

TULARE COUNTY EMPLOYEES' RETIREMENT SYSTEM



ACTUARIAL AUDIT

September 2014

ROEDER FINANCIAL

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AUDIT SCOPE

TCERA asked us to complete what we would term a "Level 2" audit. This is not a parallel valuation nor a check on data quality but offers the next highest level of review. We asked the system actuary, Buck, to provide us with selected "sample life" data. The lives were selected to represent different demographics and different valuation groups.

We performed the following tasks in our review:

- 1) We reviewed each of the last three actuarial valuations
- 2) We reviewed the last experience investigation report
- 3) We reviewed the member data files used for the June 30, 2012 and June 30, 2013 valuations
- 4) We posed numerous questions of Dave Kehler, Leanne Malison, Charlie Chittenden, Bonnie Rockwood and Victor Hong
- 5) We calculated present values and normal costs for 8 active employees, including 4 actives in the recently created Tier 4
- 6) We reviewed and checked five present value calculations for current retirants and two calculations for current beneficiaries (all non-SRBR benefits)
- 7) We calculated two sample employee contribution rates

This is the second audit that Roeder Financial has completed for TCERA. We were pleased that Buck incorporated numerous recommendations after our 2011 audit. For example, there are no longer any inconsistencies in the overall incidence of assumed employee turnover.

While this analysis is not designed to produce an audit as rigorous as if parallel valuations were completed, the scope of our audit did provide enough "meat" for us to make a host of suggestions that we believe will improve the actuarial process for TCERA. The audit also gives us the opportunity to affirm the areas where you are being well served.

Buck was cooperative in providing requested numbers. Based on both some complicated sample lives and a number of revisions, there was extensive "back and forth" dialogue and "number swapping" over nearly three months. We attempted not to disclose our calculated numbers until we were provided with requested data but there were some times where we did so disclose in an effort to help pinpoint the reasons for any significant variance and to speed up the process.

If we calculated a number which was within 96%-104% of the same number calculated by Buck, we were satisfied. If not, we asked for and/or provided further data.

From Buck's standpoint, the process required a lot of patience as TCERA's benefit structure is complex (as is the case for all the 1937 Act Systems). Such complexity has increased as a result of 2012 PEPR legislation which mandates new benefit levels for those hired after January 1, 2013. Your valuation refers to this new set of benefits as Tier 4. Since such benefit changes only apply to recent hires, TCERA should not expect such change to have significant impact on overall costs for 5-10 years.

ACTUARIAL FUNDING

No defined benefit ("DB") plan can know with certainty the associated costs in a given year. An estimate is done through an actuarial valuation.

The most significant objective that actuarial funding can hope to achieve in a DB plan is to calculate long-term contribution estimates that do not produce intergenerational subsidies among different eras of taxpayers. However, "level" does not generally mean a level dollar payment from year-to-year but level in terms of ability of a system to make payments. The usual measure of "level" is to compare computed contributions as a percentage of active member payroll. Since payroll is expected to rise with inflation, nominal dollar contributions will also be expected to increase in a level-cost system.

Social Security would be the most prominent example of a pension program that violates this principle due to its extremely low level of trust assets to pay future promised benefits. This principle would also be violated if "excessive" contributions were received in an early period of plan operation such that long-term contribution rates would be permanently lower. This can happen if actuarial assumptions are too conservative. For example, if a system continually earns a greater return on trust assets than anticipated, well intended conservatism can conflict with this principle of level funding. In California, level funding also conflicts with Proposition 162. Fiduciaries have a secondary obligation to reasonably minimize contributions charged to both employer and employees.

It is absolutely impossible to accurately estimate the wide variety of factors that are used to determine contribution rates and liabilities in a relatively short time frame. One of the key elements to any viable funding program is to have a logical, clearly defined manner as to how to handle the inevitable differences between assumed and actual experience. In any accepted funding method, such differences are reflected as actuarial gains or losses and systematically reflected in adjusting future contribution rates.

