. The only area of difference was the valuation of active member death benefit, which is discussed in Section 4. Although the relative difference in the death benefit was large, the overall impact on the valuation was not material, in our opinion.

Statement of Key Findings
(continued)

Actuarial Liabilities and Normal Cost (continued)

A summary of the Actuarial Accrued Liability (AAL) is shown in the chart below. Note that the line for the Count of Marin also includes the courts and other special districts.

	AAL ($millions)		Ratio
	EFI	Milliman	EFI/Milliman
County of Marin	$ 1,436.0	$ 1,444.9	99.4%
Novato FPD	136.3	137.4	99.2%
City of San Rafael	412.7	414.6	99.5%
Total AAL	**$ 1,985.1**	**$ 1,996.9**	**99.4%**

The total normal cost rate for each employer is shown in the following chart.

	Total Normal Cost		Ratio
	EFI	Milliman	EFI/Milliman
County of Marin	21.03%	20.82%	101.0%
Novato FPD	36.37%	35.40%	102.7%
City of San Rafael	28.05%	27.73%	101.2%

Statement of Key Findings
(continued)

Member Contribution Rates

We reviewed the current member contribution rates. We found that the basic member rates were determined in an accurate manner. We identified an issue with the calculation of the COLA portion of the member rates that understated that portion of the contribution. EFI modified its calculations based on our comments and sent us revised COLA rates. The revised member rates are consistent with our calculations.

Member contribution rates for sample ages are shown in the following exhibit. Note that we have shown the member rates reported in EFI's June 30, 2011 valuation.

	Member Contribution Rate (Basic + COLA)		EFI / Milliman
Plan	EFI	Milliman	Ratio
General Plans			
County & Courts Misc. Tier 3, 3A & 4			
Entry Age 25	6.81%	7.14%	95%
Entry Age 35	7.91%	8.08%	98%
Entry Age 45	9.48%	9.47%	100%
San Rafael Misc.			
Entry Age 25	8.52%	8.94%	95%
Entry Age 35	10.67%	10.90%	98%
Entry Age 45	13.08%	13.25%	99%
Safety Plans			
County Tier 2			
Entry Age 25	13.59%	14.05%	97%
Entry Age 35	15.74%	16.09%	98%
Entry Age 45	17.79%	17.78%	100%
County Tier 2B with 2.6% Additional Cost Sharing			
Entry Age 25	16.38%	16.92%	97%
Entry Age 35	18.68%	18.73%	100%
Entry Age 45	20.39%	20.38%	100%

Statement of Key Findings (continued)

Member Contribution Rates (continued)

An example of the issue with the COLA portion of the member contribution rates is shown below for a County and Courts Miscellaneous Tier 3 member with an entry age of 25.

Component	Member Rate		EFI / Milliman Ratio
	EFI	Milliman	
Basic	4.86%	4.85%	100%
COLA	0.81%	1.15%	70%
Cost Sharing	1.14%	1.14%	100%
Total	6.81%	7.14%	95%

As can be seen, there is a very close match on the basic portion of the member rate, but there is a material difference on the COLA portion. The difference is greatest at the younger entry ages and gradually disappears at the older entry ages. This difference can be seen in all but a few groups.

Funding

We reviewed the application of the funding method and find it is reasonable and that it meets generally accepted actuarial standards. Based on the system's funding methods and assumptions, we believe the employer contribution rates are appropriately calculated, although there is one area we recommend that EFI review for future valuations. A comparison of the funded ratios calculated by EFI and Milliman is shown in the chart below. Note that all match within less than 1%.

	Funded Ratio		Ratio EFI/Milliman
	EFI	Milliman	
County of Marin	74.2%	73.7%	100.7%
Novato FPD	77.8%	77.2%	100.8%
City of San Rafael	62.7%	62.5%	100.3%

Statement of Key Findings (continued)

Funding (continued)

A summary of contribution rates by employer as a percentage of payroll is shown in the following chart. A more detailed comparison of the contribution rates by each agency and tier is shown in Appendix A-2.

	Employer Contribution Rate		Ratio
	EFI	Milliman	EFI/Milliman
County of Marin	26.50%	26.68%	99.3%
Novato FPD	46.00%	46.01%	100.0%
City of San Rafael	54.16%	54.35%	99.7%

The employer contribution rates above are based on the member contribution rates calculated with the June 30, 2011 actuarial valuation. EFI provided us an estimate of the impact of implementing the revised member contribution rates on the aggregate employer contribution rate. EFI estimated that this change would result in a 0.18% decrease in the total employer rate. We verified that this was reasonable.

Actuarial Assumptions (Economic)

We reviewed the economic assumptions used in the valuation as studied in EFI's 2011 experience study report. We found them to be reasonable in total, although we do have some comments for consideration at the time of the next study in 2014. We have the following comments regarding the assumptions:

- We concur with EFI's opinion that there is approximately a 50% probability of MCERA achieving the current assumption of a 7.50% return, given an inflation assumption of 3.25%.
- We agree with EFI's recommendation that the inflation assumption be lowered, and the Board did make a change based on that recommendation. We also agree with EFI's statement on page 6 of the experience study report that a large, immediate change in the assumptions is usually not advisable. Finally, we agree with EFI's conclusion that if, at the time of the 2014 experience study, markets and forecasters continue to indicate lower expectations for future inflation, further reductions could be considered. We do think that a somewhat larger adjustment to the inflation assumption could have been made in 2011 and should be considered for the future if the low inflation environment continues.
- We believe that EFI's approach to reflect a 0.25% reduction for underperformance (see pages 7 and 8 of the experience study report), based on partial recognition of historical underperformance, is reasonable, although we typically take a somewhat different approach.

Statement of Key Findings (continued)

Actuarial Assumptions (Economic) (continued)

- While EFI's recommendation that there will be no real wage growth has its merits, it is not the approach we typically recommend.

Actuarial Assumptions (Demographic)

We reviewed the analysis and recommendations for the Actuarial experience study for July 1, 2008 through June 30, 2011. Based on this review, we believe the demographic assumptions used in the valuation are reasonable.

Valuation Report

Overall, we found EFI's reports to be clear and complete, particularly given the volume of numbers required in an actuarial valuation report. We felt that the amount of disclosure included in the report was commensurate with the complexity of MCERA.

Other Items to Consider in the Future

There are a few areas that we comment on in this report where MCERA and EFI may wish to consider a change in the future. We have provided references to the section of the report where more detailed information can be found.

Recommended Changes

We recommend that EFI and MCERA implement the following changes in future valuations:

- ✓ Adopt revised member contribution rates (Section 5).
- ✓ Revise calculation of liabilities for the active member death benefit to reflect the lump sum death benefit (pages 14-15)

Considerations for the Future

We recommend that EFI and MCERA consider the following for future valuations and experience studies:

- ✓ Modifying the calculation of the Unfunded Actuarial Accrued Liability (UAAL) amortization rate to assume a level active population in all future years (page 23).
- ✓ Lowering the inflation assumption. If this is done, the impact of the change on other correlated assumptions should be considered (pages 29-31).
- ✓ Using separate disabled mortality assumption for Safety and Miscellaneous members (page 40).
- ✓ Adding additional disclosures in the valuation report (Section 9).

Section 2 Membership Data

Audit Conclusion

We performed tests on both the raw data supplied by MCERA staff and the processed data used by EFI in the valuation. Based on this review, we feel the individual member data used is appropriate and complete.

Comments

Overall, the data process appears to be thorough and accurate. We would add the following comments:

- Raw Data: We were provided with the same data that was given by MCERA staff to EFI for use in the actuarial valuation.

  Completeness: The data contained all the necessary fields to perform the actuarial valuation.

  Quality: Although we did not audit the data at the source, we performed some independent checks to confirm the overall reasonableness of the data. We compared the total retiree and beneficiary benefit amounts on the MCERA data with the actual benefit payments made, as reported in MCERA's asset statements. We also compared the total active member compensation on the MCERA data with the estimated active payroll for the prior year. The estimated payroll was based on the actual employer and member contribution amounts divided by the applicable rates for the prior year. Based on this analysis, we found the data to be reasonable.

- Parallel Data Processing: We performed independent edits on the raw data and then compared our results with the valuation data used by EFI. We found our results to be very consistent.

  Our results did not match exactly; however, this is understandable since EFI, as the retained actuary, has more extensive data editing procedures. Overall, each data key component matched within an acceptable level, and we believe the individual member data used by EFI was appropriate for valuation purposes.

Comments (continued)

A summary of the data in aggregate is shown in Exhibit 2-1. The "Milliman" column reflects the MCERA data after adjustments by Milliman. The "EFI" column reflects the actual data used in EFI's valuation.

In addition to the total statistics, we reviewed individual data and summaries by plan and groups. In our opinion, there was a very close match between the data provided by MCERA and the valuation data used by EFI.

