

Stanislaus County
Employees' Retirement Association



Actuarial Audit of
June 30, 2006 Valuation
and
2003-2006 Experience Study

Prepared by:

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November 7, 2008

Mr. Tom Watson
Retirement Administrator
StanCERA
832 12th Street, Suite 600
Modesto, CA 95353

Re: Actuarial Audit Report

Dear Mr. Watson:

The enclosed report presents the findings and comments resulting from a detailed review of the June 30, 2006 actuarial valuation and 2006 experience study performed by Buck Consultants (Buck) for the Stanislaus County Employees' Retirement Association (StanCERA). 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 StanCERA'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 8 of Buck's June 30, 2006 actuarial valuation report. 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.

This work product was prepared solely for StanCERA. It may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

Offices in Principal Cities Worldwide

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by StanCERA'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 StanCERA for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning StanCERA's operations, and uses StanCERA'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 both the Buck staff, in particular Paul Obedencio, and the StanCERA 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.

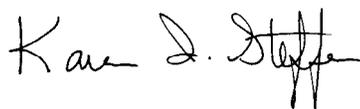
We respectfully submit the following report, and we look forward to discussing it with you.

Sincerely,

A handwritten signature in black ink that reads "Nick Collier".

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

NJC/KIS/nlo

A handwritten signature in black ink that reads "Karen I. Steffen".

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

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Stanislaus County Employees' Retirement Association Actuarial Audit of June 30, 2006 Valuation and 2003-2006 Experience Study

Section 1 Summary of the Findings



Purpose and Scope of the Actuarial Audit

This actuarial audit reviews the June 30, 2006 actuarial valuation and the experience study for the period July 1, 2003 to June 30, 2006. 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 June 30, 2006, **we believe several changes should be made to the assumptions.** If these changes are adopted, there will be a material increase in the calculated employer contribution rates.

Actuarial Valuation

Based upon our review of the June 30, 2006 actuarial valuation, we found the actuarial work performed by Buck was generally reasonable. The following table shows that our independent calculations are very close to those determined by Buck and indicate that the results of the valuation are accurate based on the current assumptions and methods.

	Buck	Milliman
Combined Employer Contributor	9.22%	9.30%
Funded Percentage	96.6%	96.5%

However, as mentioned above, we do have concerns about these assumptions. Additionally, we have a concern about the asset allocation process. We would recommend StanCERA consider a change in the future to the method used to calculate the valuation assets in the June 30, 2006 valuation. For purposes of our calculations, as shown above, we have used Buck's method to determine the valuation assets.

Statement of Key Findings

Membership Data

We performed tests on both the raw data supplied by StanCERA staff and the processed data used by Buck 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:

	Buck	Milliman	Ratio Buck/Milliman
Active Members			
Total Number	4,366	4,365	100.0%
Average Service	9.2	9.2	100.0%
Average Compensation	\$ 50,340	\$ 50,795	99.1%
Retirees and Survivors			
Total Number	2,443	2,443	100.0%
Average Monthly Pension	\$ 1,812	\$ 1,806	100.3%

Actuarial Value of Assets

We have reviewed the calculation of the actuarial value of assets used in the June 30, 2006 valuation. We matched Buck's calculation of the valuation assets; however, we did not concur with the method they used to adjust the gross actuarial valuation assets for the nonvaluation reserves. This method appears to negate the asset smoothing. We recommend StanCERA consider a change in this method for future valuations.

Actuarial Liabilities and Normal Cost

We independently calculated the normal cost and liabilities of StanCERA. 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 Buck closely. A summary is shown in the chart below. Actuarial accrued liability is shown in millions.

	Buck	Milliman	Ratio Buck/Milliman
Actuarial Accrued Liability	\$ 1,194.9	\$ 1,196.0	99.9%
Employer Normal Cost	7.47%	7.47%	100.0%

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 a reasonable manner.

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

Group	Age 35 Member Contribution Rate		
	Buck	Milliman	Buck / Milliman
General			
Tier 1	4.36%	4.13%	105.5%
Tier 2	6.94%	6.58%	105.5%
Tier 4	3.94%	3.93%	100.3%
Tier 5	7.90%	7.87%	100.4%
Safety			
Tier 4	6.31%	6.39%	98.8%
Tier 5	12.61%	12.76%	98.8%

Funding

We reviewed the application of the funding method and find it is reasonable and that it meets generally accepted actuarial standards.

The employer contribution rates are separately calculated for the County and Ceres/Other Agencies due to prior pension obligation bonds. The method used in this allocation passes all gains and losses on to the County. Our calculated employer contribution rate using their method matched Buck's closely.

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.

	Buck	Milliman	Ratio Buck/Milliman
Employer Normal Cost Rate	7.47%	7.47%	100.0%
UAAL Rate	1.75%	1.82%	95.9%
Total Employer Contribution	9.22%	9.30%	99.2%

Statement of Key Findings (continued)

Actuarial Assumptions (Economic)

We reviewed the economic assumptions used in the valuation and found the combination to be generally reasonable, but somewhat on the aggressive side. We recommend the following changes be considered:

- **Price Inflation:** The inflation assumption is just outside our best-estimate range, on the high side. We recommend that the inflation assumption be lowered.
- **Wage Inflation:** The current assumption sets the general wage increase assumption equal to price inflation. Historical patterns and future expectations indicate that there is a productivity component of wage inflation in excess of price inflation. We recommend that the wage inflation assumption be set higher than price inflation to reflect productivity.
- **Investment Return:** We find the current assumption to be reasonable based on the current 4.00% inflation assumption; however, we consider the inflation assumption to be high. We recommend consideration be given to lowering the investment return assumption, particularly if the price inflation assumption is lowered.

Although assumptions should not be set based on what other systems are doing, it is informative to see how StanCERA compares. Looking at other selected '37 Act systems, StanCERA's current assumption or 8.16% is somewhat on the high side, although the return assumptions are bunched tightly around 8.0%, so the difference is relatively small. Nevertheless, a difference as small as 0.25% in the investment return assumption can still have a fairly significant impact on how the system is funded.



Statement of Key Findings (continued)

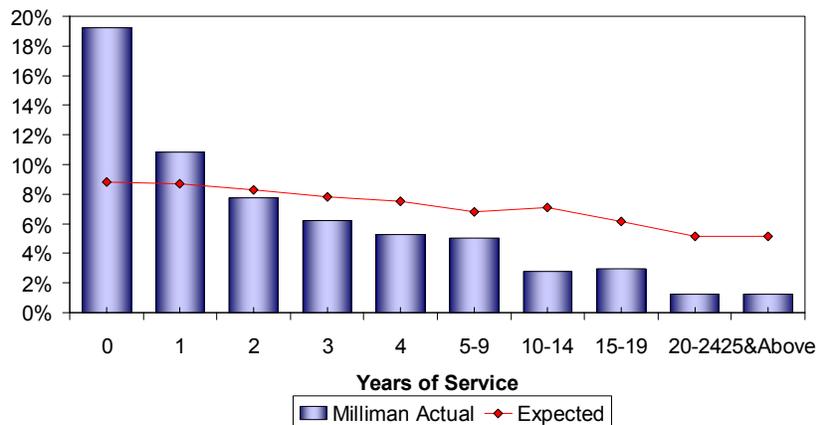
Actuarial Assumptions (Demographic)

We performed a full replication of the experience study. Based on this analysis, we reviewed the demographic assumptions used in the valuation and believe significant changes need to be made to more accurately reflect expected future experience.