Invested assets are a byproduct of level-cost funding and not the objective. Investment income, in effect, becomes an additional contributor to a system.

Definition of some terms is important:

Normal Cost: The actuarial present value of retirement system benefits allocated to the current year by the actuarial funding method employed.

Actuarial Funding Method: A mathematical budgeting process for allocating the dollar amount of the accrued present value of retirement system benefits between future normal costs and actuarial accrued liability.

Actuarial Accrued Liability: The difference between the actuarial present value of system benefits and the actuarial value of future normal costs.

Actuarial Present Value: The amount of funds currently required to provide a payment or series of payments at predetermined rates of interest and by probabilities of payment.

Actuarial Equivalent: A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.

Accrued Service: Credited system service rendered prior to the actuarial valuation date.

Amortization: Paying off an Actuarial Accrued Liability with periodic payments of interest and principal.

Unfunded Actuarial Accrued Liability: The difference between Actuarial Accrued Liability and valuation assets.

Selecting An Actuarial Funding Method

TCERA currently used the most popular funding method of acceptable actuarial funding methods for both funding and expensing, Entry Age Normal. In the most recent Funding Ranking Survey by Roeder Financial, all 37 surveyed California systems use Entry Age Normal.

Under Entry Age Normal, the present value of projected benefits for each active member is spread as a level percent of an active member's compensation for each year from the member's entry age to the member's anticipated exit from active membership. If a member's anticipated compensation, five years after entering a plan, is 30% higher than at entry age, then the dollar normal cost for such year will also be 30% higher. The normal cost for the group is the sum of the normal costs for each active member of the group.

Entry Age Normal is the most popular method for public plans and is more conservative than certain other methods such as Projected Unit Credit funding.

Selection of an Asset Valuation Method

In any funding method, the amount of assets used for valuation purposes will have a direct and significant effect on overall plan costs.

Decades ago, many public plans used book value. This approach has long gone the way of the horse and carriage. Use of book value made some sense for those entities that had primarily fixed income investments held to maturity and had little or no exposure to equities or real estate. As of your last valuation date, TCERA held 54% of fund assets in equities and another 6% in real estate.

Increasing investment in asset classes where book value and market value may diverge significantly strongly argues against the use of book value. The current pension accounting standard indicates that the asset value should be “market related” in some rational way.

Why not use market value of assets at valuation date? If a system does, its pattern of contribution rates will likely prove to be volatile. The short-term vagaries of the market can be inconsistent with the intrinsic value of equities owned and are inconsistent with the long-term nature of pension funding. Was a plan’s domestic equity portfolio intrinsically 23% less valuable at the end of Black Monday in October 1987 than at dawn? No. The subsequent market rebound in November and December affirmed that.

The current method of developing the actuarial value of assets spreads unexpected changes in market value over 10 years. GASB states that the actuarial value of assets should be market-related. We viewed this as a significant issue in your 2011 audit. However, the variance between market value of assets and the actuarial value of assets has been diminishing, as follows:

<u>Valuation</u>	<u>Market Value</u> <u>of Assets</u>	<u>Actuarial Value</u> <u>of Assets</u>	<u>Difference</u>
		<i>(millions)</i>	
2013	1,064.9	1,159.3	94.4
2012	971.5	1,126.9	155.4
2011	1,001.3	1,121.7	120.3
2010	833.3	1,093.6	260.3
2009	761.0	1,066.9	305.9
2008	965.8	1,032.8	67.0

While your 10-year asset smoothing period is higher than we would view as optimal, any concerns we have are diluted by your 15-year amortization period. We recommend consideration of a funding corridor in the event the actuarial value of assets diverges markedly from market value. However, if a difference was under 10%. Regardless, a corridor might prove valuable in extreme situations and would better comply with existing actuarial standards.