Exhibit 2-1
Member Statistics as of June 30, 2011

	EFI	Milliman	Ratio EFI/Milliman
Active Members			
Total Number	2,546	2,546	100.0%
Average Age	47.8	47.8	100.0%
Average Service	11.3	11.3	100.0%
Average Compensation	$ 86,735	$ 86,431	100.4%
Retirees and Survivors			
Number of Members in Payment			
Service Retired	1,842	1,844	99.9%
Disability Retired	353	353	100.0%
Beneficiaries	350	351	99.7%
Total Number	2,545	2,548	99.9%
Average Age	69.1	69.1	100.0%
Average Monthly Benefit	$ 3,024	$ 3,020	100.1%
Vested Terminated Members			
Total Number	582	583	99.8%
Average Age	48.4	48.5	100.0%

Section 3 Actuarial Value of Assets

Audit Conclusion

We have reviewed the calculation of the actuarial value of assets used in the June 30, 2011 valuation. We found the calculations to be reasonable and the methodology to be appropriate and in compliance with actuarial standards of practice.

Comments

The method used to determine the gross actuarial value of assets smoothes investment gains and losses by reflecting 20% of the difference between the market value and the expected market value over the most recent five years. It should be noted that half of the loss for the market value of assets for fiscal year 2009 were recognized immediately in the calculation of the actuarial value of assets, but then amortized as a separate base.

MCERA maintains separate reserves for the County of Marin, the Novato Fire Protection District and City of San Rafael plans, as well as a Contingency reserve and a 401(h) account managed for the City of San Rafael, used to pay retiree medical benefits. The Contingency reserve as of June 30, 2011 was almost precisely 1% of the market value of assets at that time.

The valuation assets used in the funding calculations are derived by subtracting the Contingency reserve from the smoothed value of assets and then allocating assets to the County, Novato and San Rafael plans and the 401(h) in proportion to the reserves maintained for those plans by MCERA.

As of this valuation, the actuarial value of assets is slightly lower than the market value of assets due to unrecognized gains over the past five years.

We reviewed the calculation of the actuarial value of assets and found it to be reasonable. Our calculation resulted in an actuarial value of assets equal to 99.97% of the value calculated by EFI. Our calculations for the expected investment returns precisely matched EFI's calculations for the past three years, while there was a small discrepancy in the calculations in the year before that. It appears that EFI used a different methodology that year than in the subsequent years, which resulted in a slightly different expected return. We did not attempt to replicate this methodology as any difference would not be material.

Comments (continued)

In order to develop the recommended employer contribution rates, the actuarial value of assets within each plan (County, Novato, and San Rafael) must be broken into smaller groups as described on page 58 of the 2011 actuarial valuation report.

The process for dividing the assets into the smaller groups varies from plan to plan. For Novato, the assets are divided between Miscellaneous and Safety, based on the Actuarial Accrued Liability. San Rafael and the County are divided in proportion to a projection of the assets allocated in the prior year. The projection is done with interest and expected contributions for the group during the year. For San Rafael, the projection also reflects expected benefit payments.

We were able to very closely match the asset allocation calculations performed by EFI.

One other item to note is that it is our understanding that the Courts made an extra contribution of $1 million at the end of the fiscal year, while the Mosquito Abatement District made an extra contribution of $500,000. The actuarial value of assets calculation on page 51 of the 2011 actuarial valuation report is based on an assumption that contributions were made uniformly throughout the year. EFI made an adjustment to reflect the extra contributions when allocating the actuarial value of assets to groups.

To us, it would have been more intuitive to exclude the extra contributions from column (a) on page 51 of the actuarial valuation report, apply the process for the asset allocations, and then add the appropriate amounts for the districts that made the extra contributions. The results would have been different by less than 0.01% due to the assumed timing for the contributions in the expected return calculation in column (c) on page 51. We believe that EFI's approach is appropriate, but wanted to mention how our approach would be different.

As discussed above, MCERA uses an asset smoothing method to reduce volatility. The five-year smoothing method is the most commonly used among large public retirement systems. We believe the use of an asset smoothing method is appropriate, and we generally recommend this to our clients, particularly in systems where contribution rates change annually. We also believe a five-year period is reasonable.

Comments (continued)

When a smoothing method is applied, the actuarial value of assets will deviate from the market value of assets. Many public retirement systems apply a corridor; that is, the actuarial value of assets is not allowed to deviate from the market value by more than a certain percentage. The purpose of a corridor is to keep the actuarial value of assets within a reasonable range of the market value.

The current asset method does apply a corridor limiting the actuarial valuation of assets to be within 20% percent of the market value. If the actuarial value of assets calculated in accordance with the smoothing technique exceeds 120% of the market value of assets, the actuarial value of assets is set equal to 120% of the market value of assets. A similar adjustment is made if the calculated assets are lower than 80% of the market value of assets.

The California Actuary Advisory Panel (CAAP) has drafted a paper on model actuarial funding policies which include guidelines for asset smoothing. MCERA's method of five-year smoothing with a 20% corridor falls in the "Model Practices" category (the highest level) under these guidelines.

Section 4 Actuarial Liabilities

Audit Conclusion

We independently calculated the normal cost and liabilities of MCERA. We found that all significant benefit provisions were accounted for in an accurate manner (with one minor exception), the actuarial assumptions and methods are being applied correctly, and that our total liabilities matched those calculated by EFI closely.

Comments

We independently calculated the liabilities for all members based on the following:

Data: We used the same data used by EFI in their valuation. As discussed in Section 2, we confirmed that this data was consistent with the data provided by MCERA staff.

Assumptions: We used the assumptions disclosed in the June 30, 2011 actuarial valuation report. This information was provided to us electronically by EFI. We confirmed the assumptions were consistent with those adopted based on the recent experience study report.

Methods: We used the actuarial methods disclosed in the June 30, 2011 actuarial valuation report. This was supplemented by discussions between EFI and Milliman on the technical application of these methods.

Benefits: We obtained this information from the MCERA website and the relevant law.

We then performed a full replication of EFI's valuation as of June 30, 2011. Based on this valuation, we completed a detailed comparison of the actuarial accrued liability (AAL) computed in our independent valuation and the amounts reported by EFI.

Comments (continued)

Exhibit 4-1 shows a summary of this analysis for each member type. The results for each group were reasonable, and our calculated AAL values match closely with those reported in the valuation.

Exhibit 4-1
Actuarial Accrued Liability by Member Type
(Dollar Amounts in Millions)

	EFI	Milliman	Ratio EFI/Milliman
Retiree	$ 1,166.5	$ 1,163.5	100.3%
Inactive	77.3	74.6	103.6%
Active	741.4	758.8	97.7%
Total AAL	**$ 1,985.2**	**$ 1,996.9**	**99.4%**

Appendix A-1 shows the total (accrued and future) present value of benefits (PVB) for current active members by employer, with a further breakdown by benefit type. Similar to the AAL, our calculated PVB was close to EFI's in total; however, there was some difference on the death benefit as noted below. A summary of the total present value of benefits for active members is shown in the following chart:

Exhibit 4-2
Active Present Value of Benefits by Benefit Type
(Dollar Amounts in Millions)

	EFI	Milliman	Ratio EFI/Milliman
Service Retirement	$ 1,005.6	$ 1,004.7	100.1%
Vested Term & Refund	37.6	35.6	105.5%
Disability	85.8	83.9	102.3%
Death from Active Status	12.5	14.9	83.8%
Total Active PVB	**$ 1,141.5**	**$ 1,139.1**	**100.2%**

Note that there will always be differences in the calculated liabilities when different software is used by different actuaries; however, the results should not deviate significantly.

The one area where we observed a relatively large difference was in the death benefit. EFI's calculation was 16% less than ours. Based on a discussion with EFI, it was determined that for deaths of unmarried members in active status with five or more years of service, EFI was not including the lump-sum death benefit, which consists of a refund of member contributions with interest plus six months of salary.

Comments (continued)

When looking at only the death benefit, there is a material difference; however, the overall impact on the valuation is not material, since the active death benefit comprises such a small percentage of MCERA's total liabilities. We recommend that EFI include the lump-sum portion of the active death benefit in future valuations.

Even after factoring in the issue with the active death benefit, the overall level of consistency we found in this audit provides a high level of assurance that the results of the valuation accurately reflect the aggregate liabilities of MCERA based on the assumptions and methods.

Exhibit 4-3 shows a breakdown of the Actuarial Accrued Liability by employer. The results for each employer were reasonable, and our calculated AAL values match closely with those reported in the valuation.

Exhibit 4-3
Actuarial Accrued Liability by Employer
(Dollar Amounts in Millions)

	EFI	Milliman	Ratio EFI/Milliman
County of Marin	$ 1,436.0	$ 1,444.9	99.4%
Novato FPD	136.3	137.4	99.2%
City of San Rafael	412.7	414.6	99.5%
Total AAL	**$ 1,985.1**	**$ 1,996.9**	**99.4%**

In addition to reviewing the liabilities in total, we also received selected results from a number of individuals included in the valuation. We were able to match closely on these individuals.

There is a technical issue with the timing of the benefit payments. In a valuation, the actuary first projects the future benefit payments for the retiree members based on the data and assumptions. The actuary then places a value on each future benefit expected to be paid based on the investment return assumption. A dollar paid in the future is less than a dollar paid today due to the time value of money.

In EFI's calculations, they are effectively treating the benefit payments as being paid on the first of the month. Our understanding is that MCERA's benefit payments are made at the end of the month. We adjusted our valuation to be consistent with EFI's approach so this did not cause any differences. If we had not made this adjustment, our numbers would have been slightly lower (about ½%). Although we think that using our method (payments at the end of the month) is more technically precise, we believe EFI's method is reasonable.

