Contra Costa County
Employees' Retirement Association

Actuarial Audit of

December 31, 2007 Valuation
and
2004-2006 Experience Study

Prepared by:

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November 11, 2008

Ms. Marilyn Leedom
Chief Executive Officer
Contra Costa County Employees' Retirement Association
1355 Willow Way Ste 221
Concord, CA 94520-5728

Re: Actuarial Audit Report

Dear Ms. Leedom:

The enclosed report presents the findings and comments resulting from a detailed review of the December 31, 2007 actuarial valuation and 2006 Experience Study performed by The Segal Group, Inc. (Segal) for the Contra Costa County Employees' Retirement Association (CCCERA). 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 CCCERA'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 4 of Segal's December 31, 2007 actuarial valuation report. As discussed in our report, we believe the package of actuarial assumptions and methods are reasonable (taking into account the experience of CCCERA 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 CCCERA'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.

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We would like to express our appreciation to both the Segal staff, in particular John Monroe, and the CCCERA staff for their assistance in supplying the data and information on which this report is based.

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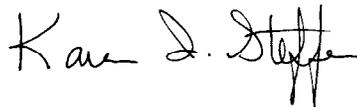
We respectfully submit the following report, and we look forward to discussing it with you.

Sincerely,

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

Karen I. Steffen, FSA, EA, MAAA
Consulting Actuary

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**Contra Costa County Employees' Retirement Association
Actuarial Audit of
December 31, 2007 Valuation and 2004-2006 Experience Study**

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Section 1   Summary of the Findings

Purpose and Scope of the Actuarial Audit

This actuarial audit reviews the December 31, 2007 actuarial valuation and the Experience Study for the period January 1, 2004 to December 31, 2006 performed by CCCERA's retained actuary, Segal. The purpose of this audit is to verify that the results of the valuation are accurate and that the assumptions the valuation is based upon are reasonable. The following tasks were performed in this audit:

- ✓ Evaluation of the data used in the valuation and Experience Study;
- ✓ Full independent replication of the Experience Study;
- ✓ Full independent replication of the key valuation results;
- ✓ Evaluation of assumptions used in the valuation; and
- ✓ Analysis of valuation results and reconciliation of material differences

Audit Conclusion

Experience Study

Based upon our review of the Experience Study for the period ended December 31, 2006, we found the package of recommended assumptions is reasonable and appropriate. We have some comments for Segal and CCCERA to consider in the future; however, these changes are based on minor differences of opinions, rather than differences of facts, and we are not proposing any changes be reflected in the current valuation.

Actuarial Valuation

Based upon our review of the December 31, 2007 actuarial valuation, we found the actuarial work performed by Segal was reasonable, appropriate, and accurate. The following table shows that our independent calculations are very close to those determined by Segal and should give the Board a high level of confidence that the results of the valuation are accurate based on the current assumptions.

	Segal	Milliman
Combined Employer Contribution Rate	27.67%	27.74%
Funded Percentage	89.9%	89.6%

We have made a few recommendations regarding the valuation; however, we do not consider any of these potential changes to be material to the overall results of the valuation.

Statement of Key Findings

Membership Data

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

	Segal	Milliman	Ratio Segal/Milliman
Active Members			
Total Number	9,421	9,416	100.1%
Average Service	10.2	10.3	99.0%
Average Compensation	$ 71,289	$ 71,097	100.3%
Retirees and Survivors			
Total Number	6,911	6,892	100.3%
Average Monthly Pension	$ 2,943	$ 2,949	99.8%

Actuarial Value of Assets

We have reviewed the calculation of the actuarial value of assets used in the December 31, 2007 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 CCCERA. We found that all significant benefit provisions were accounted for in an accurate manner, the actuarial assumptions and methods are being applied correctly, and that our total liabilities matched those calculated by Segal closely. A summary is shown in the chart below. Actuarial accrued liability is shown in millions.

	Segal	Milliman	Ratio Segal/Milliman
Actuarial Accrued Liability	$ 5,581.0	$ 5,596.8	99.7%
Employer Normal Cost*	20.36%	19.99%	101.8%

* Includes employer subvention.

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Statement of Key Findings
(continued)

Member Contribution Rates

We reviewed the current member contribution rates. We found that both the base and COLA rates were determined in an accurate manner.

The following chart compares the member contribution rates determined by Milliman with those calculated by Segal for a member entering at age 35. The rates shown are for monthly compensation in excess of $350.

Group	Age 35 Member Contribution Rate[1]		
	Segal	Milliman	Segal / Milliman
General			
Tier 1	11.02%	11.01%	100.1%
Tier 1 Enhanced	10.23%	9.93%	103.0%
Tier 3 Enhanced	9.52%	9.47%	100.5%
Safety			
Tier A	14.59%	14.62%	99.8%
Tier A Enhanced	17.09%	17.16%	99.6%
Tier C Enhanced	13.12%	13.06%	100.5%

[1] *Rates shown are for the monthly pay greater than $350 and exclude subvention.*

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.

There are a number of adjustments to account for prior pension obligation bonds that add to the complexity of the employer rate calculations. We have reviewed these adjustments and feel they are a reasonable approach to allocating costs by employer.

A summary of all employer rates combined is shown in the following chart. A comparison of the contribution rates by employer group is found in Section 6.

	Segal	Milliman	Ratio Segal/Milliman
Employer Normal Cost Rate	20.36%	19.99%	101.8%
UAAL Rate	7.31%	7.75%	94.4%
Total Employer Contribution	27.67%	27.74%	99.8%

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Statement of Key Findings
(continued)

Actuarial Assumptions (Economic)

We reviewed the economic assumptions used in the valuation and found them to be reasonable. The following should be noted regarding the investment return assumption:

- Our analysis did yield a slightly lower confidence level that the investment return assumption will be met than the 60% calculated by Segal, but it was still greater than half the time.
- The inflation assumption is on the high end of our best-estimate range. Since the inflation assumption is a component of the investment return assumption, it will tend to result in an expected investment return that is higher than it would be with a lower inflation assumption.
- Our analysis did not reflect any potential reduction in future investment earnings credited to the basic pension benefits due to the potential use of excess earnings to provide additional benefits.

Although assumptions should not be set based on what other systems are doing, it is informative to see how CCCERA compares. Looking at other selected '37 Act systems, CCCERA's current assumption or 7.8% is slightly on the low side, although the return assumptions are bunched tightly around 8.0%, so the difference is relatively small.

Investment Return Assumption

Statement of Key Findings (continued)

Actuarial Assumptions (Demographic)

We performed a full replication of the Experience Study. Based on this analysis, we reviewed the demographic assumptions used in the valuation and found them to be reasonable. We are making a few comments to consider for the next Experience Study. In particular, we recommend that the post-retirement mortality assumption be monitored closely in the future to make sure adequate margin is incorporated to reflect expected increases in life expectancies in the future.