Treatment of Actuarial Gains and Losses

Why should an actuary be very humble? Because we know that our calculations will inevitably be somewhat off target. In some years, such as your 2008-09 fiscal year that was in the throes of the equity meltdown, we will be way off. To the extent that actuarial experience differs from assumed, a fund needs to make a rational adjustment in future contribution levels. Under Entry Age Normal, actuarial gains (losses) directly impact the unfunded liability. Other factors equal, actuarial losses lead to higher plan contributions; gains result in lower contributions.

Data Analysis

There are slightly more than 26 biweekly pay periods in a year. We did make follow up inquiries with TCERA staff in two instances where the service credit implied some circumstance different from the norm. These samples related to rehire and reciprocal situations. Both actives appear to have been handled in an appropriate manner in the data file we reviewed.

Analysis of Active Members

Our analysis put added focus on TCERA's new Tier 4. This Tier was created for post-January 1, 2013 hires as a result of 2012's passage of Assembly Bill 340. In addition to reduced benefit levels, there are other distinguishing features of Tier 4.

- Ineligible for SRBR benefits
- 50-50 employee sharing of actuarially computed normal cost
- First possible service retirement age has been increased to age 52 and age 50 for General and Safety members, respectively
- There is a cap on pension compensation, based on the maximum wage base for the non-Medicare component of Social Security taxation
- Certain one-shot payments (ie, redemption of unused sick leave or unused vacation time) cannot be included in pension compensation
- There is no integration with Social Security – as was the case for other Tiers
- The County has elected to cap the amount of unused sick leave conversion to six months for benefit service for Tier 4

Buck should not have allowed for General, Tier 4 service retirement at ages 50 and 51 as indicated in their assumptions on page 43 of their valuation report. In reviewing their sample lives, they did not allow for service retirement at age 50 and 51 so the increased minimum service retirement eligibility age appears to be handled correctly. In the initial work we reviewed, Buck did not have allowance for employee termination at ages 50-51. This was corrected in their revised runs.

Similarly, the Buck report did not show that they correctly valued the increased benefit multiplier at ages over 65. The report only shows multipliers through age 65. Buck told us they valued the correct multiplier of 2.4% at age 66 and 2.5% for higher ages.

Our audit was complicated by two other ways in which the valuation report was not consistent with the provided sample lives. The mortality rates in the valuation report reflect the RP-2000 Table but their actual mortality reflects this Table projected with improvements to 2013. Reflecting mortality improvements is a good practice but this should have been reflected in the rates shown.

Another inconsistency in the report is the treatment for potentially terminating actives with 5 years of service. Their report for the withdrawal column "from 3-5 years" of service was not used for employees with 5 years of service. Instead, the column for ">5" years of service was used. Buck will correct this in their 2014 valuation report.

In the initial Tier 4 sample lives we provided, some of the values of the retirement benefits were clearly too low. The value of their initial service retirement benefit for one Safety Tier 4 sample life, Audrey Sanderson, was roughly half of what it should have been. Benefits for General Tier 4 employees were also too low; Alison Doyle by roughly 30% and Janet Loaiza by a significant margin. When this was pointed out, Buck was responsive and made some changes to correct this. Our understanding is that the changes Buck made related to their handling of disability and correcting an error which was causing members to exit the active work force before they should have exited.

For Tier 4, We were initially told that Buck used the same \$4,200 per year to differentiate for benefit accrual above and below such "break point". However, they later assured us that this was not the case. Such break point does exist for Tiers 1-3.

Buck indicated that the PEPRA pension compensation cap each year in the future would be projected with inflation. We concur with this approach as it is consistent with other inflation-related assumptions. However, in the sample life we initially reviewed, they did not index the PEPRA compensation cap.

One of the General Tier 4 sample lives had an entry age of 58. For this sample life, Buck assumed no employee withdrawal once the employee was assumed to reach age 60. On pages 42-43 of their valuation report, Buck shows employee turnover for each of the first five years of service. When asked, Buck indicated their intent to have employee turnover in each of the first five years of service in all cases. They indicated that this treatment would be clarified in their next valuation.