Comments (continued)

We also looked at the normal cost rate (the allocated cost of benefits earned during the year). In the many audits we have performed, this is usually the area where we see the greatest differences. Although there were some differences, the overall match was close and deviation by employer fell within an acceptable level.

Based on these results, we feel that EFI's calculated normal cost rate is reasonable.

Exhibit 4-4
Comparison of Normal Cost Rate
(Expressed as a Percentage of Payroll)

	EFI	Milliman	Ratio EFI/Milliman
County of Marin (including Courts and Special Districts)			
Total Normal Cost	21.03%	20.82%	101.0%
Member	10.09%	10.15%	99.4%
Employer Normal Cost	10.94%	10.67%	102.5%
Novato Fire Protection District			
Total Normal Cost	36.37%	35.40%	102.7%
Member	13.34%	13.35%	99.9%
Employer Normal Cost	23.03%	22.05%	104.4%
City of San Rafael			
Total Normal Cost	28.05%	27.73%	101.2%
Member	11.46%	11.49%	99.7%
Employer Normal Cost	16.59%	16.24%	102.2%
Totals			
Total Normal Cost	22.72%	22.46%	101.2%
Member	10.43%	10.48%	99.5%
Employer Normal Cost	12.29%	11.98%	102.6%

Section 5 Member Contribution Rates

Audit Conclusion

We reviewed the current member contribution rates. We found that the base member rates were determined in an accurate manner. We identified an issue with the calculation of the COLA portion of the member rates that understated that portion of the contribution. EFI revised their calculations based on our comments and sent us revised COLA rates. The revised member rates are consistent with our calculations.

Comments

Member contributions are of two types: basic contributions and cost-of-living contributions. Basic contributions for each member class are defined in the County Employees Retirement Law as follows:

Plan	'37 Act Reference	Formula
General Plans		
LAFCO 7, Marin City CSD, and Tamalpais CSD	31621.1	1/120 of FAS at 55
South Marin Fire Misc and San Rafael Tier C	31621.8	1/100 of FAS at 55
All other General	31621	1/120 of FAS at 60
Safety Plans	31639.25	1/100 of FAS at 50

Note that for groups with the benefit formulas based on a final average salary period equal to one year, the final period for the determination of member contribution rates is also equal to one year. For groups using a three-year period for benefits, it is also used for the determination of member contribution rates.

Basic member contributions are determined using the Entry Age Normal Actuarial Cost Method and the following actuarial assumptions:

- ✓ Expected rate of return on assets
- ✓ Individual salary increase rate (wage growth + merit)
- ✓ Mortality for members after service retirement
- ✓ The COLA is not included (for basic member rate)
- ✓ Pre-retirement decrements are excluded (i.e., 100% probability of reaching assumed retirement age)

The determination of the member cost-of-living contributions is based on Section 31873 of the County Employees Retirement Law. This section requires that the cost of this benefit be shared equally between members and the employer. As mentioned on page 128 of the 2011 actuarial valuation report, a cap on employee COLA contribution rates is applied to some members and some County Safety members are paying additional employee contributions as a result of bargaining agreements.

Comments (continued)

For the basic portion of the member contribution rates, we found our results to be consistent with EFI's. We identified an issue in the calculation of the COLA portion that primarily affected member rates at younger entry ages. EFI subsequently sent us revised member rates.

Member contribution rates for sample ages are shown in the following exhibit. Note that we have shown the member rates reported in EFI's June 30, 2011 valuation. The revised rates EFI provided to us are shown on the following page.

Exhibit 5-1
Sample Member Contribution Rates[(1)]

Plan	Member Contribution Rate (Basic + COLA) EFI	Milliman	EFI / Milliman Ratio
General Plans			
County & Courts Misc. Tier 3, 3A & 4			
Entry Age 25	6.81%	7.14%	95%
Entry Age 35	7.91%	8.08%	98%
Entry Age 45	9.48%	9.47%	100%
San Rafael Misc.			
Entry Age 25	8.52%	8.94%	95%
Entry Age 35	10.67%	10.90%	98%
Entry Age 45	13.08%	13.25%	99%
Safety Plans			
County Tier 2			
Entry Age 25	13.59%	14.05%	97%
Entry Age 35	15.74%	16.09%	98%
Entry Age 45	17.79%	17.78%	100%
County Tier 2B with 2.6% Additional Cost Sharing			
Entry Age 25	16.38%	16.92%	97%
Entry Age 35	18.68%	18.73%	100%
Entry Age 45	20.39%	20.38%	100%

(1) Rates shown are before any employer pick-up.

Comments (continued)

An example of the issue with the COLA portion of the member contribution rates is shown below for a County and Courts Miscellaneous Tier 3 member with an entry age of 25.

Component	Member Rate		EFI / Milliman Ratio
	EFI	Milliman	
Basic	4.86%	4.85%	100%
COLA	0.81%	1.15%	70%
Cost Sharing	1.14%	1.14%	100%
Total	6.81%	7.14%	95%

As can be seen, there is a very close match on the basic portion of the member rate, but there is a material difference on the COLA portion. The difference is greatest at the younger entry ages and gradually disappears at the older entry ages. This difference can be seen in all but a few groups.

Comments (continued)

As shown in the following exhibit, we have a very good match on the revised rates provided by EFI.

Exhibit 5-2
Sample Member Contribution Rates – Revised[(1)]

Plan	Revised Member Contribution Rates (Basic + COLA) EFI	Milliman	EFI / Milliman Ratio
General Plans			
County & Courts Misc. Tier 3, 3A & 4			
Entry Age 25	7.18%	7.14%	101%
Entry Age 35	8.09%	8.08%	100%
Entry Age 45	9.48%	9.47%	100%
San Rafael Misc.			
Entry Age 25	9.02%	8.94%	101%
Entry Age 35	10.90%	10.90%	100%
Entry Age 45	13.07%	13.25%	99%
Safety Plans			
County Tier 2			
Entry Age 25	13.97%	14.05%	99%
Entry Age 35	15.87%	16.09%	99%
Entry Age 45	17.79%	17.78%	100%
County Tier 2B with 2.6% Additional Cost Sharing			
Entry Age 25	16.89%	16.92%	100%
Entry Age 35	18.74%	18.73%	100%
Entry Age 45	20.39%	20.38%	100%

(1) Rates shown are before any employer pick-up.

Section 6 Funding

Audit Conclusion

We reviewed the application of the funding method and find it is reasonable and that it meets generally accepted actuarial standards. Based on the system's funding methods and assumptions, we believe the employer contribution rates are appropriately calculated, although there is one area we recommend that EFI review for future valuations.

Comments

We independently calculated the employer contribution rates based on our parallel valuation. We found that all rates were reasonable and matched closely to EFI's calculation in total. A summary comparison of our results is shown below. Note that an analysis by agency and tier is shown in Appendix A-2.

Total Employer Contribution Rates

Exhibit 6-1
Comparison of Combined Employer Contribution Rate
(as a Percentage of Payroll)

	EFI	Milliman	Ratio EFI/Milliman
County of Marin			
Employer Normal Cost Rate	10.94%	10.67%	102.5%
UAAL Rate	15.56%	16.01%	97.2%
Total Employer Contribution	26.50%	26.68%	99.3%
Novato FPD			
Employer Normal Cost Rate	23.03%	22.05%	104.4%
UAAL Rate	22.98%	23.96%	95.9%
Total Employer Contribution	46.01%	46.01%	100.0%
City of San Rafael			
Employer Normal Cost Rate	16.59%	16.24%	102.2%
UAAL Rate	37.56%	38.11%	98.6%
Total Employer Contribution	54.15%	54.35%	99.6%
Total			
Employer Normal Cost Rate	12.29%	11.98%	102.6%
UAAL Rate	19.11%	19.59%	97.5%
Total Employer Contribution	31.40%	31.57%	99.5%

Contribution Adequacy

The Government Accounting Standards Board (GASB) provides general guidelines on the appropriate annual pension cost for financial reporting purposes. The Annual Required Contribution (ARC) of the employer is based on certain minimum requirements and is measured on the basis of an actuarially sound funding methodology. These requirements for determining a system's ARC are generally the same as those used for funding purposes. Thus, the GASB requirements are often used as a benchmark for determining funding adequacy for a retirement system.

In general, the guidelines are based on the expectation that each system receives contributions equal to the normal cost plus a payment to amortize either the UAAL or any surplus amount. Under GASB and the CERL, the payment on a positive UAAL amount should be at least equal to a 30-year amortization payment (i.e., equivalent to an amortization period of 30 years or less). We generally recommend a shorter period, consistent with MCERA's current practice.

It should be noted that GASB recently adopted Statements No. 67 and No. 68 dealing with accounting disclosure for public retirement systems; however, these new statements are not effective for the June 30, 2011 valuation and associated reporting. Under the new standards, accounting and funding are explicitly separated. Therefore, it is unlikely that the funding of MCERA, nor virtually any retirement system, will match the expense calculation in its accounting disclosures in the future.

MCERA is funding the UAAL over an open 17-year period, with the exception of the asset for the fiscal year ended in 2009, which is amortized over a closed 30-year period (28 years remaining as of the June 30, 2011 valuation). As long as there is a positive UAAL being amortized over the 17-year period, this approach will always exceed the generally accepted minimum requirements for the ARC under current GASB standards. We believe it is a reasonable approach for use by MCERA.