A more detailed summary of our analysis is shown in Section 8. Based on our results we found our results to be consistent with Segal's. An example of this (the probability of retirement for all active members) is shown below.
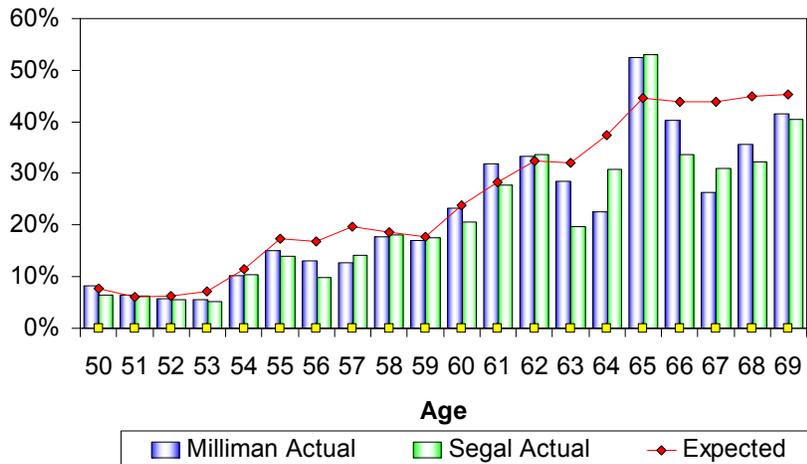
Valuation & Experience Study Reports

Overall, we found Segal's reports to be clear and complete. We have made a few comments for consideration where additional information could be included to enhance the understanding of an outside reader.

Recommendations

We are not recommending any changes be reflected in the December 31, 2007 valuation. There are a few changes that we are recommending CCCERA and Segal consider in the future.

- ✓ **Mortality Table [page 32]:** We recommend Segal continue to monitor the post-retirement mortality assumption, as the current assumption does not have very much margin for future increases in life expectancies.

- ✓ **Contribution Account for Current Non-Vested Members [page 11]:** We recommend Segal reflect the subvented member contributions in the value of the refund for these members. The impact of this is clearly not material (less than 0.01% on the total employer contribution rate).

- ✓ **Assumed Deferred Safety Member Retirement [page 37]:** We recommend Segal consider lowering the age at which deferred Safety members are assumed to retire from age 55 to age 50. We believe this better reflects actual experience.

- ✓ **Experience Study and Valuation Reports [page 38]:** We have suggested some minor changes to these reports. Each of these changes is for better disclosure and would have no impact on the valuation results if revised.

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Section 2   Membership Data

Audit Conclusion

We performed tests on both the raw data supplied by CCCERA staff and the processed data used by Segal in the valuation and the Experience Study. Based on this review, we feel the individual member data used in both projects 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 CCCERA staff to Segal for use in the actuarial valuation (and the preceding actuarial valuations for the Experience Study).

   ✓ **Completeness:** The data contained all the necessary fields to perform both the actuarial valuation and the Experience Study.

   ✓ **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 CCCERA data with the actual benefit payments made, as reported in CCCERA's asset statements. We also compared the total active member compensation on the CCCERA data with the estimated active payroll for the prior year. The estimated payroll was based on the actual employer and member contribution amounts divided the applicable rates for the prior year. Based on this analysis, we found the data to be reasonable.

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Comments
(continued)

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

Our results do not match exactly; however, this is understandable as Segal, 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 Segal was appropriate for valuation purposes.

A summary of the data in aggregate is shown in Exhibit 2-1. In all cases, we matched Segal's valuation data at a reasonable level.

The "Milliman" column reflects the CCCERA data after adjustments by Milliman. The "Segal" column reflects the actual data used in Segal's valuation.

Exhibit 2-1
Member Statistics as of December 31, 2007

	Segal	Milliman	Ratio Segal/Milliman
Active Members			
Total Number	9,421	9,416	100.1%
Average Age	45.6	45.6	100.0%
Average Service	10.2	10.3	99.0%
Average Projected Compensation	$ 71,289	$ 71,097	100.3%
Retirees and Survivors			
Total Number	6,911	6,892	100.3%
Average Age	69.0	68.9	100.1%
Average Monthly Pension[1]	$ 2,943	$ 2,949	99.8%
Vested Terminated Members			
Total Number	2,008	2,028	99.0%
Average Age	45.4	45.6	99.6%

[1] *Both Segal's and Milliman's numbers have been adjusted to reflect a 3/4 year increase due to the 2008 COLA, which is paid in 9 out of the next 12 months in the calendar year.*

Section 3   Actuarial Value of Assets

Audit Conclusion

We have reviewed the calculation of the actuarial value of assets used in the December 31, 2007 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 10% of the difference between the market-related value and the expected marked value over the most recent 10 six-month periods. This value is then adjusted to remove any non-valuation reserves which results in the valuation assets used in the funding calculations.

We reviewed the calculation of the actuarial value of assets and found it to be reasonable, and all adjustments were appropriate. The actual investment return was reduced by both the investment and administration expenses. As the assumed expenses for both are included in the development of the investment return assumption, this adjustment is proper.

As discussed above, CCCERA uses an asset smoothing method to reduce volatility. The method used is the most commonly used among the '37 Act Counties. It is roughly equivalent to five-year smoothing which is the most common 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.

When a smoothing method is applied, the actuarial value of assets will deviate from the market value of assets. Many 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 not have a corridor limiting the gross (i.e., before excluding the non-valuation reserves) actuarial valuation of assets to be within a certain percent of the gross market value (e.g., between 80% and 120% of gross market value). We would recommend CCCERA consider if the use of a corridor is appropriate for their situation.

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Section 4   Actuarial Liabilities

Audit Conclusion

We independently calculated the normal cost and liabilities of CCCERA. We found that all significant benefit provisions were accounted for in an accurate manner, the actuarial assumptions and methods are being applied correctly, and that our total liabilities matched those calculated by Segal closely.

Comments

We incorporated the following information into our valuation system:

- ✓ **Data** – We used the data provided by CCCERA. As discussed in Section 2, we confirmed that this data was consistent with the valuation data used by Segal.
- ✓ **Assumptions** – We used the assumptions disclosed in the December 31, 2007 actuarial valuation report. This information was provided to us electronically by Segal. 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 December 31, 2007 actuarial valuation report. This was supplemented by discussions between Segal and Milliman on the technical application of these methods.
- ✓ **Benefits** – We obtained this information from the CCCERA website and the relevant law.

We then performed a parallel valuation as of December 31, 2007. Based on this valuation, we completed a detailed comparison of the actuarial accrued liability (AAL) computed in our independent valuation and the amount reported by Segal. 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 very closely with those reported in the valuation.

Exhibit 4-1
Actuarial Accrued Liability by Member Type

(Dollar Amounts in Millions)

	Segal	Milliman	Ratio Segal/Milliman
Retiree	$ 3,070.7	$ 3,051.0	100.6%
Inactive	147.9	151.8	97.4%
Active	2,362.4	2,394.0	98.7%
Total AAL	**$ 5,581.0**	**$ 5,596.8**	**99.7%**

**Comments
(continued)**

Exhibit 4-2 shows the total (accrued and future) present value of benefits (PVB) for active members by benefit type. Similar to the AAL, our calculated PVB was close to Segal's in total. 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)

	Segal	Milliman	Ratio Segal/Milliman
Service Retirement	$ 2,933.2	$ 2,916.9	100.6%
Vested Term & Withdrawal	154.9	154.4	100.3%
Disability	311.6	310.1	100.5%
Death from Active Status	70.2	67.6	103.8%
Total Active PVB	**$ 3,469.9**	**$ 3,449.0**	**100.6%**

* Both Segal and Milliman values are reported prior to loads for terminal pay and sick leave.

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 level of consistency we found in this audit provides a high level of assurance that the results of the valuation accurately reflect the liabilities of CCCERA based on the assumptions and methods.