The most significant changes that we are recommending are the following:

- **Termination Rates after Retirement Eligibility:** The termination assumption should be revised so that members who are currently eligible for a service retirement benefit are not assumed to elect either a deferred retirement benefit or a refund of contributions.
- **Termination Rates (Age vs. Service):** The termination assumption should be changed from the current method based on age to a service-related schedule to more accurately reflect the nature of StanCERA's liabilities.

The following graph shows the correlation between service and termination rates for General members. The current rates (red line) predict fewer terminations than are actually occurring in the first few years of service, with the converse being true at three years of service or more. For members with 10 or more years of service, the expected rates based on age are more than double the actual rates.

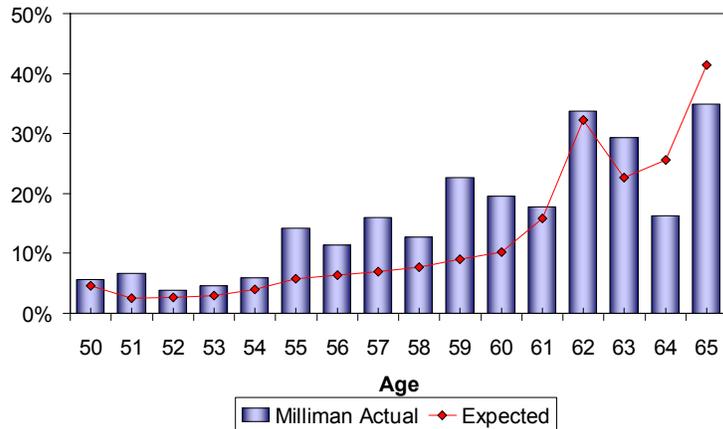


- **Post-Retirement Mortality:** We recommend that the post-retirement mortality assumption be strengthened to make sure adequate margin is incorporated to reflect expected increases in life expectancies in the future.

Statement of Key Findings (continued)

Actuarial Assumptions (Demographic) continued

- **Service Retirement:** In Buck's work, they did not correctly reflect which members were eligible for service retirement in their determination of the service retirement rates. The assumed rates should be increased to correct this issue. The following graph shows an example of how much lower the current expected rates (red line) are than the actual rates (blue bars).



- **Merit Salary Increases:** We recommend that merit salary increase assumption be changed from the current method based on age to a service-related schedule to more accurately reflect the nature of StanCERA's liabilities.

Valuation & Experience Study Reports

We are recommending additional disclosures be included in both the valuation and experience study reports. In particular, the valuation report does not provide sufficient documentation of the adjustment made in the calculation of the valuation assets and the employer contribution rates.

Recommendations

We are recommending a number of changes be reflected in future valuations. We have broken these down into several groups and have included the location in this report for further reference.

Recommended Changes – Material

- ✓ **Actuarial Assumptions (Demographic):** We are recommending the following changes to the demographic assumptions, as previously discussed.
 - Shut off termination assumption when a member becomes eligible for service retirement. (p. 40)
 - Base termination rates on age not service. (p. 40)
 - Increase service retirement rates. (p. 37-38)
 - Strengthen the post-retirement mortality assumption. (p. 35-36)
 - Base assumed merit salary increases on service not age. (p. 36-37)
- ✓ **Valuation Assets:** We recommend that the calculation of the valuation assets be reviewed with respect to the adjustments for nonvaluation reserves. (p. 11)
- ✓ **Actuarial Assumptions (Economic):** We are recommending the following changes to the economic assumptions, as previously discussed.
 - Add a productivity component to the wage increase assumption. (p. 32-33)
 - Lower inflation assumption. Note the change to the inflation alone does not have a material impact; however, to the extent it impacts the wage increase and investment return assumptions, it will likely have a material impact. (p. 24-27)

Changes to Consider – Material

- ✓ **Actuarial Assumptions (Economic):** The following change should be considered.
 - Lower the investment return assumption. (p. 27-32)
- ✓ **Actuarial Assumptions (Demographic):** The following change should be considered.
 - Add terminal pay assumption to account for increased compensation in final year due to cash out of vacation time. (p. 34)

Recommendations (continued)

Other Key Points

These are issues that we want to make sure the Board is aware of, but we do not think a change is required.

- ✓ **Excess Earnings:** Excess earnings may be credited when the funding level is below 100% funded. (p. 30-31)
- ✓ **Funding Method:** The unfunded actuarial accrued liability (UAAL) for the County is funded on a level dollar basis. The UAAL for other employers is funded as a level percentage of pay. (p. 19)
- ✓ **Contribution Rates by Employer:** The current method used in the allocation of employer contribution rates passes all gains and losses on to the County. (p. 19-20)

Other Recommended Changes

- ✓ **Actuarial Assumptions (Demographic):** We are recommending the following change:
 - Lower the assumed commencement age for deferred vested members. (p. 41)
- ✓ **Reports:** Add additional disclosure.
 - Show more detail on derivation of assumptions in experience study report. (p. 42)
 - Disclose adjustments used in calculation of UAAL contribution rates. (p. 42)
 - Disclose adjustments used in calculation of valuation assets. (p. 42)
 - Disclose experience gains and losses due to changes in the nonvaluation reserves. (p. 43-44)

Other Changes to Consider

- ✓ **Actuarial Assumptions (Demographic):** The following change:
 - Use separate service retirement assumptions for Tier 3. Set the probability of disability retirement to 0% for Tier 3 (p. 38)
 - Use a lower probability of eligible survivor assumption for males and slightly higher for females. (p. 41)
- ✓ **Membership Data:** Include credited service to date (in addition to hire date). (p. 9)

Stanislaus County Employees' Retirement Association Actuarial Audit of June 30, 2006 Valuation and 2003-2006 Experience Study

Section 2 Membership Data

Audit Conclusion



We performed tests on both the raw data supplied by StanCERA staff and the processed data used by Buck in the valuation and the experience study. Based on this review, we feel the individual member data used in both projects is appropriate for its purposes.