There are a number of pros and cons to using an open amortization. The most significant advantage of this approach is that it will generally provide the most stable contribution rates in the long term. The downside of this approach is that if all assumptions are met, the UAAL will not be paid off over any period of time (since the system is effectively refinancing every year).

Contribution Adequacy (continued)

Reviewing the CAAP's current draft paper regarding model actuarial funding policies, it appears that MCERA's current amortization period falls under the "Non-Recommended Practices." Under the draft guidelines, MCERA's current funding is "non-recommended" because the separate amortization of the 2008-09 asset loss is over a period greater than 25 years. As the amortization period for the loss decreases, the current funding method is expected to move into one of the "Acceptable" categories.

It should be noted the CAAP guidelines are just recommendations for California public plans and not requirements for MCERA.

We would note that it is possible, albeit unlikely, for a calculated contribution rate under this method to be less than a 30-year amortization of the aggregate UAAL, which is the minimum required under the '37 Act. This comparison should be done every year to make sure that the contribution rate meets this requirement.

Additional Comments on the UAAL Amortization

There are two nuances to the method EFI uses to calculate the UAAL amortization rate that we believe are worth mentioning. We recommend that these methods be disclosed in the valuation report, particularly the first one, since it is not common among public sector actuaries.

1. Payroll

For purposes of calculating the recommended employer contribution rates, in the year following the valuation date, EFI assumes a closed group. That is, it is assumed that no new members are hired in that year. In all successive years, it is assumed there is a stable active population (i.e., any member leaving the system is replaced by a new member, such that the payroll for active members increases at 3.75% per year). Our standard method is to assume a stable active population in all years.

EFI's approach will result in a slightly higher calculated rate than our standard method in the valuation year. If all assumptions are exactly met in future years, our method will result in no change in future UAAL contribution rates; whereas, EFI's method will result in small decreases. Note that, given recent trends in payroll (increases less than the actuarial assumption or even decreases in payroll), EFI's method has probably worked well over the last few years.

Additional Comments on the UAAL Amortization (continued)

2. Contribution Lag

There is another area where EFI uses a slightly different method in the calculation of the UAAL amortization payment than we generally do. We believe that our method is more technically consistent with actual practice, although we feel EFI's approach is reasonable.

The June 30, 2011 valuation sets the recommended contribution rates effective July 1, 2013. EFI does not account for this one-year lag in the implementation of the contribution rates. In our valuation work, we generally make an adjustment to account for this lag in contributions; however, based on our experience, both approaches are common among actuaries working with public sector retirement systems.

One thing MCERA should be aware of is that in periods of rising contribution rates, the current approach will cause an actuarial loss in the following year. In EFI's calculation of the employer contribution rate, they are effectively assuming that the increased contribution rates calculated in the 2011 valuation will be implemented on July 1, 2011; however, in practice the new rates will not go into effect until July 1, 2012. EFI's approach will result in a slightly lower calculated rate than our standard method in the valuation year. All else being equal, this will cause a slight rise in the next year's contribution rate (assuming contribution rates are increasing). Conversely, in periods of declining contribution rates, an actuarial gain on contribution rates would be expected.

Actuarial Cost Method

MCERA uses the Entry Age Actuarial Cost Method. We agree that it is appropriate for valuing the costs and liabilities of MCERA and is the cost method that we usually recommend.

Purpose of a Cost Method: The purpose of any cost method is to allocate the cost of future benefits to specific time periods. Most public plans follow one of a group of generally accepted funding methods, which allocate the cost over the members' working years. In this way, benefits are financed during the time in which services are provided.

Actuarial Cost Method (continued)

Most Common Public Plan Cost Method (Entry Age): The most common cost method used by public plans is the Entry Age Actuarial Cost Method. The focus of the Entry Age Cost Method is the level allocation of costs over the member's working lifetime. For a public plan, if all assumptions are met, this method requires that current taxpayers pay for the pensions of the public employees who are currently providing services. Current taxpayers are not expected to pay for services received by a past generation, nor are they expected to pay for the services that will be received by a future generation. The cost method does not anticipate increases or decreases in allocated costs.

The 2011 Public Fund Survey shows that approximately 70% of the retirement systems surveyed are using the Entry Age Cost Method. We believe that the use of this cost method satisfies the requirement of CERL 31453.5.

Actuarial Cost Method: MCERA uses a modified version of the individual Entry Age Cost Method. Our general preference is to use the individual method, and we do not believe the modification EFI makes should materially differ from the traditional method. It should be noted that under the new GASB statements the individual method will be required for disclosure purposes, although this does not apply to funding. EFI should confirm that their modification to the individual cost method conforms with the new GASB statements when they become applicable.

GASB Reporting

We reviewed the items shown in Sections 4.2, 4.3 and 4.4 in the June 30, 2011 valuation report. Based on our review of the valuation, we believe the valuation performed for funding purposes meets the guidelines for financial reporting specified by GASB.

Section 7 Actuarial Assumptions (Economic)

Audit Conclusion

We reviewed the economic assumptions used in the valuation as studied in EFI's 2011 experience study report. We found them to be reasonable in total, although we do have some comments for consideration at the time of the next study in 2014. We have the following comments regarding the assumptions:

- We concur with EFI's opinion that there is approximately a 50% probability of MCERA achieving the current assumption of a 7.50% return, given an inflation assumption of 3.25%.
- We agree with EFI's recommendation that the inflation assumption be lowered and the Board did make a change based on that recommendation. We also agree with EFI's statement on page 6 of the experience study report that a large, immediate change in the assumptions is usually not advisable. Finally, we agree with EFI's conclusion that if, at the time of the 2014 experience study, markets and forecasters continue to indicate lower expectations for future inflation, further reductions could be considered. We do think that a somewhat larger adjustment to the inflation assumption could have been made in 2011 and should be considered for the future if the low inflation environment continues.
- We believe that EFI's approach to reflect a 0.25% reduction for underperformance (see pages 7 and 8 of the experience study report), based on partial recognition of historical underperformance, is reasonable, although we typically take a somewhat different approach.
- While EFI's recommendation that there will be no real wage growth has its merits, it is not the approach we typically recommend.

Comments

The purpose of the actuarial valuation is to analyze the resources needed to meet the current and future obligations of the system. To provide the best estimate of the long-term funded status of the system, the actuarial valuation must be predicated on methods and assumptions that will estimate the future obligations of the system in a reasonably accurate manner.

An actuarial valuation uses various methods and two different types of assumptions: economic and demographic. Economic assumptions are related to the general economy and its long-term impact on the system, or to the operation of the system itself. Demographic assumptions are based on the emergence of the specific experience of the system's members.

Actuarial Standard of Practice No. 27: Selection of Economic Assumptions

The Actuarial Standards Board has adopted Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. This standard provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefit plans, such as MCERA. Note that a revision to the Standard is currently pending.

As no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data.

The Standard explicitly advises the actuary not to give undue weight to recent experience.

Recognizing that there is not one "right answer," the Standard calls for the actuary to develop a best-estimate range for each economic assumption, and then recommend a specific point within that range. Each economic assumption should individually satisfy this Standard.

After completing the selection process, the actuary should review the set of economic assumptions for consistency. This may require the actuary to use the same inflation component in each of the economic assumptions selected.

An actuary's best-estimate range with respect to a particular measurement of pension obligations may change from time to time due to changing conditions or emerging plan experiences. Even if assumptions are not changed, we believe that the actuary should be satisfied that each of the economic assumptions selected for a particular measurement complies with Actuarial Standard of Practice No. 27, unless that assumption has been prescribed by someone with the authority to do so.

Economic Assumptions

Based on the information and economic environment present as of the date of EFI's analysis, we believe the economic assumptions used by EFI in the June 30, 2011 actuarial valuation are reasonable. Our analysis suggests very similar expected real rates of return to what EFI's analysis provided. In our opinion, while the inflation assumption was lowered, it could have been lowered further. A lower inflation assumption with the same real rate of return would suggest a lower investment return assumption should be considered.

While we find EFI's analysis regarding real growth in pay to be reasonable, we typically recommend some modest real wage growth. We discuss this issue in more detail later in this section of our report.

With respect to any particular valuation, each economic assumption should be consistent with every other economic assumption over the measurement period. The economic assumptions are much more subjective in nature than the demographic assumptions. The current economic assumptions are as follows:

Assumption	Rate
Price Inflation	3.25%
Real Investment Return	4.25%
Total Investment Return	7.50%
Price Inflation	3.25%
Real Wage Growth (Productivity)	0.00%
Total Wage Growth	3.25%
Payroll Growth	3.25%

The Board should be aware that the liabilities and normal cost are directly impacted by these important assumptions. The most critical assumption in determining the present value of benefits is the total investment return assumption.

In our opinion, the current package of economic assumptions is reasonable. Since economic assumptions are subjective in nature, it is our recommendation that the Board be fully comfortable with the implications of the assumptions. There is an "actuarial risk" associated with the economic assumptions, just as there is an investment risk associated with a given portfolio mix.

The following portion of this report discusses three of the key economic assumptions: inflation, wage growth and investment return.