We found no material issues with the calculation of the liabilities. We did identify one small issue that caused some very minor differences between our results and Segal's results. For current non-vested terminated members, Segal assumes that they will elect a refund for valuation purposes, with the value being equal to the member's account. In their calculation of the member account, they did not include contributions made by the member to subvent employer contributions. This was clearly non-material to the valuation, with the total impact being less than $0.2 million.

Additionally, 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.

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Comments
(continued)

Segal is effectively treating benefit payments for a given month as being paid on the first of that month in its calculations. CCCERA's benefit payments are actually made at the beginning of the following month. For example, a member's payment for October is made in early November. Segal is treating the payment as being made October 1.

We adjusted our valuation to be consistent with Segal'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 usual method (payments at the end of the month) better reflects CCCERA's processes, we believe Segal's method is reasonable.

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 tier fell within an acceptable level. Analysis by tier can be found in Appendix A-1.

Based on these results, we feel that Segal is valuing all significant plan provisions in an accurate manner.

Exhibit 4-3
Comparison of Normal Cost Rate
(Expressed as a Percent of Payroll)

	Segal	Milliman	Ratio Segal/Milliman
Gross Normal Cost Rate			
Basic	20.19%	20.00%	100.9%
COLA	7.83%	7.58%	103.3%
Total	28.02%	27.58%	101.6%
Member Normal Cost Rate			
Basic	6.77%	6.62%	102.2%
COLA	3.85%	3.95%	97.5%
Total	10.62%	10.57%	100.5%
Employer Normal Cost Rate			
Basic	13.42%	13.38%	100.3%
COLA	3.98%	3.63%	109.6%
Total	17.40%	17.01%	102.3%

Section 5   Member Contribution Rates

Audit Conclusion

We reviewed the current member contribution rates. We found that both the base and COLA rates were determined in an accurate manner.

Comments

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

Tier	Basic Formula	Final Avg. Comp. Period
G1	1/100th of 1-Year FAC at age 55	1 Year
G1E	1/120th of 1-Year FAC at age 60	1 Year
G3	1/120th of 1-Year FAC at age 60	1 Year
SA	1/100th of 1-Year FAC at age 50	1 Year
SAE	1/100th of 1-Year FAC at age 50	1 Year
SCE	1/100th of 1-Year FAC at age 50	3 Years

FAC = Final Average Compensation

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

1. Expected rate of return on assets
2. Individual salary increase rate (wage growth + merit)
3. Mortality for members after service retirement

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.

For both the basic and COLA portions, we found our results to be consistent with Segal's. Member contribution rates for sample ages are shown in the following exhibit.

Exhibit 5-1
Sample Member Contribution Rates

	Entry Age	Milliman Calculated Rates over $350 per Month[1]			Segal (Total)	Segal / Milliman
		Basic	COLA	Total		
General Members						
Tier 1	25	6.30%	3.12%	9.42%	9.42%	100%
	35	7.36%	3.00%	11.01%	11.02%	100%
	45	8.75%	3.00%	13.09%	13.10%	100%
Tier 1 Enhanced	25	5.48%	3.04%	8.52%	8.75%	103%
	35	6.39%	3.00%	9.93%	10.23%	103%
	45	7.51%	3.00%	11.67%	12.02%	103%
Tier 3 Enhanced	25	5.48%	2.64%	8.12%	8.13%	100%
	35	6.39%	3.00%	9.47%	9.52%	101%
	45	7.51%	3.00%	11.13%	11.18%	100%
Safety Members						
Safety A	25	8.41%	4.13%	12.54%	12.49%	100%
	35	9.81%	3.00%	14.62%	14.59%	100%
	45	11.86%	3.00%	17.68%	17.61%	100%
Safety A Enhanced	25	8.41%	6.30%	14.71%	14.64%	100%
	35	9.81%	3.00%	17.16%	17.09%	100%
	45	11.86%	3.00%	20.75%	20.64%	99%
Safety C Enhanced	25	8.01%	3.18%	11.19%	11.24%	100%
	35	9.35%	3.00%	13.06%	13.12%	100%
	45	10.88%	3.00%	15.20%	15.31%	101%

(1) Does not reflect subvention.

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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.

There are a number of adjustments to account for prior pension obligation bonds that adds to the complexity of the employer rate calculations. We have reviewed these adjustments and feel they are a reasonable approach to allocating cost by employer.

Comments

Total Employer Contribution Rates

We independently calculated the aggregate employer contribution rates based on our parallel valuation. We found that all rates were reasonable and matched Segal's calculations very closely in total. A summary comparison of our results is shown below.

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

	Segal	Milliman	Ratio Segal/Milliman
Employer Normal Cost Rate	20.36%	19.99%	101.8%
UAAL Rate	7.31%	7.75%	94.4%
Total Employer Contribution	27.67%	27.74%	99.8%

Individual Employer Contribution Rates

Additionally, we reviewed the employer contribution rates for each individual employer and found them to be reasonable.

Our only recommended change is to clarify which rates apply to the Superior Court employees. In 2005, the Superior Court became a separate employer; previously it had been part of the County. The contribution rates that apply to the Superior Court employees are the same as those that apply to the County. There is no indication of this in the valuation report. We recommend that a comment or footnote be added to the valuation report to make this clear.

Exhibit 6-2
Comparison of Employer Contribution Rates

(as a Percentage of Payroll)

	Segal	Milliman	Ratio Segal/Milliman
General Non-Enhanced	32.38%	29.53%	109.6%
General Enhanced			
Tier 1 (County)	24.81%	24.34%	101.9%
Tier 1 (District No POB)	32.75%	33.49%	97.8%
Tier 1 (CCCFPD)	16.96%	18.07%	93.8%
Tier 1 (Moraga)	19.05%	19.71%	96.6%
Tier 3 (County)	23.00%	22.81%	100.9%
Tier 3 (District No POB)	31.44%	32.46%	96.9%
Safety Non-Enhanced	34.38%	34.61%	99.3%
Safety Enhanced			
Tier A (County)	43.81%	43.38%	101.0%
Tier A (District NO POB)	59.74%	59.86%	99.8%
Tier A (CCCFPD)	27.38%	26.31%	104.1%
Tier A (Moraga)	28.02%	28.19%	99.4%
Tier C (County)	34.76%	34.50%	100.7%
Grand Total	**27.67%**	**27.74%**	**99.8%**

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 expect each system to receive contributions equal to the normal cost plus a payment to amortize either the UAAL or any surplus amount. Under GASB, the payment on a positive UAAL amount should be at least equal to a 30-year amortization payment. We generally recommend a shorter period, consistent with CCCERA's current practice.

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Contribution Adequacy (continued)

CCCERA is funding the UAAL over a closed (i.e., declining) 15-year period as of the December 31, 2007 valuation. This approach exceeds the generally accepted minimum requirements for the ARC, and we believe it is appropriate for use by CCCERA.

We would note that as the amortization period declines, gains and losses will be recognized over a shorter period of time. This will likely lead to significant contribution rate volatility in the future; therefore the current approach may need to be reviewed at some point in the near future.

Actuarial Cost Method

CCCERA uses the Entry Age Actuarial Cost Method. We agree that it is appropriate for valuing the costs and liabilities of CCCERA, 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.

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 this means current taxpayers pay their fair share of 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 2007 Public Fund Survey shows that about 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.

GASB Reporting

We reviewed the items shown in Exhibits I, II, & III of Section 4 in the December 31, 2007 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.

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Section 7   Actuarial Assumptions (Economic)

Audit Conclusion

We reviewed the economic assumptions used in the valuation and found them to be reasonable. The following should be noted regarding the investment return assumption:

- Our analysis did yield a slightly lower confidence level that the investment return assumption will be met than the 60% level calculated by Segal, but it was still greater than half the time.