Buck made one further Tier 4 correction. Initially, they assumed no withdrawal benefits for General members ages 50 and 51. This would have been a reasonable approach for Tiers 1-3, because of potential eligibility for service retirement benefits commencing at age 50, but with the minimum service retirement age increased to age 52, there needed to be some provision for employee termination at ages 50-51.

There was a pensionable pay ceiling that was imposed in an incorrect manner for a Tier 4 sample life. The cap is 100% of the Social Security pensionable wage ceiling if a member is an entity in Social Security; 120% otherwise. These caps are subject to annual indexing. The sample life imposed a dollar limit on the cap instead of using annual indexing.

Buck has continued to use the same retirement assumptions for Tier 4 members as other Tiers. Obviously, one cannot rely on actual experience for a large number of years to come for this group. Thus, some judgment is needed as to whether there will be later retirement ages due to the lesser benefits. Not only will pension benefit levels affect a retiree's choice as to when to retire, there will be other external factors such as the differential, if any, of the level of medical benefit coverage provided actives and retirees. We recommend that staff have input as to their considered judgment in this realm. -Other factors equal, we see no problem in assuming lower retirement incidence at the earlier ages.

One of the non-Tier 4 Safety members selected, Douglas Winslow, offers some insight as to how Buck handled a tricky situation. Winslow's valuation age is 50. The active member data file indicates that he has 21.5 years of benefit service. If Winslow had continuous service, an entry age of 28.5 (50 less 21.5) would be indicated. However, the entry age on the data file is 25. This apparent discrepancy could be caused by either a break in service or previous employment with a reciprocal entity. Under reciprocity, the entry age of the first employer is retained for purposes of determining employee contributions. Buck's stated approach was to use the entry age on the data file. When we mimicked their approach, our normal cost rate was roughly 3% lower. They subsequently discovered that their calculated compensation did not extend back to the entry age of 25.

Buck correctly uses actual benefit service in addition to the entry age from the data file. The actual benefit service is important. To fully fund the TCERA benefit by retirement age and to best reflect the TCERA accrued liability, we believe it would be an improvement to use a "backed in" entry age to represent the actual start date with TCERA, but, with the assumptions for withdrawal, pays, retirements based on the earlier entry age. From a simplicity standpoint, we have no problem if the TCERA employment date is used for all purposes, since this situation will likely not arise often enough to have a simple approach materially skew results.

Results for the other three non-Tier 4 actives were all satisfactory.

Employee Contributions

Tulare County has used a permissive section of California Government Code Section 31625.3 which permits the cessation of contributions for members with 30+ years of service. Such cessation does not apply to Tier 4 members. In our analysis for non-Tier 4 actives, Buck appears to have captured this cessation correctly.

Our test lives for Tier 2/3 employee contribution rates were all within tolerance of Buck's rates.

There is no special calculation for Tier 4 actives since they will be assessed half of the total normal cost. This approach, mandated by PEPRA, is a significant departure from prior practice. Many may have thought the calculation for previous Tiers represented half the anticipated cost but this was untrue.

In the pre-Tier 4 calculations, there are no employee contributions attributed to spousal continuance or disability pensions. Also, there is another "disconnect" between employer and employee contributions due to anticipated employee turnover. The County contribution rate is significantly reduced by anticipated employee turnover. No such reduction is used in employee calculations.

Buck shows that the average employee contributions for Tier 4 General employees are lower than pre-Tier 4 General members but higher for Tier 4 Safety members. This strikes us as reasonable. Safety members have higher disability incidence than General members. Now, Tier 4 members pay for half of all costs, inclusive of disability.

Analysis of Vested Deferred Members

We analyzed the benefit levels and the present value of benefits for four vested deferred members. Two of the members are now working for reciprocal employers. One of the sample lives was a Safety member, James Tomerlin.

The sample life data we received from Buck had two inconsistencies from their 2013 valuation report. The age in the report for the commencement of benefits was assumed to be age 60 and age 53, respectively for General and Safety vested deferreds. We believe these assumptions to be sound. In the initial sample life data we received, the assumed benefit commencement ages were ages 55 and 50. Buck indicated that the intent was to use the assumption stated in the valuation report and that a coding error was made.