Inflation

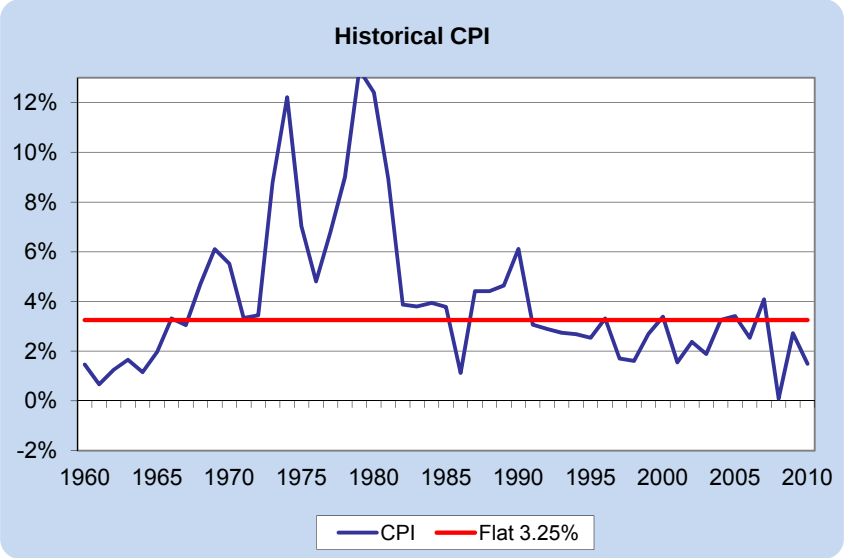
Use in the Valuation: Inflation as referred to here means price inflation. The inflation assumption has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage increases, the payroll increase assumption, and the cost-of-living adjustments for retirees and survivors.

There is expected to be a long-term relationship between inflation and the investment return assumption. The basic principle is that the investors demand a "real return" – the excess of actual investment returns over inflation. If inflation rates are expected to be high, investors will demand expected investment returns that are also expected to be high enough to exceed inflation, while lower inflation rates will result in lower demanded expected investment returns, at least in the long run.

Historical Perspective: The data for inflation shown following is based on the national Consumer Price Index, U.S. City Average, All Urban Consumers (CPI-U) as published by the Bureau of Labor Statistics.

We agree with EFI that "historical trends are not entirely indicative of the future," but also agree that those trends can serve as a useful guide.

The following graph shows historical national CPI increases. As noted in the EFI experience study, there have been periods of high inflation, particularly 1973-1981. The past two decades have seen modest inflation. One reason for caution for making a radical, long-term adjustment to the inflation assumption could be the fact that we have had sustained periods of high inflation.



Inflation (continued)

Forecasts of Inflation: Since the U.S. Treasury started issuing inflation indexed bonds (Treasury Inflation-Protected Securities or TIPS), it is possible to determine the approximate rate of inflation anticipated by the financial markets over the next 30 years by comparing the yields on inflation-indexed bonds with traditional fixed government bonds.

The chart on the top right of page 5 of EFI's experience study report displayed the implied inflation yields for different horizons in September and October 2011. Implied inflation for long horizons has actually increased slightly since the time of EFI's analysis.

As noted by EFI, most investment consultants and economists forecast inflation significantly lower than the current assumption of 3.25%. As indicated on page 6 of EFI's report, those projections are based on 10-year horizons. To consider a longer time frame more appropriate for a pension valuation, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the 2011 Trustees report, the ultimate annual increase in the CPI was estimated to be 2.8%, under the intermediate cost assumptions. The lower cost assumption used a forecast of 1.8% and the high cost assumption used a forecast of 3.8%.

Peer System Comparison: Although we do not believe that assumptions should be set based on what other systems are doing, it is informative to see how MCERA compares.

Assumptions for peer systems vary considerably, although they do tend to be higher than current forecasts by investment professionals and economists. There is also a definite downward trend in the inflation assumptions. The current assumption is about average among other systems, albeit slightly on the high side.

CalPERS recently decreased its assumption from 3.00% to 2.75%. CalSTRS lowered its inflation assumption to 3.00% in 2010.

Inflation (continued)

Reasonable (Best Estimate) Range: We believe that a range for inflation between 2.0% and 3.5% is reasonable for an actuarial valuation of a retirement system. Inflation has averaged about 2.5% over the past 20 years and financial markets indicate expectations of 2.5% or less for the future. However, a longer view of history does provide some reason for using an assumption above 2.5%.

We agree with EFI's recommendation to lower the inflation assumption. We also agree with EFI that large, immediate changes in the long-term assumptions are not advisable. Given these facts, we believe that the Board could have considered a slightly larger reduction (perhaps down to 3.0%), but that the current assumption is reasonable.

On page 6 of its report, EFI concludes that, "if markets and forecasters continue to indicate lower expectations for future inflation, further reductions in the assumptions could be considered." We agree, although under the scenario that low expectations continue, we believe that not only *could* further reductions be considered, they *should* be considered.

Consumer Price Inflation	
Current Assumption	3.25%
Best-Estimate Range	2.0% - 3.5%

Investment Return

Use in the Valuation: The investment return assumption is one of the primary determinants in the calculation of the expected cost of the System's benefits, providing a discount of the future benefit payments reflecting the time value of money. The current net investment return assumption of 7.50% per year includes two components: 1) inflation of 3.25%, and 2) a net real rate of return equal to 4.25%. This approach of dividing the net return into separate pieces is called the "building block" method.

The discount rate is the rate used to discount future benefit payments into an actuarial present value. The traditional actuarial approach used in the public sector sets the discount rate equal to the expected investment return. Under current standards set by the GASB, the terms "discount rate" and "investment return assumption" are used interchangeably and that rate "should be based on an estimated long-term investment yield on the investments that are expected to be used to finance the payment of benefits, with consideration given to the nature and mix of current and expected plan investments."[1]

[1] Governmental Accounting Standards Board (GASB) Statement No. 27, paragraph 10.c, and GASB Statement No. 45, paragraph 13.c.

Investment Return (continued)

It should be noted that GASB has recently revised the accounting and financial reporting for pension plans. While GASB has made many fundamental changes, the discount rate will still be based on the "long-term expected rate of return," provided that the system is not expected to be depleted of assets. Further, GASB's provisions only apply to accounting and are not intended to impact a system's funding.

Method to Determine Best-Estimate Range for Investment Return: The following chart sets out the target asset allocation found in EFI's experience study.

Asset Class	Target Asset Allocation
Domestic Equity	33%
Global Equity	21%
Domestic Fixed Income	26%
Real Estate	12%
Private Equity	8%
Total Portfolio	100%

Note that we assumed that "Global Equity" does not include equities in the United States. We further assumed that weighting to developed markets and emerging markets is similar to the market capitalization for those types of markets.

Milliman studied the expected returns based upon the target asset allocation, the expected real rates of returns used by Milliman's investment consultants, and an assumption of annual rebalancing of the portfolio. After making the same adjustments of 0.22% for administrative expenses and 0.25% for expected underperformance, our results were very similar to the results of EFI's simulations based on Callan's assumptions.

EFI reviewed the MCERA's non-investment expenses based on historical amounts. EFI found that non-investment expenses in recent years averaged 0.22% per year. Note that they studied the period from 2005 through 2010. The average would have been a bit higher using 2006 through 2011. The expenses are similar to what we see with similar systems and seem like a reasonable expectation for future non-investment expenses.

When studying investment expenses, EFI notes the common assumption that actively managed investments earn enough "alpha" to cover additional investment fees. Over the long run, it is reasonable to assume that investors will only pay active management fees if their active managers outperform their passive benchmarks by at least the difference between their active fee and the comparable fee for an index fund. Otherwise, the investor has the option to use an index fund.

Investment Return (continued)

Based on this, we think it is reasonable to assume that long-term average returns net of active investment management fees can be approximated by returns on indexed investments net of their fees. In other words, the investment expenses associated with passive investing could be deducted from the expected returns for the benchmark index. Based on MCERA's target asset allocation, we believe that fees associated with passive investment would be approximately 0.15% of assets.

EFI considered the historical plan returns after investment expenses and compared those returns to the benchmark returns. EFI found a pattern of underperformance and recommended that the real return be lowered to reflect this. Based on guidance from ASOP 27, EFI recommended partial recognition of this underperformance and a reduction of 0.25%.

We found EFI's analysis of underperformance and non-investment expenses to be reasonable and have made a similar 0.47% adjustment to our expected return. We also added 3.25% to the real returns based on the current assumption for inflation.

Using properties of the lognormal distribution, we calculated the long-term total return distributions.

Expected Return with 3.25% Inflation and Milliman's Capital Market Assumptions
(Net of 0.47% deduction for underperformance and non-investment expenses)

Horizon	Percentile Results for Nominal Rate of Return				
In Years	5th	25th	50th	75th	95th
1	-11.64%	-0.78%	7.55%	16.57%	30.89%
5	-1.50%	3.74%	7.55%	11.49%	17.42%
10	1.07%	**4.84%**	**7.55%**	**10.32%**	14.44%
20	2.93%	5.63%	7.55%	9.50%	12.38%
30	3.76%	5.98%	7.55%	9.14%	11.48%

Note that for EFI's 10-year simulations, the 25th, 50th (median) and 75th percentile results were 4.92%, 7.51% and 10.07%. As you can see, those results are very similar to the results highlighted in the chart above. This implies that EFI's model with Callan's investment assumptions produce results very similar to those produced by Milliman's model with the capital market assumptions from Milliman's investment consultants.