- The inflation assumption is on the high end of our best-estimate range. Since the inflation assumption is a component of the investment return assumption, it will tend to result in an investment return assumption that is higher than it would be with a lower inflation assumption.

- Our analysis did not reflect any potential reduction in future investment earnings credited to the basic pension benefits due to excess earnings.

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 CCCERA.

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.

However, 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. However, if a change occurs in one assumption, the actuary needs to consider if the change would modify other economic assumptions as well.

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. The actuary may change assumptions frequently in certain situations, even if the best-estimate range has not changed materially, and less frequently in other situations. 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 Segal's analysis, we believe the economic assumptions used by Segal in the December 31, 2007 actuarial valuation are reasonable. In our opinion, the inflation assumption is on the high end of the best-estimate range and the investment return assumption is just below the best estimate (based on the inflation assumption).

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	3.75%
Real Investment Return	4.05%
Total Investment Return	7.80%
Price Inflation	3.75%
Real Wage Growth (Productivity)	0.50%
Total Wage Growth	4.25%
Payroll Growth	4.25%

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. We would describe them as "middle-of-the-road." 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 the same as there is an investment risk associated with a given portfolio mix.

Assumptions do not directly affect the actual long-term cost of a plan. The ultimate cost will emerge in accordance with the benefits and expenses that are actually paid. 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 and the payroll increase assumption. It does not have a direct impact on the valuation results unless it directly impacts the assumed COLA paid, which it does for CCCERA in cases where the maximum COLA is 4.00%.

The long-term relationship between inflation and investment return has long been recognized by economists. 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 below is based on the national Consumer Price Index, US City Average, All Urban Consumers (CPI-U) as published by the Bureau of Labor Statistics.

Although economic activities in general and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and long term trends are a factor to be considered in developing the inflation assumption.

There are numerous ways to review historical data, with significantly differing results. The tables below show the compounded annual inflation rate for various 10-year periods, and for longer periods ended in December of 2006. Note that 2006 is used, because it is consistent with the end of the study period used in Segal's review of economic assumptions.

Decade	CPI
1996-2006	2.4%
1986-1996	3.7%
1976-1986	6.6%
1966-1976	5.9%
1956-1966	1.8%

Period	CPI
1996-2006	2.4%
1986-2006	3.1%
1976-2006	4.2%
1966-2006	4.6%
1956-2006	4.1%
1946-2006	3.8%
75 years	3.6%

Inflation
(continued)

The following graph shows historical national CPI increases. Note that the actual CPI increase has been less than 3.75% for each of the last 15 years. It should be noted that inflation was greater than 3.75% in 2007; however, since Segal's analysis of economic assumptions was as of December 31, 2006 we have only shown through that time period.

Historical CPI-U
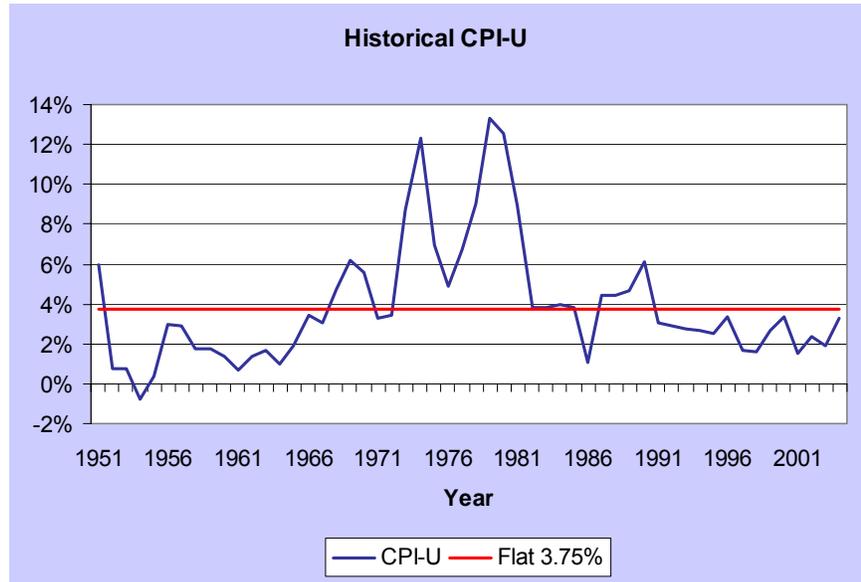
Forecasts of Inflation: Since the U.S. Treasury started issuing inflation indexed bonds (TIPs), it is possible to determine the approximate rate of inflation anticipated by the financial markets by comparing the yields on inflation indexed bonds with traditional fixed government bonds. Market prices suggest investors expect inflation to be about 2.5% over the next ten years. This rate is slightly less than the amount forecast by CCCERA's investment consultant Milliman (3.0%). Note that the current (November 2008) expectation for inflation based on TIPs is significantly lower than 2.5%, which is likely in response to the recent market turmoil and recessionary fears.

Although most investment consultants and economists forecast lower inflation, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the April 2007 report of the Board of Trustees, the annual increase in the CPI over the next 30 years 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%; this implies a reasonable range of 1.8% to 3.8%.

**Inflation
(continued)**

Their rationale, as explained in the report, is as follows:

> *These rates of increase are the same as those used in the 2006 report, and reflect a belief that future inflationary shocks will likely be offset by succeeding periods of relatively slow inflation due to persistent international competition, and that future monetary policy will be similar to the recent past, with its strong emphasis on holding the growth rate in prices to relatively low levels.*

Note that historically inflation in California has been slightly higher than the national average, so this may appear to argue for a higher assumption; however, we do not see this trend continuing indefinitely. More importantly, the correlation between inflation and the investment return is on a national, not local, basis.

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

According to the *Public Fund Survey* (a survey of approximately 100 statewide systems), the average inflation assumption for statewide systems has been steadily declining. As of the most recent study, the average rate is approximately 3.50%.

Looking at other selected '37 Act systems, the current inflation assumption is in the mainstream.

**Inflation
(continued)**

Reasonable (Best Estimate) Range: We believe that a range for inflation between 1.8% and 3.8% is reasonable for an actuarial valuation of a retirement system. Inflation has averaged 4.0% over the last 50 years; however it has averaged almost a full percent less over the last 20 years. Also, current economic forecasts, in particular those of Social Security, are predicting lower rates in the future. Our recommendations to retirement systems where we are the retained actuary have been 3.50% or lower. Given these facts, we consider the current assumption of 3.75% to be on the high end of the best-estimate range.

Consumer Price Inflation	
Current Assumption	3.75%
Best-Estimate Range	1.8% - 3.8%

Investment Return

Use in the Valuation: The investment return assumption is one of the primary determinants in the calculation of the expected cost of CCCERA's benefits, providing a discount of the estimated future benefit payments to reflect the time value of money. This assumption has a direct impact on the calculations of actuarial accrued liabilities, normal cost, and member and employer contribution rates. The valuation interest rate should represent the long-term rate of return on the actuarial value of assets, considering the fund's asset allocation policy, expected long-term real rates of return on the specific asset classes, the underlying inflation rate, and investment and administrative expenses.

The current assumption for investment return is 7.80% per year, net of all investment-related and administrative expenses.