Also, the assumed survivor benefit continuances were not accurate. While the 60% survivor continuance does not vary, actuaries will reduce the 60% to reflect the fact that not all retirees will have a spouse/domestic partner. For instance, the Buck valuation report assumes that 75% of General females will have a qualified beneficiary for the 60% survivor benefit. Since 75% of 60% is 45%, an acceptable actuarial approximation is to value all General females with a 45% continuance to a spouse/domestic partner. In the sample lives we received, the implicit marital status percentages were not consistent with the marital assumptions in the report. For example, the General female joint and survivor percent on the sample life was 39%. This is consistent with a General female marital assumption of 65% (65% of 60% is 39%). Similarly, the survivor percent for Safety males sample life was 60%. This implied that all Safety males were married. This implication was not consistent with the stated assumption in their valuation. Buck did some recalculations once the discrepancy was discovered. Buck calculated the impact on liabilities by such change to be roughly \$145,000 for the regular valuation and \$7,000 for the SRBR valuation.

For those deferred vesteds who are reciprocal, Buck uses different assumed pay increases than if they had remained in County employment. They employ a 5% pay increase assumption which is comprised of 4% inflation plus 1% merit. We see no rationale to use a different salary scale than the one used for County employees.

We also have an observation on how many terminating County employees, with 5+ years of service, are assumed to "shoot themselves in the foot" by pulling out their accumulated employee contributions, despite strong communication efforts by TCERA staff. In so doing, they forfeit their accrued pension. For General members with fewer than 15 years of service, 95% of terminating employees are assumed to withdraw contributions. For Safety members, with fewer than 15 years of service, this percentage fluctuates and is either 90% or 95%. For non-reciprocal terminations, this percentage becomes even higher since reciprocals must leave their employee contributions with TCERA. We have asked staff to analyze whether they feel comfortable with this assumption. If these percentages reflect current reality, we recommend that increased communication efforts be made to fully ensure what the employee is giving up.

Buck has made one clear improvement in the handling of withdrawing active members since 2011. By setting an overall withdrawal assumption and then assuming that a given percentage will become deferred vesteds, the anomaly of having higher aggregate withdrawal rates at older ages has been eliminated.

Analysis of Retirants and Beneficiaries

Our figures and Buck's figures were very close on the non-disability retirants. For the disability retirants, our present values were markedly lower. Upon Buck's review, they discovered a coding error. For example, on Randall Terry, we calculated a present value of benefit of \$239,889. Buck's initial calculations were roughly \$100,000 higher. Their disability retirants were being valued using non-disabilitant mortality.

Buck did complete calculations as to the reduction in the County contribution as a result of such correction. Buck indicated that 266 disabled retirants were impacted. Their revision indicates that the accrued liabilities were overstated by roughly \$6.3 million. They calculated that the County contribution was overstated by \$544,000. They also indicated that the disability mortality for currently active members was handled correctly.

One unusual assumption was made for General male assumptions in the probabilities of retirement. One of the improvements Buck has made is to reflect that attained age should not be the sole predictor of retirement. The idea is that actives with greater amounts of service are more likely to retire at a given age than others with the same attained age having lesser years of service because of a greater wherewithal to retire. For General males, retirement eligibles with less than 15 years of service, are assumed to have greater eligibility to retire than those with 15-20 years of service. Buck indicated that the statistics bore this out. This may prove to be an anomaly. Unless the next experience studies continue to bear this out, we would suggest revision of this relationship.

Assumption Recommendations

Pay Increases: In our 2011 audit, we expressed the belief it would be unlikely that either Tulare County or the State will return to robust financial health in the foreseeable future. This premise has been borne out by the average pays for active members in recent years. Currently, over half of the County's revenues come from Sacramento. While the state's fiscal condition has improved since the 2011 audit, we would still label the recovery as "fragile." We view the assertion that the state budget is now "balanced" with great skepticism. For example, the budget entirely ignores the 60+ billion unfunded liability existing for the State Teachers' Retirement System ("CalSTRS").