Note also that the range of compounded returns narrows as the time horizon is increased.

Investment Return (continued)

Peer System Comparison: We do not believe that assumptions should be set based on what other systems are doing. Different systems have different target asset allocations and use differing assumption for capital markets and inflation. However, if a system significantly differs from its peers, it is important to know why.

It should be noted that many systems have lowered the assumption recently and many more are considering it. According to the National Conference on Public Employee Retirement Systems 2011 Public Fund Study, the average investment assumption for responding funds was 7.7%. Approximately 23% of responding funds had reduced the assumption in the past two years, and an additional 15% had plans in place to reduce it in the next two years.

Conclusion: MCERA is currently using an investment return assumption of 7.50% based on EFI's recommendation, based on the inflation assumption of 3.25% and a real return of 4.25%. Our analysis implies that the 4.25% assumption for real returns is reasonable. As mentioned above, we believe that a lower inflation assumption could have been considered and believe that the inflation assumption should be carefully monitored in the future.

General Wage Growth

Use in the Valuation: Estimates of future salaries are based on two types of assumptions: 1) rates of increase in the general wage level of the membership and 2) individual salary increases due to longevity and promotion. This section will address the general wage growth assumption (price inflation plus real pay growth in excess of inflation). The longevity and promotion assumptions are discussed in Section 8.

The current wage growth assumption is for no real wage growth above the inflation rate, or 3.25% per year.

The wages being projecting are those to be paid to MCERA members. In theory, future general wage increases will be decided more by the experience in the nation as a whole than the experience in Marin County. Economic developments (such as the rates of inflation) are not going to be slowed or accelerated to any significant degree because of Marin County experience.

General Wage Growth (continued)

Over the very long term, we do not expect the wage growth for MCERA to be significantly different than that of the nation as a whole, although they will vary due to short-term fluctuation. The need to attract and retain employees should prevent MCERA from providing wage increases much lower than national averages, while budgetary pressures will likely make it difficult for MCERA wages to increase much more rapidly than national averages over the very long term.

Historical Perspective: As acknowledged by EFI on page 9 of the experience study, the US as a whole has witnessed annual real wage growth of approximately 0.7% over the past 40 years. Taking an even longer view of history provides even higher actual real wage growth.

Forecasts of Future Wages: EFI also acknowledges the projections used by the Office of the Chief Actuary of the Social Security Administration in its Trustees report. We feel that this is a good source, because the Social Security Administration has a long time horizon similar to what is appropriate for a pension valuation.

EFI's Case for Zero Real Wage Growth

EFI points to the fact that other areas of compensation, including health care costs and pension contributions, are likely to increase faster than general inflation. This appears likely to be true in the short term, but is not so clear in the long term.

Although pension contributions are currently rising, pension reform could decrease contributions as a percentage of total compensation. Since the time of EFI's report, the passage of AB 340 (PEPRA) has already lowered the long term expected employer costs for pensions.

While most forecasters expect health care inflation to continue to exceed price inflation over the long term, the share of health care costs provided by the employer is likely to continue to decline.

EFI also points out that any long term assumption of salary growth beyond inflation carries with it an assumed improvement in the relative standard of living. This is true, but history and the Social Security administration suggest that the relative standard of living can be expected to improve in the future.

The current assumption of no real wage growth does not match what we typically recommend, although it may be reasonable based on the explanation provided by EFI and the increases for longevity and promotion pay assumed.

Longevity and Promotion Pay Increases

While longevity and promotion pay increases are typically studied separately and we will discuss them in the next section of this report, it should be noted that the benefit projections depend upon these assumptions in addition to the assumption for real wage growth.

EFI has recommended longevity and promotion assumptions that are on the high end of what we typically see, particularly for Safety employees with long service. This may somewhat offset the effect of assuming no real wage growth. In addition, the lack of real wage growth decreases the projected payroll over the UAAL amortization period, which serves to increase the recommended employer contribution rates if all else is equal.

Conclusion

Based on our judgment, we believe that a range between 0.25% and 1.25% is our best estimate for the real wage inflation assumption. We believe that wages will continue to increase at a rate greater than price inflation. The current assumption of no real wage growth does not match what we typically recommend, although it may be reasonable based on the explanation provided by EFI and the increases for longevity and promotion pay assumed.

Real Wage Inflation	
Current Assumption	0.00%
Best Estimate Range	0.25% - 1.25%

Payroll Increase Assumption

The UAAL is amortized as a level percentage of payroll in determining contribution rates as a percentage of pay. The current payroll increase assumption is equal to the general wage growth assumption of 3.25%. It is our general recommendation to set these two assumptions equal, unless there is a specific circumstance that would call for an alternative assumption. Therefore, we agree with this assumption.

Cost-of-Living Adjustments (COLAs)

Every April, retirees and survivors receive cost-of-living adjustments (COLAs) equal to the CPI increases, but capped at 2%, 3%, or 4% based on agency and tier. Because there is "COLA Bank" for years in which the CPI increases by more than the maximum, actual increases will likely sometimes exceed CPI increases.

EFI recommended COLA growth of 1.9%, 2.7%, and 3.0% for those with maximums of 2%, 3%, or 4%, respectively. Those recommendations were based on simulations EFI performed, which reflected the cap, COLA Bank, inflation expectations, and volatility in inflation.

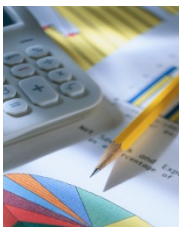
Cost-of-Living Adjustments (COLAs) (continued)

Due to the caps and the COLA Banks, it is typical in the public sector to assume COLA growth equal to the lower of the cap and the CPI assumption. That approach is somewhat conservative as demonstrated in EFI's simulations.

We believe that EFI's recommendations are reasonable.

Section 8 Actuarial Assumptions (Demographic)

Audit Conclusion



We reviewed the analysis and recommendations for the Actuarial experience study for July 1, 2008 through June 30, 2011. Based on this review, we believe the demographic assumptions used in the valuation are reasonable.

Comments

Studies of demographic experience involve a detailed comparison of actual and expected experience. If the actual experience differs significantly from the overall expected results, or if the actual pattern does not follow the expected pattern, new assumptions are considered. Recommended revisions normally are not an exact representation of the experience during the observation period. Judgment is required to predict future experience from past trends and current evidence, including a determination of the amount of weight to assign to the most recent experience.

Actuarial Standard of Practice No. 35: Selection of Demographic Assumptions

Actuarial Standard of Practice No. 35 (ASOP 35) governs the selection of demographic and other noneconomic assumptions for measuring pension obligations. ASOP 35 states that the actuary should use professional judgment to estimate possible future outcomes based on past experience and future expectations, and select assumptions based upon application of that professional judgment. The actuary should select reasonable demographic assumptions in light of the particular characteristics of the defined benefit plan that is the subject of the measurement. A reasonable assumption is one that is expected to appropriately model the contingency being measured and is not anticipated to produce significant cumulative actuarial gains or losses over the measurement period.

Actual-to-Expected Ratio

In performing an experience study, an actuary will compare the actual results of the study with those the assumptions would have predicted. This comparison is called the Actual-to-Expected (A/E) ratio. If, for example, the A/E ratio for service retirement is 120%, this would indicate that the actual number of service retirements exceeded the number expected by the assumptions by 20%.

Post-Retirement Mortality – Healthy Retirement

We reviewed the section of the Actuarial Experience Study regarding mortality. Based on the results they reported, we believe that the current assumptions for mortality are reasonable.

The overall A/E ratio was 118.2% for members retired for service and surviving spouses in EFI's study. Therefore, there were more deaths than the prior assumptions would have predicted (i.e., retirees were not living as long as the assumptions predicted). This is a positive result from the perspective of funding a pension plan and provides some margin.

We believe retaining the current mortality assumptions is reasonable and provides an appropriate margin between actual and expected. We like to see a margin in these rates for the following two reasons:

- **Margin for Anticipated Improvements in Mortality:** It is generally accepted that life expectancies will continue to increase, and it is prudent to either have a "margin" in the rates used (i.e., predict fewer deaths in the future than actually occurred in the past). Alternatively, the actuary could project future mortality improvements directly through the use of a generational table, which uses higher life expectancies for people born in later years.
- **Differences by Benefit Amount:** Our analysis typically confirms EFI's conclusion that members with larger benefits tend to have lower mortality rates. This means that although the current assumptions may be underestimating the number of deaths, they may not underestimate the release of liability expected when retirees die, which is what impacts the valuation. Based on our analysis with other systems, an adjustment of 5% to 10% in the actual-to-expected ratio is needed to account for this.

Many actuaries like to see a 10% margin to account for anticipated improvements in mortality. We like to see a slightly higher margin due to the differences in benefit amount discussed above. We feel that the 18.2% margin from EFI's recommendation is appropriate.

Post-Retirement Mortality – Disabled Retirement

We performed a similar review of mortality for disabled retirees. EFI's A/E ratio was very low, indicating that the assumptions may overstate the likelihood of death for this group. Admittedly, the sample size is very small for this group, but such a low ratio may be cause to consider a change in assumption. The set forward currently applied to the ages of disabled members may not be required.