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Investment Return (continued)

Method to Determine Best-Estimate Range for Investment Return: The following chart sets out the asset allocation as of December 31, 2006 and the expected real rate of return for each class that was used by Segal in determining the expected return. Note that we compared the real returns by class used by Segal with those used by Milliman's investment consultants and found them to be reasonably close.

Asset Class	Target Asset Allocation	Segal's Expected Real Rate of Return
Domestic Stocks	43.0%	6.70%
International Stocks	11.5%	7.03%
Domestic Bonds	23.0%	2.26%
Domestic High Yield Bonds	2.0%	4.06%
International Bonds	4.0%	2.47%
Real Estate	9.0%	4.80%
Alternative Investments	5.0%	9.50%
Commodoties	2.0%	3.73%
Cash & Equivalents	0.5%	0.00%
Total	100.0%	

Milliman calculated the best-estimate range for the investment return assumption based upon the target asset allocation, the expected real rates of return used by Segal, Segal's administrative and expense assumptions, and the assumed inflation assumption of 3.75%.

In addition, an 11.4% annual portfolio standard deviation was included. We then used a standard Milliman model to project future returns based on the capital market assumptions, the asset allocation, and assumed annual rebalancing.

The capital market assumptions were combined with the target asset allocation policy to generate expected rates of returns which were then added to the inflation assumption. The real rate of return is subject to significant year-to-year volatility as measured by the standard deviation. Volatility over time will lower the mean real rate of return but diversification by asset class will reduce the volatility and narrow the range of expected total returns for the entire portfolio

Using properties of the lognormal distribution, we calculated the 25th and 75th percentiles of the long-term total return distribution. This becomes our best-estimate range because 50% of the outcomes are expected to fall within this range and it is the narrowest range with 50% of the probable outcomes.

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Investment Return (continued)

The results are summarized below:

Expected Return with 3.75% Inflation and Segal's Expected Rate of Return
(net of investment and administrative expenses)

Horizon	Percentile Results for Nominal Rate of Return				
In Years	5th	25th	50th	75th	95th
1	-9.1%	0.7%	8.1%	16.1%	28.5%
5	0.0%	4.7%	8.1%	11.6%	16.8%
10	2.3%	5.7%	8.1%	10.6%	14.2%
20	4.0%	6.4%	8.1%	9.8%	12.4%
50	**5.5%**	**7.0%**	**8.1%**	**9.2%**	**10.8%**

Over a 50-year time horizon, we estimate there is a 25% chance the nominal rate of return will be less than 7.0% and a 25% chance the return will be greater than 9.2% (bold numbers on the bottom line in the table above). Therefore, we can say the return is just as likely to be within the range from 7.0% to 9.2% as not. The median return over 50 years is expected to be about 8.1%.

Note that the median for the investment return (net of expenses) of 8.1% is less than the 8.66% reported by Segal in their "Review of Economic Actuarial Assumptions for the December 31, 2006 Actuarial Valuation." This means that our analysis leads to a lower risk adjustment of 0.28% compared to the 0.84% Segal shows. The difference is that Segal is reporting an arithmetic mean, and we are showing a geometric mean.

The simplest way to understand this difference is with an example. If, during a two-year period, a fund returns 0% one year and 20% the next year, the arithmetic mean is 10.00% (the simple average of the two numbers); whereas, the geometric mean is only 9.54%. That is, if the fund earned 9.54% each year for two years, it would be equivalent to the 0% return followed by the 20% return. We believe using the geometric approach is the appropriate method as it is consistent with the way the investment return assumption works in the valuation. We assume one flat return rate to approximate the actual future return which we know will be volatile from year to year.

The following chart shows the difference between the arithmetic mean and the geometric mean over time.

Horizon In Years	Arithmetic Mean	Geometric Mean
1	8.7%	8.7%
5	8.7%	8.2%
10	8.7%	8.1%
20	8.7%	8.1%
50	**8.7%**	**8.1%**

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Investment Return (continued)

Excess Earnings: Section 31592.2 of the 1937 Act provides the Retirement Board with the authority to set aside earnings of the retirement fund during any year in excess of the total interest credited to contributions when such surplus exceeds one percent of the total assets of the retirement system. Based on the law, the excess earnings are considered on a year-by-year basis, so excess earnings are not based upon overall funded status. This means that the Board can choose to distribute excess earnings at a time when actuarial accrued liabilities exceed assets.

Also, if earnings are diverted from funding the base pension benefits when returns exceed the assumption, these earnings will not be available to make up the difference when earnings are less than assumed. Ultimately, this will result in a decrease in the long-term investment return.

CCCERA has addressed these issues with their interest crediting and excess earnings policy.

One of our main concerns about excess earnings is that money may be diverted from funding the pension liability, even if the system is poorly funded. By requiring earnings in excess of the targeted return to be first used to make up for prior shortfalls, CCCERA has somewhat alleviated this concern.

Even with this policy, it is still possible that there will be some impact on the long-term investment return due to excess earnings; however, this depends on the future investment returns of CCCERA and the Board's discretion. We have not made any adjustments in our analysis of the investment return assumption due to the potential impact of excess earnings.

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**Investment Return
(continued)**

Peer System Comparison: According to the *Public Fund Survey*, the average investment return assumption for statewide systems has been slowly declining. As of the most recent study, the average rate is just under 8.0%

Looking at other selected '37 Act systems, CCCERA's current assumption is slightly on the low side, although the return assumptions are bunched tightly around 8.0%, so the difference is relatively small. Similar to statewide systems, the trend among '37 Act Systems has been toward slightly lower investment return assumptions.
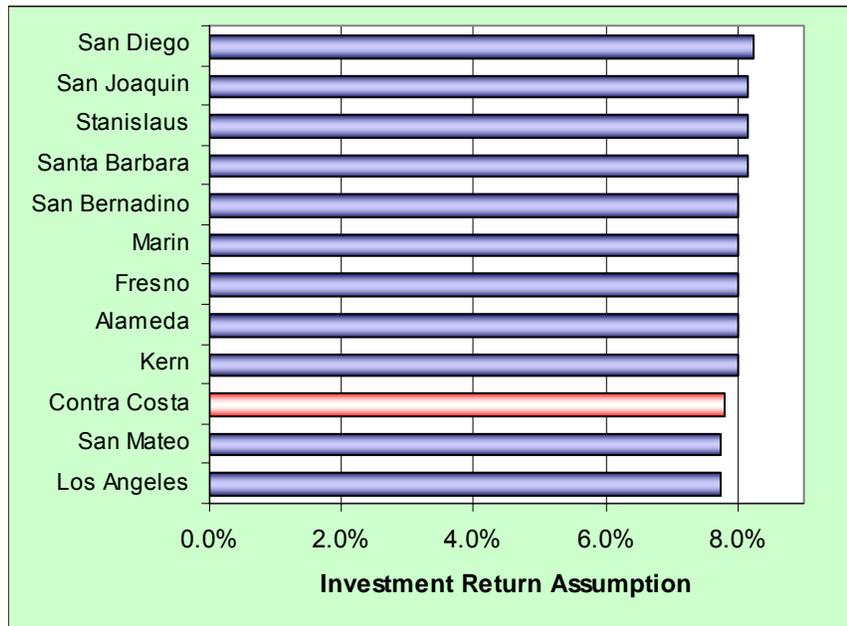
The investment return assumptions shown above are based on the latest available valuation reports as of September, 2008.

Best-Estimate Range: Based on guidance in *ASOP No. 27*, we conclude that the best estimate range for the investment return, net of expenses, is 7.0% to 9.2%.