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 StanCERA staff to Buck 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. Our only comment is that the member's exact credited service is not provided. Credited service can be estimated based on the member's hire data, although in cases where a member has worked less than full-time hours, this method can overstate the service amount; however, we do not believe this has a significant impact on the total valuation results.
- ✓ **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 StanCERA data with the actual benefit payments made, as reported in StanCERA's asset statements.

**Comments
(continued)**

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

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

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

The “Milliman” column reflects the StanCERA data after adjustments by Milliman. The “Buck” column reflects the actual data used in Buck’s valuation.

**Exhibit 2-1
Member Statistics as of June 30, 2006**

	Buck	Milliman	Ratio Buck/Milliman
<i>Active Members</i>			
Total Number	4,366	4,365	100.0%
Average Age	43.5	43.5	100.0%
Average Service	9.2	9.2	100.0%
Average Compensation	\$ 50,340	\$ 50,795	99.1%
<i>Retirees and Survivors</i>			
Total Number	2,443	2,443	100.0%
Average Monthly Pension	\$ 1,812	\$ 1,806	100.3%
<i>Vested Terminated Members</i>			
Total Number	915	914	100.1%

Stanislaus County Employees' Retirement Association Actuarial Audit of June 30, 2006 Valuation and 2003-2006 Experience Study

Section 3 Actuarial Value of Assets

Audit Conclusion



We have reviewed the calculation of the actuarial value of assets used in the June 30, 2006 valuation. We matched Buck's calculation of the valuation assets; however, we did not concur with the method they used to adjust the gross actuarial valuation assets for the nonvaluation reserves. This method appears to negate the asset smoothing. We recommend StanCERA consider a change in this method for future valuations.

Comments

The method used to determine the gross actuarial value of assets smoothes investment gains and losses by reflecting one-fifth of the difference between the market-related value and the expected market value each year over the most recent five-year period. This value is then adjusted to remove any non-valuation reserves which results in the valuation assets used in the funding calculations.

Our concern about Buck's method is that they make an adjustment to the nonvaluation reserves in their calculation of the valuation assets. This adjustment effectively offsets the actuarial smoothing. The result is the valuation assets are equal to the gross market value of the valuation reserves less the market value of the nonvaluation reserves, with a minor adjustment in the Contingency Reserve. Note these adjustments seemed to occur only in the 2006 valuation. They did not occur in the 2005 Buck valuation report.

As discussed above, StanCERA uses an asset smoothing method to reduce volatility. The five-year smoothing is the most common among 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. The current asset method applies a corridor so that the actuarial value of assets does not deviate from the market value by more than 20%. We believe this is appropriate.

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
and 2003-2006 Experience Study**

Section 4 Actuarial Liabilities

Audit Conclusion



We independently calculated the normal cost and liabilities of StanCERA. 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 Buck closely.

Comments

We incorporated the following information into our valuation system:

- ✓ **Data** – We started with the same data Buck used in their valuation. As discussed in Section 2, we confirmed that this data was consistent with the valuation data provided by StanCERA.
- ✓ **Assumptions** – We used the assumptions disclosed in the June 30, 2006 actuarial valuation report. This information was provided to us electronically by Buck. We confirmed the assumptions were consistent with those adopted based on the most recent experience study report.
- ✓ **Methods** – We used the actuarial methods disclosed in the June 30, 2006 actuarial valuation report. This was supplemented by discussions between Buck and Milliman on the technical application of these methods.
- ✓ **Benefits** – We obtained this information from the StanCERA website and the relevant law.

We then performed a parallel valuation as of June 30, 2006. 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 Buck. 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)

	Buck	Milliman	Ratio Buck/Milliman
Retiree	\$ 619.1	\$ 615.7	100.6%
Inactive	27.5	28.6	96.2%
Active	548.3	551.7	99.4%
Total AAL	\$ 1,194.9	\$ 1,196.0	99.9%

**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 Buck'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)

	Buck	Milliman	Ratio Buck/Milliman
Withdrawal	\$ 113.8	\$ 111.6	102.0%
Service Retirement	606.3	609.7	99.4%
Death	11.0	11.2	98.2%
Duty Disability	47.4	47.6	99.6%
Non-duty Disability	12.4	12.5	99.2%
Total Active PVB	\$ 790.9	\$ 792.6	99.8%

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 StanCERA based on the assumptions and methods used by Buck.

There was one 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 Buck's calculations, they are effectively treating benefit payments for a given month as being paid on the first of that month. StanCERA'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. Buck is treating the payment as being made October 1.

We adjusted our valuation setup to be consistent with Buck'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 StanCERA's processes, we believe Buck's method is acceptable.

**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. Buck uses the Aggregate Entry Age Normal cost method to allocate costs to individual years. We have used this method for our comparison.

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.

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

**Exhibit 4-3
Comparison of Normal Cost Rate**

(Expressed as a Percent of Payroll)

	Buck	Milliman	Ratio Buck/Milliman
Gross Normal Cost Rate			
General	13.17%	13.02%	101.2%
Safety	25.87%	26.29%	98.4%
Combined	15.43%	15.53%	99.4%
Member Normal Cost Rate			
General	7.38%	7.40%	99.7%
Safety	10.91%	10.88%	100.2%
Combined	7.97%	8.06%	98.9%
Employer Normal Cost Rate			
General	5.79%	5.62%	103.1%
Safety	14.96%	15.41%	97.1%
Combined	7.47%	7.47%	100.0%

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
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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 a reasonable manner.

Comments

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

Tier	Basic Formula	Final Avg. Comp. Period
General 1	1/200th of FAC at age 60	1 Year
General 2	1/120th of FAC at age 60	3 Years
General 3	No Contributions	
General 4	1/240th of FAC at age 55	1 Year
General 5	1/120th of FAC at age 55	1 Year
Safety 4	1/200th of FAC at age 50	1 Year
Safety 5	1/100th of FAC at age 50	1 Year

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 Buck's. Member contribution rates for sample ages are shown in the following exhibit. The only area we observed differences of any magnitude were for the General Tier 1 and Tier 2 COLA rates; however, this group makes up only 0.2% of the total payroll.