Mortality for disabled retirees is one assumption in which we usually see a significant difference between Safety and Miscellaneous members. In the retirement systems we have studied, we have observed that disabled Safety members typically have much lower mortality than Miscellaneous members. Given the small sample sizes of these groups, it may be difficult to identify statistically significant differences based on MCERA's data alone, but we believe the difference in disabled mortality between Safety and Miscellaneous members is established enough that consideration should be given to separate assumptions.

Longevity and Promotion Salary Increases

We reviewed the individual salary increase assumptions due to merit (longevity and promotion). These increases are in addition to the assumed increases due to general wage inflation. For MCERA, general wage growth is assumed to equal CPI, as there is an assumption of no real wage growth.

We looked at the magnitude of the increases and EFI's recommendations. EFI recommended 0.50% merit increases (in addition to general wage inflation) for all General members with five or more years of service. This is in line with what we have seen with other systems for General members.

For Safety members, the merit increases are assumed to be 1.25% for those with more than four years of service. This is higher than we typically see. However, we have observed that Safety members in some of the systems we have studied tend to get larger increases later in their careers than General members. The assumed rates were significantly increased from the prior study for Safety members with more than ten years of service.

As mentioned in the previous section of our report, having merit assumptions that are somewhat high will somewhat offset the effect of assuming no real wage growth.

In total, we believe that the recommended assumptions for longevity and promotion are reasonable and consistent with the data studied.

Rates of Service Retirement

We reviewed the rates of service retirement. The current assumption varies by membership class (General vs. Safety) and age. We agree that these factors are the most significant in projecting retirement rates. While retirements by sex were studied, the recommended rates do not vary by sex.

Higher retirement rates are assumed for those with more than 30 years of service. Higher retirement rates for longer service are consistent with what we have observed in other retirement systems.

Higher retirement rates are also assumed for those receiving benefits under 31664.1 (3% @ 50) than those under 31664.2 (3% @ 55). For ages 50-54, this matches our observations with other systems and makes intuitive sense, as the richer benefit formula allows more people to be able to afford retirement.

It is not clear to us why the 3% @ 50 group has higher retirement rates at ages 55 and beyond. The benefit formulas are precisely the same at those ages. If anything, we might expect a spike in retirements for the 3% @ 55 group when those members newly obtain the ultimate retirement age factor at age 55.

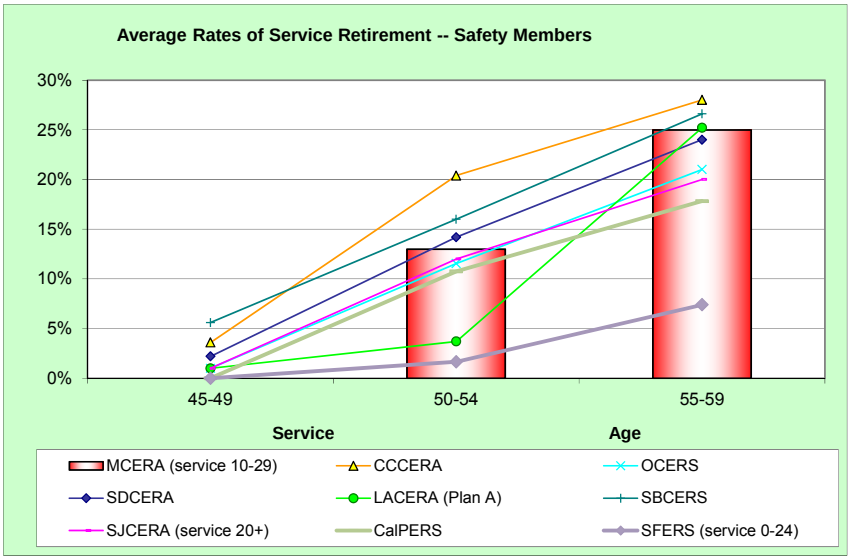
We also compared MCERA's service retirement rates with those from other California retirement systems and found them to be consistent with the assumptions used in those other systems. The graphs on the following page show MCERA's rates (red bars) along with several other California retirement systems.

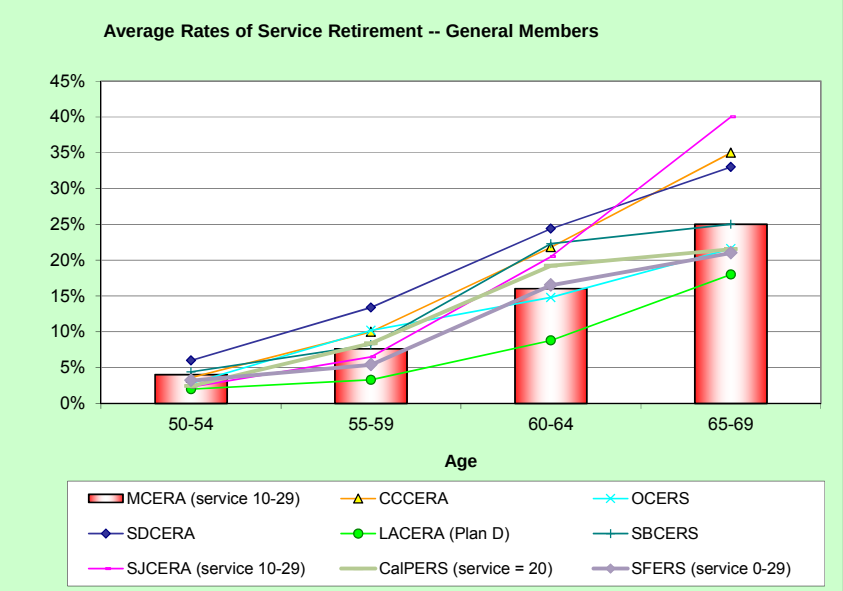
Rates of Service Retirement (continued)

Separate graphs are shown for Safety and General members.

Overall, we believe that the service retirement rates are reasonable.

The Safety chart is for the 3% @ 50 formula.





Rates of Disability Retirement

We reviewed the rates of disability retirement. The current assumptions vary by membership class (General and Safety) and increase with age. Service connected and non-service connected disability assumptions are studied separately. We believe this methodology is sound.

The sample size is small for this assumption. EFI's recommendation to lower the assumed rates for General members and duty disability rates for Safety is aligned with actual experience. We believe that EFI's results and recommended assumptions are reasonable.

Rates of Termination (Withdrawal and Vested Termination)

We reviewed the rates of termination. The current assumption varies by membership class, age, and length of service. We agree that these factors are the most significant in projecting termination rates.

EFI also studied the experience by sex and found that the termination rates were similar, so EFI did not make separate recommendations on the basis of sex.

EFI uses an assumption that 40% of those terminating with less than five years of service will take refunds and 25% of those with more than five years of service will do the same.

EFI uses an assumption that no terminations take place after 20 years of service or after eligibility for service retirement. We agree that such terminations are rare and that this is an appropriate assumption.

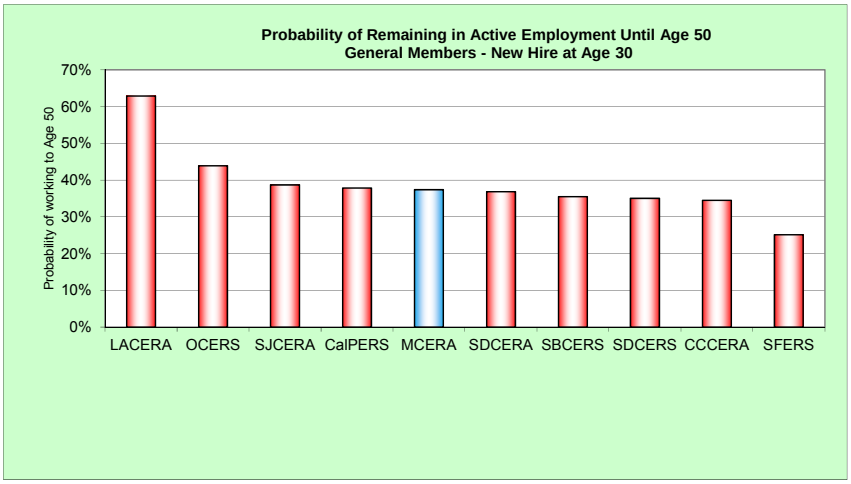
The proposed rates are aligned with actual experience. We believe that EFI's results and the recommended assumptions are reasonable.