Components of Return	Percentile Results		
	25th	**50th**	**75th**
Real Investment Return	3.82%	4.90%	5.99%
Assumed Inflation	3.75%	3.75%	3.75%
Expenses	(0.55%)	(0.55%)	(0.55%)
Net Investment Return	7.02%	8.10%	9.19%

General Wage Growth

Use in the Valuation: Estimates of future salaries are based on two types of assumptions. Rates of increase in the general wage level of the membership are directly related to inflation while individual salary increases due to promotion and longevity (referred to as the merit scale) occur even in the absence of inflation. This section will address the general wage growth assumption (price inflation plus productivity increases). The merit scale is discussed in Section 8 (demographic assumptions).

The current wage growth assumption is 0.50% above the price inflation rate, or 4.25% per year. Note that the 4.25% includes increases in wages due to productivity as discussed below.

Historical Perspective: We have used statistics from the Social Security System on the National Average Wage back to 1951. For years prior to 1951, we studied the Total Private Nonagricultural Wages as published in *Historical Statistics of the U.S., Colonial Times to 1970.*

There are numerous ways to review this data. For consistency with our observations of CPI, the table below shows the compounded annual rates of wage growth for various 10-year periods, and for longer periods ended in 2006.

The excess of wage growth over price inflation represents "productivity" or the increase in the standard of living, (also called the real wage inflation rate). The following table shows the compounded wage growth over various periods, along with the comparable inflation rate for the same period. The differences represent the real wage inflation rate.

Decade	Wage Growth	CPI Incr.	Real Wage Inflation
1997-2006	3.9%	2.4%	1.5%
1987-1996	4.1%	3.7%	0.4%
1977-1986	6.5%	6.6%	(0.1)%
1967-1976	6.4%	5.9%	0.5%
1957-1966	3.4%	1.8%	1.6%

Period	Wage Growth	CPI Incr.	Real Wage Inflation
1997-2006	3.9%	2.4%	1.5%
1987-2006	4.0%	3.1%	0.9%
1977-2006	4.8%	4.2%	0.6%
1967-2006	5.2%	4.6%	0.6%
1957-2006	4.9%	4.1%	0.8%
1932-2006	5.1%	3.6%	1.5%

Forecasts of Future Wages: The wage index we used for the historical analysis has been projected forward by the Office of the Chief Actuary of the Social Security Administration. In the April 2007 Trustees report, the annual increase in the National Average Wage Index over the next 30 years under the intermediate cost assumption was forecast to be 3.9%, 1.1% higher than the Social Security intermediate inflation assumption of 2.8% per year. The range of the assumed real wage inflation in the 2007 Trustees report was 0.6% to 1.6% per year.

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General Wage Growth (continued)

Best-Estimate Range: Based on our judgment, we believe that a range between 0.5% and 1.5% is reasonable for the real wage inflation assumption. We believe that wages will continue to increase at a rate greater than price inflation. The current real wage assumption of 0.50% is in the range that we usually recommend to our retained clients. We believe the general wage increase assumption of 4.25% is reasonable.

Real Wage Inflation	
Current Assumption	0.50%

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 4.25%. 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.

Section 8   Actuarial Assumptions (Demographic)

Audit Conclusion

We performed a full replication of the Experience Study. Based on this analysis, we reviewed the demographic assumptions used in the valuation and found them to be reasonable. We are making a few comments to consider for the next Experience Study.

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%.

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Post-Retirement Mortality – Healthy Retirement

We studied the probability of death at each age for healthy retired members (service retirements). Overall our results are similar to Segal's. Based on these results, we believe that the current assumption is reasonable; however, consideration should be given to changing the assumption to reflect increased life expectancies with the next triennial experience study.

The overall actual-to-expected ratio is 107% in Segal's study, so there were fractionally more deaths than the assumptions predicted (i.e., retirees did not live quite as long as expected). However, we generally like to see a higher actual-to-expected ratio. The two main reasons for this are:

- **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) or project future mortality improvements directly. Segal mentions that "general actuarial practice is to include some margin for improvements in mortality in the future"; however, we generally like to see a margin greater than 7% (the A/E ratio reported by Segal for healthy retirees was 107%). We normally look to have a margin around 10% to 15%.

- **Differences by Benefit Amount:** Our analysis has shown that retirees with above-average benefit amounts tend to live longer than those with below-average benefit amounts. This means that although the current assumptions may be accurately predicting the number of deaths, they are overstating the release of liability expected when retirees die, which is what impacts the valuation. Based on our analysis with other systems, an additional adjustment of 5% to 10% in the actual-to-expected ratio is needed to account for this.

The following table shows a comparison of the results of our study of mortality on a count basis with the results reported by Segal.

Group	Healthy (Milliman)			Healthy (Segal)		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
General	313	296	106%	317	296	107%
Safety	37	32	116%	35	33	106%
Total	350	328	107%	352	329	107%

Post-Retirement Mortality – Disabled Retirement

We performed a similar study of mortality for disabled retirements. The results of our study were consistent with those reported by Segal. Segal's actual-to-expected ratio was 115% which indicates there is some margin for future increases in life expectancies. We believe the current mortality assumptions for disabled retirees are reasonable.

The following table shows a comparison of the results of our study of mortality on a count basis with the results reported by Segal.

Group	Disabled (Milliman)			Disabled (Segal)		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
General	56	48	117%	56	48	117%
Safety	14	13	108%	14	13	108%
Total	70	61	115%	70	61	115%

Merit and Longevity Salary Increases

We studied the individual salary increases due to promotion and longevity – the merit component of salaries. These increases are in addition to the assumed increases due to general wage inflation (price inflation plus real "across the board" increases). We believe the current assumption is reasonable.

The method was recently changed to vary merit increases based on service instead of age. Members earlier in their career (i.e., service less than 10 years) are expected to received larger increases than those later in their career. We agree that service is the most significant factor in expected future merit increases, and this is the approach we generally recommend.

The following graph shows how CCCERA's actual merit increases (blue bars), as calculated by Milliman, are consistent with the assumption.
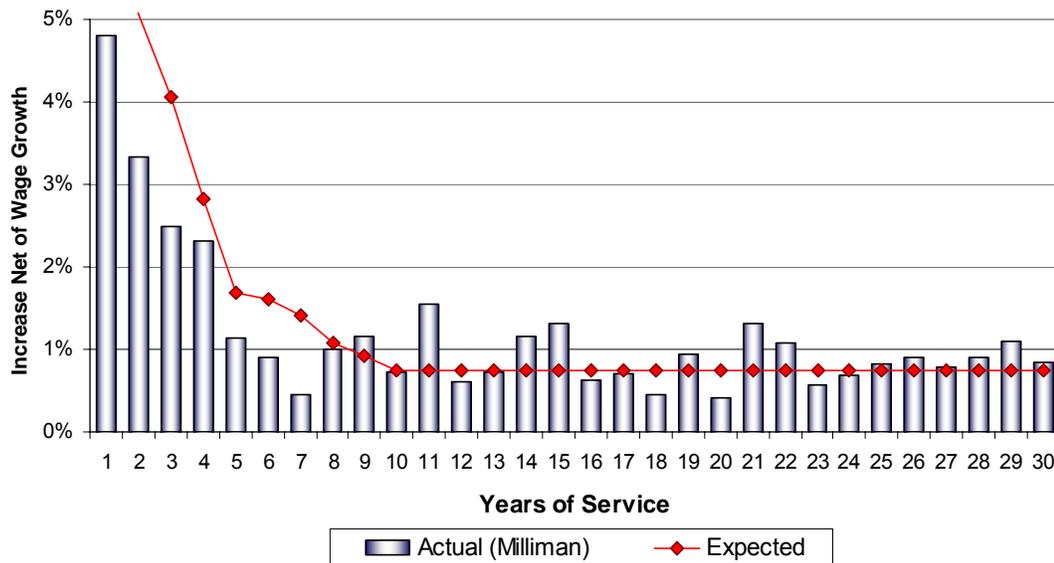
Rates of Service Retirement

We studied service retirement rates for both General and Safety members. We found our results to be generally consistent with Segal's and believe the current assumptions are reasonable.