The following table indicates both actual aggregate pay increases and, alternatively, if the overall average pensionable pays if TCERA's actual annual inflation assumption of 4% was exactly met:

-----ACTUAL-----			IF ASSUMPTIONS MET	
Valuation	Average	Percent	Average	Percent
<u>Year</u>	<u>Pay</u>	<u>Increase</u>	<u>Pay</u>	<u>Increase</u>
2009	\$ 51,241	-----	\$51,241	-----
2010	51,358	0.2%	53,291	4.0%
2011	52,384	2.0%	55,422	4.0%
2012	51,884	(1.0)%	57,639	4.0%
2013	52,693	1.6%	59,945	4.0%

The average pensionable pay increase during this period has been 0.7% -- far short of the 4% assumed in your current assumptions. In the 2011 Buck experience study, their report cited support for a long-term rate of inflation of between 2.5% and 3% as indicated by the returns on inflation-linked bonds. In our 2014 Funding Ranking Survey, 25 of the 37 entities used inflation assumptions of less than 4%. Three entities used a 4.25% inflation assumption and nine others also used 4%.

Current pay increase assumptions reflect a robust financial condition that has not existed for some years and is unlikely to be reversed in the near term. We made a similar observation in the 2011 audit. Since there was a modest reduction in assumed pay increases, our comment does not have as much emphasis as in our 2011 work. Pay increase assumptions still may be too high. We believe the pay increase assumption likely remain too conservative in light of the County’s foreseeable economic condition.

We believe some reduction of the inflation assumption is in order, either to 3.75% or 3.5% per annum. The uncertainty of predicting long-term inflation and some bias toward making only moderate assumption tweaks argue in favor of 3.75%. Recent years’ experience and near-term predictions argue for a more significant reduction to 3.5%. This decision is complicated by TCERA’s decision to gradually reduce its assumed investment return by 0.05% annually until a 7% rate is reached in 2031. **Since inflation is also one of the two elements in determining the assumed investment return, consistent linkage between the overall pay increase assumption and the assumed investment return is essential.**

$$\text{Assumed Rate of Investment Return} = \text{Assumed Inflation} + \text{Assumed Real Rate of Return}$$

$$\text{Assumed Pay Increases} = \text{Assumed Inflation} + \text{Assumed Merit/Longevity Increase}$$

When the Board adopted the gradual, 18-year reduction in the assumed investment rate, our understanding is that the Board did not address which component of investment return would be impacted: the inflation element or the real rate of return component? If the inflation component is the element to be impacted, then the real rate of return would remain constant.

If there is a reduction in assumed inflation in the 2014 Experience Study, as we recommend, one of the implications is that the assumed real rate of return will increase. While this posture is defensible pursuant to the “conservatism margin” Buck delineated in the 2011 Experience Study, an “optimistic” assumption for the assumed real rate of return leaves TCERA more vulnerable to actuarial losses. We do note that TCERA’s current 7.90% assumed rate of total return is the highest of the 37 major California systems. While the Board likely does not wish to revisit the topic of the overall assumed return after its long-term “compromise” solution, we believe the issue does need to be addressed, particularly in view of our recommendation to reduce the inflation assumption.

Over the four-year period ending on June 30, 2013, inflation averaged 1.7 % per annum based on the Los Angeles-urban consumer index. If inflation of this magnitude existed each year, the average pay at June 30, 2013 would have been \$54,810 instead of the actual \$52,693. In other words, unexpectedly low inflation does not entirely explain the stagnant active pays. Thus, we also recommend a modest decrease in the promotional component of pay increase assumptions unless staff believes future pay increases will be more robust than indicated by recent activity.