**Stanislaus County Employees' Retirement Association
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**Exhibit 5-1
Sample Member Contribution Rates**

	Entry Age	Milliman Calculated Rates over \$350 per Month			Buck (Total)	Buck / Milliman
		Basic	COLA	Total		
General Members						
Tier 1	25	2.66%	0.84%	3.50%	3.69%	105.4%
	35	3.14%	0.99%	4.13%	4.36%	105.5%
	45	3.79%	1.20%	4.99%	5.25%	105.2%
Tier 2	25	4.14%	1.31%	5.45%	5.89%	108.1%
	35	5.00%	1.58%	6.58%	6.94%	105.5%
	45	6.05%	1.91%	7.96%	8.39%	105.4%
Tier 4	25	2.62%	0.74%	3.36%	3.38%	100.5%
	35	3.06%	0.87%	3.93%	3.94%	100.3%
	45	3.69%	1.05%	4.74%	4.75%	100.3%
Tier 5	25	5.25%	1.49%	6.74%	6.75%	100.2%
	35	6.13%	1.74%	7.87%	7.90%	100.4%
	45	7.38%	2.09%	9.47%	9.50%	100.3%
Safety Members						
Tier 4	25	3.51%	1.92%	5.43%	5.37%	98.9%
	35	4.13%	2.26%	6.39%	6.31%	98.8%
	45	4.94%	2.70%	7.64%	7.56%	98.9%
Tier 5	25	7.02%	3.84%	10.86%	10.73%	98.8%
	35	8.25%	4.51%	12.76%	12.61%	98.8%
	45	9.89%	5.41%	15.30%	15.11%	98.8%

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
and 2003-2006 Experience Study**

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.

The employer contribution rates are separately calculated for the County and Ceres/Other Agencies due to prior pension obligation bonds. The method used in this allocation passes all gains and losses on to the County. Our calculated employer contribution rate (based on Buck's methods and assumptions) matched Buck's rate closely.

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 Buck's calculations very closely in total. However, recommended changes in assumptions and methods, if made, will have a significant impact on the level of the contribution rates. A summary comparison of our results is shown below.

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

	Buck	Milliman	Ratio Buck/Milliman
Employer Normal Cost Rate	7.47%	7.47%	100.0%
UAAL Rate	1.75%	1.82%	95.9%
Total Employer Contribution	9.22%	9.30%	99.2%

**Individual Employer
Contribution Rates**

Additionally, we reviewed the employer contribution rates for the County and Ceres/Other Agencies and found them to be reasonable.

**Exhibit 6-2
Comparison of Employer Contribution Rates**
(as a Percentage of Payroll)

	Buck	Milliman	Ratio Buck/Milliman
General (County)			
Tier 3	3.94%	3.89%	101.2%
Tier 4	7.52%	7.09%	106.1%
Tier 5	7.20%	7.12%	101.1%
General (Other Agency)			
Tier 1	13.54%	12.17%	111.3%
Tier 2	9.02%	9.50%	94.9%
Tier 4	10.74%	9.84%	109.1%
Tier 5	10.42%	9.88%	105.5%
Safety (County)			
Tier 4	19.41%	20.34%	95.4%
Tier 5	17.32%	17.31%	100.0%
Safety (Other Agency)			
Tier 4	23.63%	24.85%	95.1%
Tier 5	21.54%	21.83%	98.7%
Grand Total	9.22%	9.30%	99.2%

There was not sufficient detail in the valuation report to independently verify these calculations. We obtained additional information on Buck's methods to perform our calculations. We recommend that future valuation reports disclose the adjustments made in the allocation of contribution rates by employer.

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 StanCERA's current practice.

StanCERA is funding the UAAL over an open (i.e., rolling) 20-year period as of the June 30, 2006 valuation with level dollar payments. This approach exceeds the generally accepted minimum requirements for the ARC, and we believe it is reasonable for use by StanCERA.

We would note that by using an open amortization period, the UAAL is not expected to be paid off over the 20 year period, as each year in the future the amortization period resets. This is a drawback of the open approach; however, it does help with contribution rate volatility.

Funding Method

The County's UAAL contribution is based on a level-dollar amortization schedule. The vast majority of public sector retirement systems use a level percentage of payroll approach. We do think the current approach is reasonable, just not the one we usually recommend. It should be noted that, unlike the County, the Ceres/Other group is funded as a level percentage of pay. We are not sure of the rationale for this difference.

There is another difference in the calculation of the UAAL contribution rate between the County and the Ceres/Other Agency group. The calculation of the employer rates for Ceres/Other is based on a theoretical UAAL for the group. The theoretical UAAL is the actual UAAL as of 1995 (when the County issued the pension obligation bond) adjusted each year with increases for the assumed investment return and decreases for the estimated UAAL contributions. The employer contribution for this group is then based on this theoretical UAAL.

Funding Method (continued)

The County's UAAL is then equal to the total UAAL less the theoretical Ceres/Other Agency UAAL.

Making an adjustment for the pension obligation bond is clearly appropriate. The Board should just be aware of the implications of this approach. If, for example, the valuation assets returned 20%, this asset gain would go directly to the County in the form of lower contribution rates, and there would be no impact on the Ceres/Other Agency group. Similarly, if the valuation assets returned negative 10%, this asset loss would go directly to the County, resulting in higher contribution rates, and there would be no impact on the Ceres/Other Agency group.

Actuarial Cost Method

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

**Stanislaus County Employees' Retirement Association
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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 generally reasonable, but somewhat on the aggressive side. We are recommending the following changes:

- **Price Inflation:** The inflation assumption is just outside our best-estimate range, on the high side. We recommend that the inflation assumption be lowered.
- **Wage Inflation:** The current assumption sets the general wage increase assumption equal to price inflation. Historical patterns and future expectations indicate that there is a productivity component of wage inflation in excess of price inflation. We recommend that the wage inflation assumption be set higher than the price inflation assumption to reflect productivity.
- **Investment Return:** We find the current assumption to be reasonable based on the current 4.00% inflation assumption; however, we consider the inflation assumption to be high. We recommend consideration be given to lowering the investment return assumption, particularly if the price inflation assumption is lowered.

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.

In their experience study, Buck reviewed the economic assumptions as of June 30, 2006. For purposes of our analysis, we have looked at the current environment in 2008.

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 StanCERA.

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 Buck's analysis, we believe the economic assumptions used by Buck in the June 30, 2006 actuarial valuation are generally reasonable, although somewhat on the aggressive side. In our opinion, the inflation assumption is just outside our best-estimate range, on the high side, and the investment return assumption is in the best estimate range but somewhat aggressive (less than a 50% probability of meeting the 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	4.00%
Real Investment Return	<u>4.16%</u>
Total Investment Return	8.16%
Price Inflation	4.00%
Real Wage Growth (Productivity)	<u>0.00%</u>
Total Wage Growth	4.00%
Payroll Growth	4.00%

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 generally reasonable. We would describe them as somewhat aggressive. 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 not for StanCERA since the current assumptions are greater than the maximum COLA of 3.00%.

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.