The following chart shows the results of our analysis for all retirements from active service. Note how the blue (Milliman) and green (Segal) bars tend to be close in height. This indicates that the observed rates of Milliman and Segal are consistent. Our rates are slightly higher, as we made an adjustment for a group of service retirements who were not reported in the original valuation data.

Also note the assumption (red line) tracks fairly well with the bars. The observed rates are somewhat higher than the assumption at age 65 due to the impact of Social Security and somewhat lower at other ages above 62, but overall we believe the current assumption is reasonable.
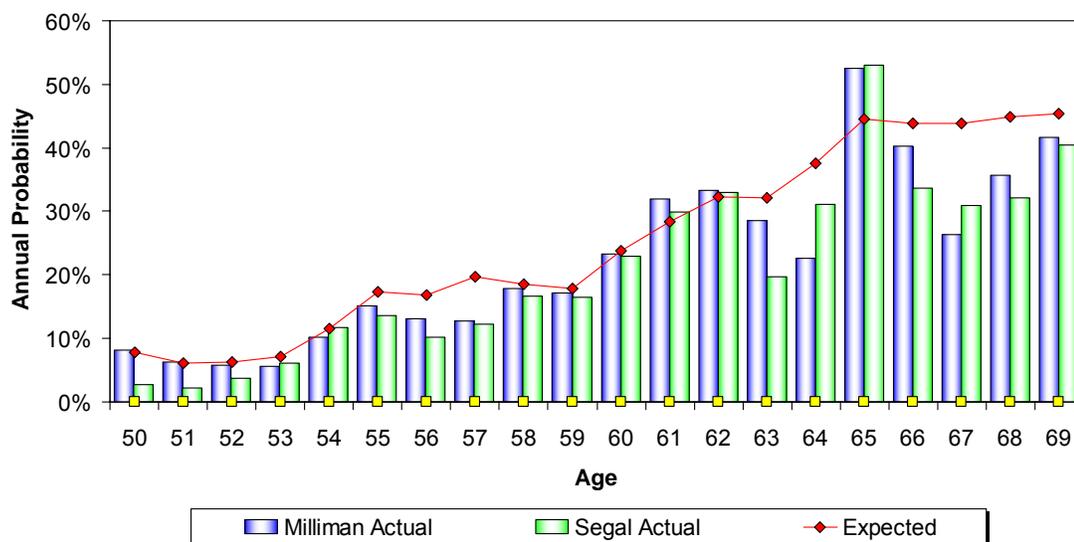
Group	Milliman			Segal		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
Tier 1 Enhanced	318	287	111%	297	288	103%
Tier 3 Enhanced	416	398	105%	387	419	92%
Safety Enhanced	174	219	79%	177	206	86%
Total	**908**	**904**	**100%**	**861**	**913**	**94%**

Rates of Disability Retirement

We studied rates of disability retirement for both General and Safety members. We found our results to be reasonably consistent with Segal's and believe the current assumptions are reasonable. Results of our study are shown by group below. Additionally, we reviewed the split between service-connected and nonservice-connected disabilities and found that to be reasonable, also.

Group	All Disability Retirements by Group			
	Expected	Actual (Milliman)	Actual (Segal)	S/M Ratio
General Tier 1	19	18	18	100%
General Tier 3	8	18	15	120%
Safety	59	45	48	94%
Total	**86**	**81**	**81**	**100%**

Rates of Termination (Withdrawal and Vested Termination)

We studied rates of termination for both General and Safety members. We found our results to be generally consistent with Segal's and believe the current assumptions are reasonable.

The following graph shows a comparison of the rates of termination for all active members with less than five years of service. Our results are close to Segal's with the exception of the first year (years of service = zero). Since many members who terminate during their first year of service are not active on June 30, they will not appear in the data. Thus, the actual results are generally understated in the first year (as is the case with our numbers) if no adjustment is made. Since the liability for members with less than one year of service is immaterial, we generally estimate the rate based on the other years of service. Using this method would produce a result consistent with Segal.

**Termination Rates with Less than Five Years of Service**
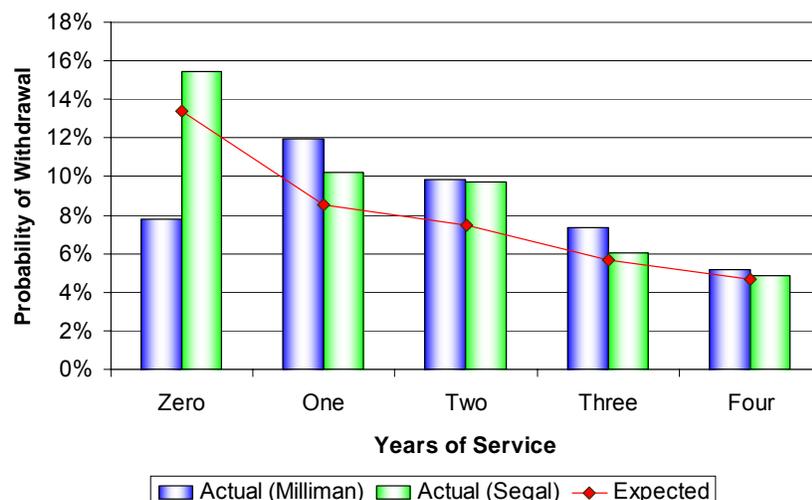
Rates of Termination (continued)

The following graph shows a comparison of the rates of termination for all active members with five or more years of service. Once again our results are close to Segal's

Termination Rates with Five or More Years of Service

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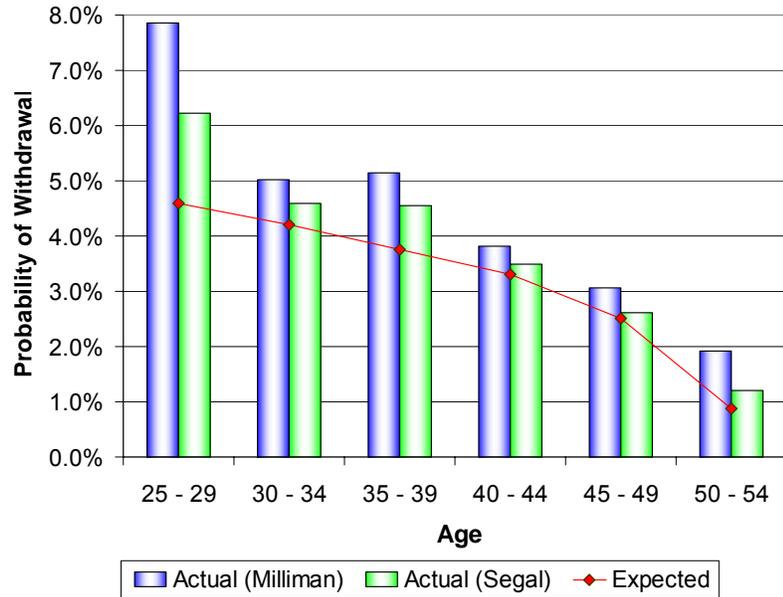
Other Assumptions

We reviewed the remaining assumptions and have the following comments:

- ✓ **Commencement Age for Deferred Vested Members:** For current and future Safety members who terminate with a deferred vested benefit, it is assumed that they will retire at age 55. Given that these members can get their full retirement benefit with a COLA starting at age 50, it seems unlikely that many would wait until age 55, with the possible exception of reciprocal members.