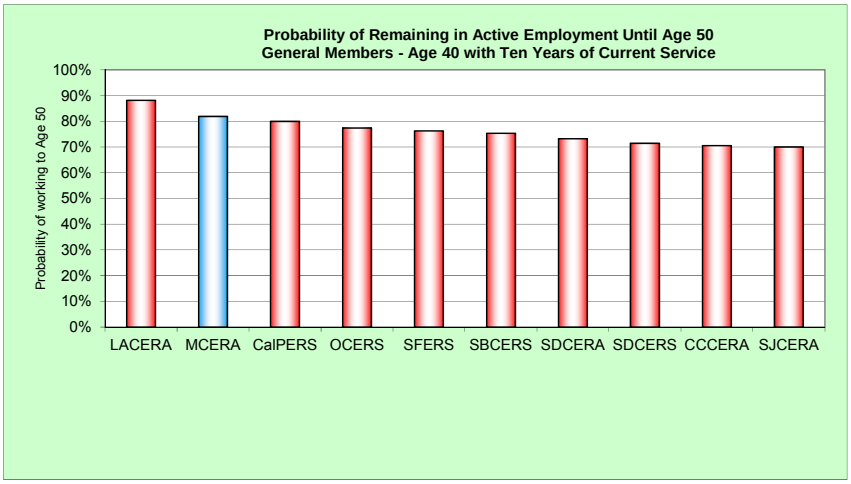
Additionally, we compared MCERA's termination rates for General members with those from other California retirement systems and found them to be relatively consistent. Because some systems base this assumption on service only, some by age only, and some by a combination of age and service, comparing among systems can pose some issues. To best compare, we used two sample members, both hired at age 30. For one of the sample members, we assumed no current service and for the other, we assumed 10 years of current service. For both, we compared the probability of remaining employed to age 50 (first eligibility for service retirement).

Rates of Termination (Withdrawal and Vested Termination) (continued)

The graphs below show the probability based on MCERA's assumptions (blue bar) along with several other California retirement systems.

In regards to termination assumptions, MCERA appears to near the average of its peers for the new hire. After 10 years of service, the probability of remaining employed until service retirement eligibility is a bit higher than the average, but is within the range. Note that the termination rates shown are the combined withdrawal and vested termination rates for each system.





Other Assumptions

We reviewed the remaining assumptions and have the following comments:

- ✓ **Terminal Pay and Service Load:** A member's pensionable compensation may be increased for some pay elements not included in the regular valuation data. Also, it appears that some groups have the opportunity to convert unused sick leave into service credit at retirement. The valuation includes an assumption to account for the impact of increased compensation and service on pension benefits.

  Separate assumptions are made for different groups. While data is sparse for small groups, there is reason to believe that the load should be higher for some groups and the assumptions reflect that.

  The recommendation to maintain the previous assumption appears reasonable and we agree that it should be considered and monitored in the future.

- ✓ **Family Composition:** EFI uses an assumption that 80% of males and 50% of females are married (or have an eligible domestic partner) at the time of retirement. This is a significant assumption due to the increased value of the unmodified benefit for those with eligible survivors. EFI also assumes that husbands are three years older than their wives.

  These assumptions are similar to what we have found for other California retirement systems. We believe that it is a reasonable assumption. We did not see any comments in the experience study about these assumptions.

Section 9 Valuation

Audit Conclusion

Overall, we found EFI's reports to be clear and complete, particularly given the volume of numbers required in an actuarial valuation report. We felt that the amount of disclosure included in the report was commensurate with the complexity of MCERA.

Comments

As previously noted, we felt EFI's valuation report was an appropriate actuarial communication. In particular, we compliment EFI on the inclusion of projected changes in future employer contribution rates and funded ratios. The following discussion mentions a few items that we believe that EFI should consider disclosing (or changing their current disclosure) in the future. None of these items would impact the results of the valuation.

We reviewed the report for consistency with the basic model disclosure elements recommended by the California Actuary Advisory Panel. The EFI report met all of these criteria with two minor exceptions:

- EFI did not disclose the UAAL based on the Market Value of Assets.
- EFI did not disclose the Liability Volatility.

We had a few minor comments on EFI's report that we recommend they consider incorporating in future reports.

- Add disclosure on method for determining UAAL contribution rate (e.g., declining payroll in first year and no reflection of contribution lag).
- On page 29 of the valuation report, EFI references retirement eligibility at 10 years of "credited" service. We believe this should reference "membership" service.
- On page 34 of the valuation report, we believe the death benefit amount is not completely accurate. Specifically, we believe the service connected death benefit is equal to the greater of the member's service retirement benefit and 50% of the member's final compensation. In the second paragraph, we believe "survivor benefit" should be replaced with "non-service connected disability benefit."

Comments (continued)

In addition we noted what appear to be some minor discrepancies in the report:

- In the 2008 line for column (g) on page 51 of the 2011 actuarial valuation report, the unrecognized dollars should read $4***5***,1***8***7,597 instead of $4***8***,1***5***7,597.
- The top line on page 53 belongs on page 52.
- On page 54, the compounded 15-year average for CPI is 2.8% while the 5-year average is 2.2%. These numbers are reversed on page 54.
- In the first paragraph on page 128, the reference to CERL section 31**3**21.8 should be 31**6**21.8.
- In the second paragraph on page 128, it should be mentioned that the mortality tables used are projected from 2000 to 2010 using Scale AA
- The member contribution rates for LAFCO 7, Marin City CSD, and Tamalpais CSD (page 137) decline for entry ages later than age 54. It is our understanding that the Basic member contribution rates for these members are based on assumed retirement at age 55. For all other groups, the rates are flat for entry ages beyond the assumed retirement ages. It is not clear to us how the rates are developed for entry ages 55 and beyond on page 137.

Appendix A Supporting Exhibits

Appendix A-1

Comparison of Present Value of Benefits by Agency and Tier

Tier	EFI	Milliman	EFI / Milliman
County of Marin (including Courts and Special Districts)			
County Misc Tier 1	$ 44,680,000	$ 44,350,000	99.3%
County Misc Tier 2	25,120,000	24,870,000	99.0%
County Misc Tier 3	433,790,000	433,260,000	99.9%
County Misc Tier 4	15,180,000	14,910,000	98.2%
County Safety Tier 1	2,370,000	2,360,000	99.6%
County Safety Tier 1A	3,000,000	2,990,000	99.7%
County Safety Tier 2	46,050,000	46,780,000	101.6%
County Safety Tier 2B	206,480,000	206,460,000	100.0%
Courts Tier 1	4,280,000	4,270,000	99.8%
Courts Tier 2	2,760,000	2,790,000	101.1%
Courts Tier 3	30,620,000	30,620,000	100.0%
Courts Tier 4	380,000	370,000	97.4%
South Marin Fire Misc	580,000	570,000	98.3%
South Marin Fire Safety Tier 1	18,370,000	18,260,000	99.4%
South Marin Fire Safety Tier 2	4,720,000	4,640,000	98.3%
Mosquito Abatement	14,150,000	14,090,000	99.6%
LAFCO Tier 3	170,000	170,000	100.0%
LAFCO Tier 7	510,000	520,000	102.0%
Tamalpais CSD	3,160,000	3,120,000	98.7%
Marin City CSD	980,000	960,000	98.0%
Employer Total	$ 857,350,000	$ 856,360,000	99.9%
Novato Fire Protection District			
Novato Misc	$ 2,920,000	$ 2,870,000	98.3%
Novato Safety Tier 1	70,810,000	70,000,000	98.9%
Novato Safety Tier 2	3,250,000	3,230,000	99.4%
Employer Total	$ 76,980,000	$ 76,100,000	98.9%
City of San Rafael			
San Rafael Misc	92,540,000	92,860,000	100.3%
San Rafel Fire	61,170,000	60,810,000	99.4%
San Rafel Safety (Police)	53,400,000	52,980,000	99.2%
Employer Total	$ 207,110,000	$ 206,650,000	99.8%

Appendix A-2

Comparison of Employer Contribution Rates by Agency and Tier

(as a Percentage of Payroll)

Tier	EFI	Milliman	EFI / Milliman
County of Marin (including Courts and Special Districts)			
County Misc Tier 1	30.45%	29.29%	103.9%
County Misc Tier 2	24.65%	24.40%	101.0%
County Misc Tier 3	23.28%	23.44%	99.3%
County Misc Tier 4	23.24%	23.62%	98.4%
County Safety Tier 1	46.38%	46.90%	98.9%
County Safety Tier 1A	53.12%	52.19%	101.8%
County Safety Tier 2	36.58%	38.59%	94.8%
County Safety Tier 2B	35.75%	36.03%	99.2%
Courts Tier 1	25.49%	25.41%	100.3%
Courts Tier 2	24.01%	23.88%	100.5%
Courts Tier 3	21.93%	22.37%	98.0%
Courts Tier 4	22.56%	22.63%	99.7%
South Marin Fire Misc	18.84%	17.94%	105.0%
South Marin Fire Safety Tier 1	41.54%	41.30%	100.6%
South Marin Fire Safety Tier 2	37.23%	36.98%	100.7%
Mosquito Abatement	29.31%	28.70%	102.1%
LAFCO Tier 3	24.79%	25.03%	99.0%
LAFCO Tier 7	30.60%	31.10%	98.4%
Tamalpais CSD	26.99%	26.49%	101.9%
Marin City CSD	18.22%	19.16%	95.1%
Employer Total	26.50%	26.68%	99.3%
Novato Fire Protection District			
Novato Misc	20.23%	20.27%	99.8%
Novato Safety Tier 1	48.43%	48.67%	99.5%
Novato Safety Tier 2	46.28%	47.72%	97.0%
Employer Total	46.00%	46.01%	100.0%
City of San Rafael			
San Rafael Misc	44.13%	44.78%	98.5%
San Rafel Fire	66.64%	65.93%	101.1%
San Rafel Safety (Police)	65.83%	65.88%	99.9%
Employer Total	54.16%	54.35%	99.7%