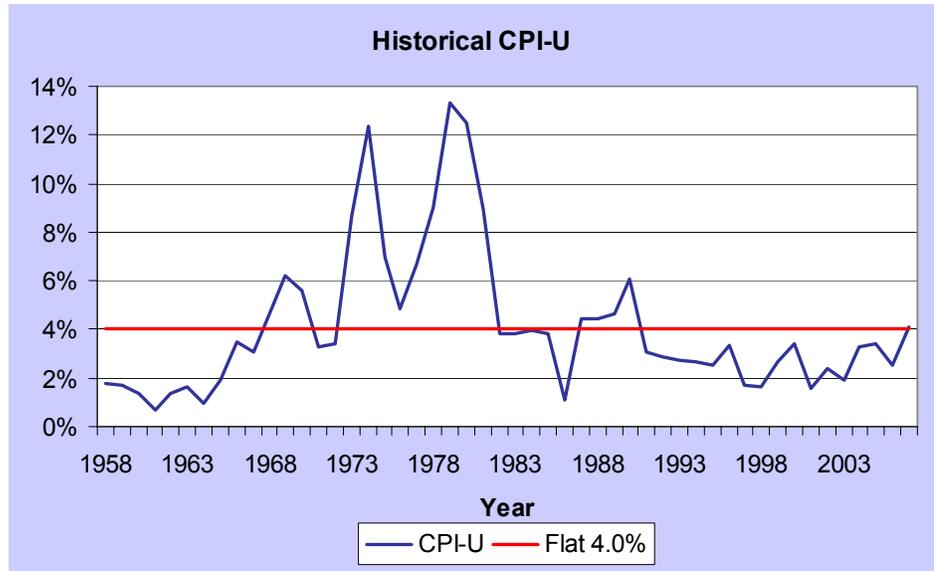
There are numerous ways to review historical data, with significantly differing results. The tables below show the compounded annual inflation rate for various 10-year periods, and for longer periods ended in 2006.

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 greater than 4.0% only once in the last 15 years, when it was 4.1% (2007).



Forecasts of Inflation: Since the U.S. Treasury started issuing inflation indexed bonds, 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 for most of 2008 have suggested investors expect inflation to be about 2.5% over the next 10 years. The current (November 2008) expectation is significantly lower, 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 2008 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:

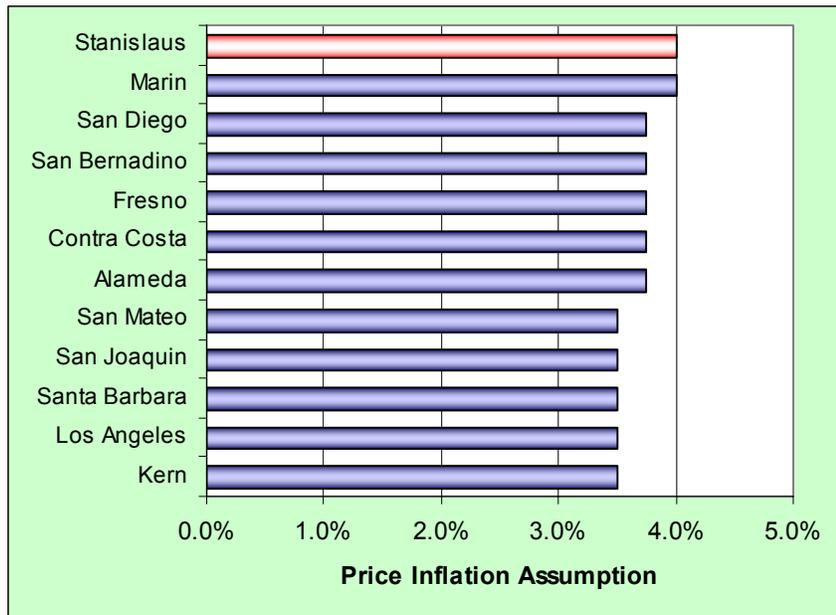
These rates of increase are the same as those used in the 2007 report, and reflect a belief that future inflationary shocks will likely be offset by succeeding periods of relatively slow inflation due to persistent international competition, and that future monetary policy will be similar to the recent 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 StanCERA 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 on the high side.



**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 4.00% to be slightly higher than our best-estimate range.

Consumer Price Inflation	
Current Assumption	4.0%
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 StanCERA'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 8.16% per year, net of all investment-related and administrative expenses.

**Investment Return
(continued)**

Method to Determine Best-Estimate Range for Investment

Return: The following chart sets out the asset allocation as of June 30, 2006 and the expected real rate of return for each class that was used by Milliman in determining the expected return.

Asset Class	Target Asset Allocation	Milliman's Expected Real Rate of Return*
Large Cap US Stocks	36.1%	6.28%
Small Cap US Stocks	9.3%	7.89%
International Stocks	20.0%	6.65%
Fixed Income	29.6%	2.56%
Special Situations Fund	5.0%	5.19%
Total	100.0%	

** Rates are expected annual arithmetic returns.*

Note that for purposes of this analysis, we have assumed that the 5% in the Special Situations Fund is allocated as an additional 2% in fixed income and an additional 1% in each of the three stock classifications.

We compared the real returns by class used by Buck with those used by Milliman's investment consultants and found Buck's rate to be high. We believe this is because Buck is using actual returns for the period 1926-2005 ("backward-looking"); whereas, Milliman's expected returns are based on future expectations ("forward-looking").

Milliman calculated the best-estimate range for the investment return assumption based upon StanCERA's asset allocation, the expected real rates of return used by Milliman's investment consultants, an administrative and investment expense assumption of 0.46% (average of expenses from prior two years), and the assumed inflation assumption of 3.50%.

**Investment Return
(continued)**

Note that we have used a 3.50% inflation assumption, because we do not believe that a 4.00% inflation assumption is a reasonable expectation of the future. We believe 3.50% is more consistent with the current environment, although it is still higher than what most economists and investment consultants are predicting. As discussed earlier, we have been recommending 3.50% or less to our clients.

In addition, an 13.2% 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.

The results are summarized below:

Expected Return with 3.5% Inflation and Milliman's Expected Rate of Return
(net of investment and administrative expenses)

Horizon In Years	Percentile Results for Nominal Rate of Return				
	5 th	25 th	50 th	75 th	95 th
1	-11.0%	-0.4%	7.7%	16.4%	30.3%
5	-1.2%	4.0%	7.7%	11.5%	17.3%
10	1.4%	5.0%	7.7%	10.4%	14.4%
20	3.2%	5.8%	7.7%	9.6%	12.4%
50	4.8%	6.5%	7.7%	8.9%	10.6%

**Investment Return
(continued)**

Over a 50-year time horizon, we estimate there is a 25% chance the nominal rate of return will be less than 6.5% and a 25% chance the return will be greater than 8.9% (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 6.5% to 8.9% as not. The median return over 50 years is expected to be about 7.7%.

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

Horizon In Years	Arithmetic Mean	Geometric Mean
1	8.4%	8.4%
5	8.4%	7.8%
10	8.4%	7.7%
20	8.4%	7.7%
50	8.4%	7.7%

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 used for funding purposes.

StanCERA has addressed some of these issues with their excess earnings policy by setting up a contra-reserve for prior interest crediting shortfalls.

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, StanCERA has somewhat alleviated this concern.