  We reviewed actual commencement for non-reciprocal deferred Safety members and found that all of those who retired during the study period were less than age 55 and the majority were age 50 or less. We recommend that consideration be given to changing this assumption to age 50 for non-reciprocal deferred members with the next triennial experience study.

- ✓ **Percent Married (or with an Eligible Domestic Partner):** Segal studied the percentage of recent retirees who had an eligible survivor. They found that the actual percent was somewhat lower; however, recent changes in the requirements to be an eligible survivor could result in a small increase over time.

  Based on their results Segal recommended the current assumption be retained, males set at 80% and females at 55%. This is in line with the results of our study and studies we have done for other California counties, and we believe it is a reasonable assumption.

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Section 9   Valuation and Experience Study Reports

Audit Conclusion

Overall, we found Segal's reports to be clear and complete. We have made a few comments for consideration where additional information could be included to enhance the understanding of an outside reader.

Comments

We offer the following comments on the report. Each of these comments pertain to additional disclosure and none impact the valuation results.

- The valuation report should indicate that the Superior Court pays the same employer contribution rate as the County.

- On page 17 of the Experience Study report, results for the study of Post-Retirement Mortality are shown for males and females combined and split out by year of death. In our opinion, it would be informative to the reader to show the results separately for males and females, as they have different mortality and consequently different assumptions. To avoid a proliferation of numbers, a breakdown by gender could replace the current subtotals by each year of the study which do not add much to the analysis.

- In the Post-Retirement Mortality section of the Experience Study report, Segal should disclose their recommended assumption for beneficiary mortality. The assumption being used (beneficiary mortality is the same as a General member of the opposite sex under service retirement) is a reasonable assumption, but it should be disclosed, so it is clear what assumption the Board is adopting.

- A similar comment applies to the Actuarial Assumptions section of Segal's valuation report (page 61). The mortality for beneficiaries should be disclosed.

- Some of CCCERA's death and disability benefits provide additional payments for minor children. Segal does not disclose what assumption they use to value this provision.

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Contra Costa County Employees' Retirement Association
Actuarial Audit of
December 31, 2007 Valuation and 2004-2006 Experience Study

Appendix A Supporting Exhibits

Active Normal Cost Ratios

Tier	Segal	Milliman	Segal/Milliman
General Tier 1 Non-Enhanced			
Gross Normal Cost Rate			
Basic	19.23%	18.92%	101.6%
COLA	7.31%	6.76%	108.0%
Total	26.54%	25.69%	103.3%
Member Normal Cost Rate			
Basic	7.27%	7.29%	99.7%
COLA	3.61%	3.86%	93.5%
Total	10.88%	11.15%	97.6%
Employer Normal Cost Rate			
Basic	11.96%	11.63%	102.8%
COLA	3.70%	2.91%	127.3%
50% Subvention	3.62%	3.65%	99.2%
TOTAL	**19.28%**	**18.19%**	**106.0%**
General Tier 1 Enhanced			
Gross Normal Cost Rate			
Basic	18.16%	18.06%	100.5%
COLA	7.27%	6.85%	106.2%
Total	25.43%	24.91%	102.1%
Member Normal Cost Rate			
Basic	5.83%	5.62%	103.6%
COLA	3.49%	3.57%	97.9%
Total	9.32%	9.19%	101.4%
Employer Normal Cost Rate			
Basic	12.33%	12.44%	99.1%
COLA	3.78%	3.28%	115.3%
50% Subvention	2.91%	2.81%	103.6%
TOTAL	**19.02%**	**18.53%**	**102.7%**

Active Normal Cost Ratios

Tier	Segal	Milliman	Segal/Milliman
General Tier 3 Enhanced			
Gross Normal Cost Rate			
Basic	17.19%	17.09%	100.6%
COLA	6.22%	6.02%	103.4%
Total	23.41%	23.11%	101.3%
Member Normal Cost Rate			
Basic	6.33%	6.05%	104.6%
COLA	3.08%	3.14%	98.0%
Total	9.41%	9.19%	102.4%
Employer Normal Cost Rate			
Basic	10.86%	11.04%	98.3%
COLA	3.14%	2.87%	109.3%
50% Subvention	3.16%	3.02%	104.6%
TOTAL	17.16%	16.94%	101.3%
Safety Tier A Non-Enhanced			
Gross Normal Cost Rate			
Basic	22.44%	22.55%	99.5%
COLA	8.53%	8.97%	95.1%
Total	30.97%	31.53%	98.2%
Member Normal Cost Rate			
Basic	8.53%	8.12%	105.0%
COLA	4.23%	4.86%	87.0%
Total	12.76%	12.98%	98.3%
Employer Normal Cost Rate			
Basic	13.91%	14.43%	96.4%
COLA	4.30%	4.11%	104.6%
50% Subvention	0.00%	0.00%	100.0%
TOTAL	18.21%	18.54%	98.2%

Active Normal Cost Ratios

Tier	Segal	Milliman	Segal/Milliman
Safety Tier A Enhanced			
Gross Normal Cost Rate			
Basic	29.99%	29.82%	100.6%
COLA	13.00%	12.78%	101.7%
Total	42.99%	42.61%	100.9%
Member Normal Cost Rate			
Basic	8.53%	8.80%	96.9%
COLA	6.42%	6.63%	96.9%
Total	14.95%	15.43%	96.9%
Employer Normal Cost Rate			
Basic	21.46%	21.02%	102.1%
COLA	6.58%	6.15%	106.9%
50% Subvention	3.00%	3.00%	100.0%
TOTAL	31.04%	30.17%	102.9%
Safety Tier C Enhanced			
Gross Normal Cost Rate			
Basic	26.87%	26.72%	100.6%
COLA	7.01%	6.80%	103.2%
Total	33.88%	33.52%	101.1%
Member Normal Cost Rate			
Basic	8.42%	8.65%	97.3%
COLA	3.47%	3.57%	97.3%
Total	11.89%	12.22%	97.3%
Employer Normal Cost Rate			
Basic	18.45%	18.07%	102.1%
COLA	3.54%	3.23%	109.7%
50% Subvention	0.00%	0.00%	100.0%
TOTAL	21.99%	21.30%	103.2%

Active Normal Cost Ratios

Tier	Segal	Milliman	Segal/Milliman
All Employers Combined			
Gross Normal Cost Rate			
Basic	20.19%	20.00%	100.9%
COLA	7.83%	7.58%	103.3%
Total	28.02%	27.58%	101.6%
Member Normal Cost Rate			
Basic	6.77%	6.62%	102.2%
COLA	3.85%	3.95%	97.5%
Total	10.62%	10.57%	100.5%
Employer Normal Cost Rate			
Basic	13.42%	13.38%	100.3%
50% Subvention	2.96%	2.98%	99.4%
COLA	3.98%	3.63%	109.6%
Total Employer NC Rate	20.36%	19.99%	101.8%

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