Investment Return (continued)

It should be noted that since the contra-reserve is based on a theoretical interest crediting, it is not impacted by changes in liabilities. Therefore, excess earnings can be granted when the system is less than 100% funded. If there are significant changes in liability levels (due to assumption changes for example), excess earnings may be credited when the funding level is significantly less than 100% funded.

As noted above, it is 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 StanCERA 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 future excess earnings.

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, StanCERA's current assumption is somewhat on the high side, although the return assumptions are bunched tightly around 8.0%, so the difference is relatively small. Nevertheless, a difference as small as 0.25% in the investment return can still have a fairly significant impact on how the system is funded.



**Investment Return
(continued)**

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 6.5% to 8.9%.

Components of Return	Percentile Results		
	25th	50th	75th
Real Rate of Return	3.43%	4.62%	5.82%
Assumed Inflation	3.50%	3.50%	3.50%
Total Expenses	-0.46%	-0.46%	-0.46%
Net Investment Return	6.47%	7.66%	8.86%

**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 the same as the price inflation rate, 4.00% per year. This means that the 4.00% includes no provisions for increases in wages due to productivity 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%

General Wage Growth (continued)

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 2008 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 2008 Trustees report was 0.6% to 1.6% per year.

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 0.0% does not fall in this range. We recommend that consideration be given to increasing this assumption to at least 0.5%.

Real Wage Inflation	
Current Assumption	0.0%
Reasonable Range	0.5% - 1.5%
General Wage Growth	
Current Assumption	4.0%

* Note that if the inflation assumption were lowered from 4.0% to 3.5% (in line with what we recommend to our clients), the reasonable range for the general wage growth would be 4.0% to 5.0%.

Payroll Increase Assumption

The UAAL is amortized as a level dollar amount for the County. For Ceres and other agencies the amortization is based on a level percentage of pay. In most public retirement systems, the UAAL is amortized as a percentage of pay. We generally recommend the payroll increase assumption be set equal to the general wage growth assumption.

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
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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 believe significant changes need to be made to more accurately reflect expected future experience. These changes can be expected to have a material impact on the funding status and contribution rates.

The most significant of the changes that we are recommending are the following:

- **Termination Rates after Retirement Eligibility:** The termination assumption should be revised so that members who are currently eligible for a service retirement benefit are not assumed to elect either a deferred retirement benefit or a refund of contributions.
- **Termination Rates (Age vs. Service):** The termination assumption should be changed from the current method based on age to a service-related schedule to more accurately reflect the nature of StanCERA's liabilities.
- **Service Retirement:** In Buck's work, they did not correctly reflect which members were eligible for service retirement in their determination of the service retirement rates. These rates should be increased to correct this issue.
- **Post-Retirement Mortality:** We recommend that the post-retirement mortality assumption be strengthened to make sure adequate margin is incorporated to reflect expected increases in life expectancies in the future.
- **Merit Salary Increases:** We recommend that merit salary increase assumption be changed from the current method based on age to a service-related schedule to more accurately reflect the nature of StanCERA's liabilities.
- **Terminal Pay Load:** Final compensation may be increased in the member's final year due to cash outs of vacation time. We recommend consideration be given in the next experience study to reflect this impact.

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.

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 current assumptions by 20%. Note that the “current” assumptions are those used in the June 30, 2006 actuarial valuation.

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 Buck’s; however, we believe that based on these results a change should be made. We strongly recommend consideration be given to updating the assumption to reflect increased life expectancies.

The overall actual-to-expected ratio is 93% in Buck’s study, so there were fractionally fewer deaths than the assumptions predicted (i.e., retirees are living longer than expected). We like to see an actual-to-expected ratio that is at least 110%. 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.
- **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.

**Post-Retirement
Mortality – Healthy
Retirement
(continued)**

We have one other recommendation with regard to the mortality assumption. Currently, the mortality for all Safety members is based on a standard table for males. We believe male and females should be treated differently. The following table shows a comparison of the results of our study of mortality with the results reported by Buck.

Group	Healthy (Milliman)			Healthy (Buck)		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
General	141	150	94%	147	157	94%
Safety	10	14	71%	9	10	87%
Total	151	164	92%	156	167	93%

**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 Buck. However, similar to healthy mortality, actual experience indicates that disabled retirees are living longer than the current assumptions are predicting, as indicated by Buck’s actual-to-expected ratio of 81%. We believe this assumption needs to be updated.

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

Group	Disabled (Milliman)			Disabled (Buck)		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
General	22	31	71%	17	23	76%
Safety	7	7	100%	5	5	104%
Total	29	38	76%	22	27	81%

**Merit and
Longevity Salary
Increases**

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 have two comments on the current assumption:

- **Age vs. Service:** The current assumptions expect lower merit increases as a member ages. While we agree this is true, our analysis has shown that a member’s years of service is a better predictor of merit increases than their age. That is, early in the member’s career, they tend to receive larger merit increases; whereas, later in a member’s career the increases tend to be smaller.

Merit and Longevity Salary Increases (continued)

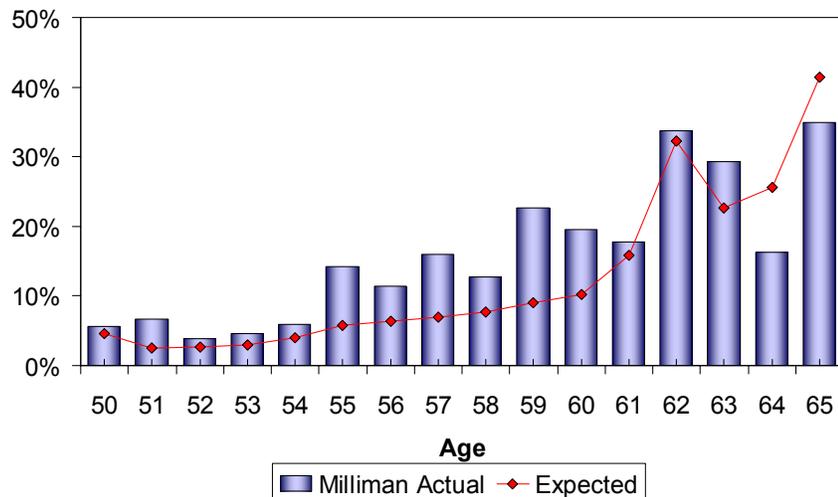
- Small Increase After Age 35:** Under the current assumption, merit increases are assumed to be relatively high at age 20, but rapidly decrease to less than 0.50% by age 35. This means that a member hired at age 35 or later (which is roughly half of StanCERA's population) is never expected to have significant merit increases. This is not consistent with what we have seen in other systems.

We recommend the current merit increase assumption be changed to be based on years of service.

Rates of Service Retirement

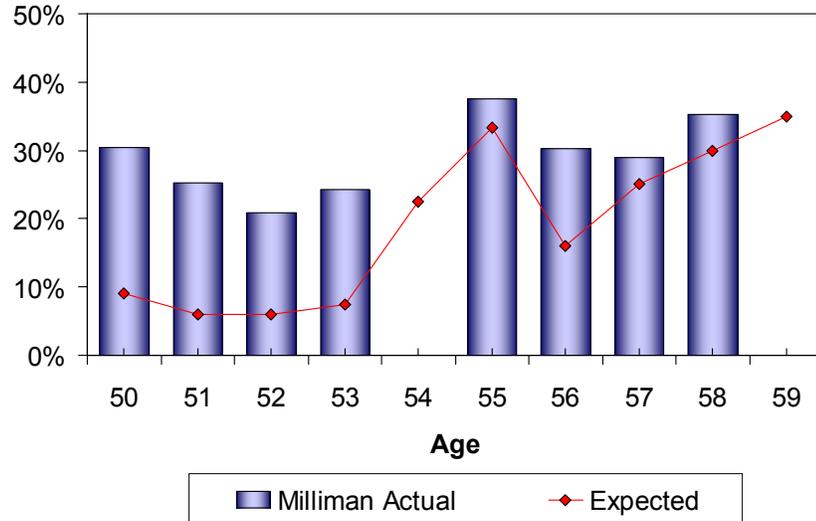
We studied service retirement rates for both General and Safety members. We believe the method Buck used to develop their service retirement rates was flawed and that the current rates are significantly understated.

The following graph shows the results of our analysis for all General member service retirements from active service. Note how the blue bars (actual rates) are significantly higher than the red line (assumed rates) for ages less than 64.



Rates of Service Retirement (continued)

The difference is more pronounced for Safety members as can be seen in the following graph. Once again the expected rates (red line) are significantly less than the actual service retirement rates (blue bars).



Based on our analysis, we concluded that Buck was including all active members in their calculations of service retirement rates, instead of only those eligible for service retirement. We have confirmed this with Buck. This is the reason for the difference in the actual and assumed rates.

Including only those eligible for service retirement is the standard approach in actuarial work, is consistent with the plan provisions, and is the method used in the valuation. This is the method that should be used in determining the service retirement assumption.

We recommend one additional change that would only have a small impact on the overall funding of StanCERA. It would be appropriate to have a separate service retirement schedule for Tier 3, given the significantly lower level of benefits. Since the group is quite small, we recommend that the rates be based on those being used by other '37 Act systems that have a similar tier. This would result in a decrease in the service retirement rates for this group. We also recommend the Tier 3 disability rate be set to 0%, as there are no disability benefits for this group.

Rates of Disability Retirement

We studied rates of disability retirement for both General and Safety members. We found our results to be consistent with the current assumptions. Once again there was a difference in methodology between Buck and Milliman, similar to the issue with the service retirement rates. This affects the comparison between Buck's results and our results; however, the impact was much smaller, and we believe the current assumptions are reasonable.

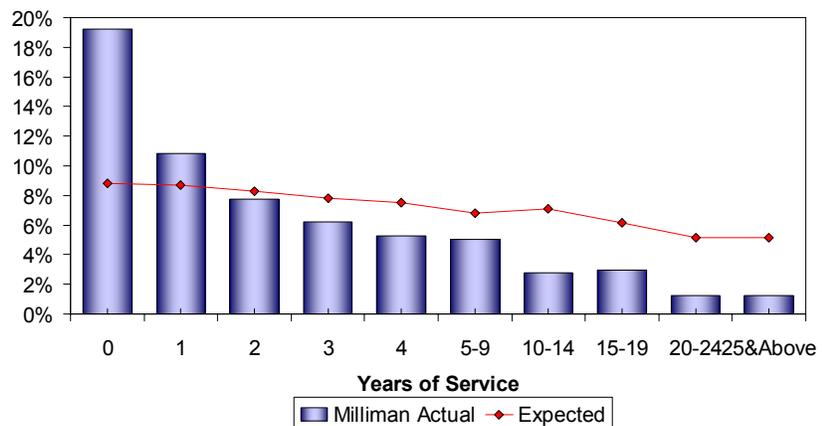
Results of our study are shown by group below.

Group	Milliman			Buck		
	Actual	Expected	Act/Exp	Actual	Expected	Act/Exp
Ordinary Disability						
General	11	8.1	136%	10	11.3	88%
Safety	1	1.2	83%	1	1.7	59%
Total	12	9.3	129%	11	13.0	85%
Duty Disability						
General	10	8.9	112%	6	9.2	65%
Safety	13	15.6	83%	12	15.7	76%
Total	23	24.5	94%	18	24.9	72%
Total	35	33.8	104%	29	37.9	77%

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 Buck's; however, we strongly recommend that current assumptions be revised so that terminations are based on service and not age. Our analysis of other retirement systems has consistently shown that service is a much better predictor of termination rates than age. We also found this to be true with StanCERA.

The following graph shows a comparison of the rates of termination for all active General members based on years of service. It shows that the current rates (red line) predict fewer terminations than are actually occurring in the first few years, with the converse being true at three years of service or more. For members with 10 or more years of service, the expected rates based on age are more than double the actual rates. Since these are the members with the vast majority of the liabilities, the current method is overpredicting terminations for this group and therefore understating liabilities overall.



Our second recommendation with regard to the termination assumption relates to the rates applicable after a member is eligible for service retirement. Buck assumes the same rates of termination apply both before and after a member is eligible for retirement. Our practice, and that of the majority of pension actuaries, is to assume no terminations will occur after eligibility for retirement.

Although it is true there will be an occasional person who will terminate employment while eligible and not elect to begin retirement benefits, it has been our experience that this is extremely rare. We studied this for StanCERA and found that there were 7 terminations among those eligible for service retirement compared to an expected 81. We strongly recommend that the assumption be no terminations after eligibility for service retirement, as the current method will tend to materially understate the system's liabilities.

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 deferred Safety members and found that of those who retired during the study period, half were age 50 or less, with an average of age 52. Similarly, the assumption for deferred General members is age 62, but the actual average age at retirement was 57. We recommend that consideration be given to lowering the ages for these assumptions.

- ✓ **Percent Married (or with an Eligible Domestic Partner):** The current assumption is 90% of males have an eligible survivor at retirement and 50% of females. We studied this assumption and found that actual number for the period was less for males (77%) and slightly greater for females (52%). We recommend consideration be given to changing this assumption to reflect the actual experience. Note that the actual experience is consistent with our observations of other '37 Act systems.
- ✓ **Reciprocal Employer:** The current assumption is 50% of members who terminate with a vested benefit will enter a reciprocal system. We studied this assumption and found that actual number for the period was less for both General (21%) and Safety (32%). We recommend consideration be given to changing this assumption to partially reflect the actual experience. Note that the actual percentage of members joining a reciprocal employer is slightly lower than our observations of most other '37 Act systems.

**Stanislaus County Employees' Retirement Association
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Section 9 Valuation and Experience Study Reports

Audit Conclusion



We are recommending additional disclosures be included in both the valuation and experience study reports. In particular, the valuation report does not provide documentation on the adjustment made in the calculation of the valuation assets and the basis for the different employer group contribution rates.

Comments

We offer the following comments on the report. Each of these comments pertains to additional disclosure, and none directly impacts the valuation results.

- In our opinion, the experience study report has very little documentation to support the recommendations. Providing additional detail, such as the graphs we have shown in Section 8, would help Board members make a more informed decision when adopting the new assumptions.
- The valuation report should disclose the adjustments made to the UAAL for prior pension obligation bonds in the determination of the UAAL contribution rates by employer group.
- In the Post-Retirement Mortality section of the experience study report, Buck 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 Buck's valuation report (page 36). The mortality for beneficiaries should be disclosed.
- Between the 2003 and 2006 valuations, there were changes made to which funds were treated as valuation assets or nonvaluation assets. The disclosure for these changes which impact the assets available to fund the base pension benefits was not adequately disclosed or consistent between reports.

Comments (continued)

Between the 2004 and 2005 valuations, the Contingency Reserve was reduced from 3% to 2% of the market value of assets. This resulted in an \$11,762,637 gain in the valuation assets. Exhibit 2.4 computed the asset gain and rate of investment return correctly on the prior year's valuation assets and then reported the transfer of funds as an actuarial method gain in Exhibit 3.3. This at least reported the experience gain and its source as other than normal gains from assets. However, nowhere in the 2005 report was this increase in valuation assets discussed.

Between the 2005 and 2006 valuations additional activity occurred between the valuation and the nonvaluation funds. No disclosure was made in the 2006 report regarding the transfer of the prior 2% Contingency Reserve to valuation assets or an additional increase which appears to have occurred due to a significant decrease in the Health Insurance Reserve fund and other nonvaluation reserves from 2005 to 2006. There were about \$35 million dollars reallocated from nonvaluation reserves to valuation reserves for funding purposes resulting in a significant funding gain and most likely the primary reason for a contribution decrease. Note these adjustments in the nonvaluation reserves were made to the market value reserve amounts reported in the 2006 CAFR but only for the nonvaluation reserves. The valuation reserves were left at full market value for purposes of determining the valuation assets.

In addition, the 2006 report repeatedly stated the return rate was 10.92% for the valuation assets when clearly the increase was due more to the reallocation of funds rather than any investment income return. We recommend future reports disclose the changes in not only the market value of assets and the valuation assets but also in the actuarial assets. Since StanCERA continues to have nonvaluation reserves, any changes in those reserves will have a direct impact on valuation funding assets and the resulting funded ratio and contribution rate calculations. This difference is illustrated below for the 2006 financial results using the amounts shown in the Buck report. Note that on an actuarial asset basis, the plan actually had an investment return loss.

Comments (continued)

We also noticed that some of the actuarial disclosures in the financial section of the 2006 CAFR did not correctly reflect the information from the 2005 actuarial valuation report. Also the experience gain from the reallocation of the nonvaluation funds due to the decrease in the Contingency Reserve was not reported in the CAFR analysis of financial experience in the actuarial section of the report even though it was correctly reported in the 2005 actuarial valuation report.

We would suggest that the CAFR disclosures be compared to the actual valuation report information.

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
and 2003-2006 Experience Study**

Appendix A Supporting Exhibits



The following exhibits provide additional supporting details for the calculations performed in the audit.

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
and 2003-2006 Experience Study**

Active Present Value of Benefits

All Values in \$Millions

Tier	Buck	Milliman	Buck/Milliman
General			
Withdrawal	\$ 95.6	\$ 93.8	101.9%
Service Retirement	463.3	466.6	99.3%
Death	6.9	6.8	101.5%
Duty Disability	10.7	10.8	99.1%
Non-duty Disability	9.2	9.3	98.9%
Total Active PVB (General)	\$ 585.7	\$ 587.3	99.7%
Safety			
Withdrawal	\$ 18.2	\$ 17.8	102.2%
Service Retirement	143.0	143.1	99.9%
Death	4.1	4.4	93.2%
Duty Disability	36.7	36.8	99.7%
Non-duty Disability	3.2	3.2	100.0%
Total Active PVB (Safety)	\$ 205.2	\$ 205.3	100.0%
Totals			
Withdrawal	\$ 113.8	\$ 111.6	102.0%
Service Retirement	606.3	609.7	99.4%
Death	11.0	11.2	98.2%
Duty Disability	47.4	47.6	99.6%
Non-duty Disability	12.4	12.5	99.2%
Total Active PVB	\$ 790.9	\$ 792.6	99.8%

**Stanislaus County Employees' Retirement Association
Actuarial Audit of June 30, 2006 Valuation
and 2003-2006 Experience Study**

Normal Cost Rates

Tier	Buck	Milliman	Buck/Milliman
General Tiers 1 & 4			
Gross Normal Cost Rate	9.43%	9.13%	103.3%
Member Rate	3.31%	3.51%	94.1%
Employer NC Rate	6.13%	5.62%	109.0%
General Tiers 2 & 5			
Gross Normal Cost Rate	13.55%	13.40%	101.1%
Member Rate	7.74%	7.75%	99.9%
Employer NC Rate	5.81%	5.66%	102.7%
General Tier 3			
Gross Normal Cost Rate	2.55%	2.42%	105.0%
Member Rate	0.00%	0.00%	100.0%
Employer NC Rate	2.55%	2.42%	105.0%
General Combined			
Gross Normal Cost Rate	13.17%	13.02%	101.2%
Member Rate	7.38%	7.40%	99.7%
Employer NC Rate	5.79%	5.62%	103.1%
Safety Tiers 1 & 4			
Gross Normal Cost Rate	22.34%	23.71%	94.2%
Member Rate	5.31%	5.31%	100.0%
Employer NC Rate	17.02%	18.39%	92.6%
Safety Tiers 2 & 5			
Gross Normal Cost Rate	25.91%	26.33%	98.4%
Member Rate	10.98%	10.96%	100.2%
Employer NC Rate	14.93%	15.37%	97.2%
Safety Combined			
Gross Normal Cost Rate	25.87%	26.29%	98.4%
Member Rate	10.91%	10.88%	100.2%
Employer NC Rate	14.96%	15.41%	97.1%
All Employers Combined			
Gross Normal Cost Rate	15.43%	15.53%	99.4%
Member Rate	7.97%	8.06%	98.9%
Total Employer NC Rate	7.47%	7.47%	100.0%