To boot, the County will have fewer dollars for pay increases as long as pension contributions keep their steady annual increase over the past decade. While rates have not spiked sharply in Tulare County, rates have markedly increased for three entities who indirectly impact Tulare County from a standpoint of nearby competitive governmental employers: Fresno County, Kern County and CalPERS.

The 2012 passage of PEPRA will reduce County contributions in the long-term, other factors equal. However, since only post-2012 hires are impacted, the County will not begin to see significant savings for 5-10 years.

One factor in projecting pay increases is to be mindful of pay levels in surrounding comparable entities for competitive reasons. Fresno County has a contribution rate that has skied to 44% of pay. In Kern County, the contribution rate is slightly smaller, at 39%, but still staggering when one considers that the County also is paying debt service on Pension Obligation Bonds. So, it is extremely difficult to see that the nearest 1937 Act entities will be able to offer large pay increases given their daunting pension contribution requirements. The increasing pension contribution rates of CalPERS matter because over half of Tulare County’s revenue comes from the state. Even if the economy dramatically improves, the pension contribution burden that nobody envisioned a decade ago, will remain for at least the next decade due to the significant deferred asset losses that have not yet had a direct impact on contributions. Further, once some added fiscal strength returns to the state, there is a generation backlog of infrastructure needs that will need to be addressed.

Pay Increase Assumptions

The following table compares the assumed pay increases, **above inflation**, for TCERA and the two adjacent 37 Act Counties during an employee’s first 15 years of service. The numbers in parentheses reflect the assumptions in place during our 2011 audit:

Years of Service	TCERA		Fresno County		Kern County	
	General	Safety	General	Safety	General	Safety
0	2%	2.30% (2.25%)	7.5%	7%	6.75%	7.5%
1	1.8% (2%)	2.15% (2.25)	7	6	5.75	6.5
2	1.8% (2)	2.15% (2.25)	6.5	5.75	4.75	6.25
3	1.75% (2)	2.10% (2.25)	6	5.25	3.75	5.75
4	1.75% (2)	2.10% (2.25)	4.75	4.35	3.25	4.85
5	1.75% (2)	2% (2.25)	2.5	3.75	2.75	4.25
6	1.75% (2)	2% (2.25)	2	3.75	2.50	4.25
7	1.75% (2)	2% (2.25)	1.75	3.5	2.25	4
8	1.70% (2)	2% (2.25)	1.50	1.5	2	2
9	1.70% (2)	2% (2.25)	1.50	1.5	1.75	2
10	1.70% (2)	2% (2.25)	1.50	1.5	1.65	2
11	1.70% (2)	2% (2.25)	1.50	1.5	1.55	2
12	1.70% (2)	2% (2.25)	1.50	1.5	1.45	2
13	1.70% (2)	1.95% (2.25)	1.50	1.5	1.35	2
14	1.70% (2)	1.95% (2.25)	1.50	1.5	1.25	2
15	1.70% (2)	1.95% (2.25)	1.50	1.5	1.25	2

In both Fresno County and Kern County, the pattern of assumed pay increases is much more typical than Buck uses for Tulare County. For both FCERA and KCERA, more promotional opportunities are assumed to be available early in careers and fewer available as more seniority accrues. Assumed pay increases in later years of service usually carry “more weight” in the actuarial process since longer service employees are less likely to terminate and have higher accrued liabilities.

Kern County’s inflation assumption is 3.25% per annum. Thus, their aggregate pay increase for a General member with 15 years of service would be 4.5% (3.25% plus 1.25%). The overall pay increase assumed for a similarly situated Tulare County would be 5.70%.

Fresno County’s inflation assumption is 3.5% per annum. Thus, the total pay increase for a General member, with 15 years of service, would be 5% (3.5% plus 1.5%).

We have asked staff to weigh in the likelihood of promotions during an employee's County career. The template for pay raises in the Kern County and Fresno County valuations are more typical of what is typically assumed in public sector valuations. In most entities, the likelihood of promotions is significantly higher in earlier years of service. For those with 10+ years of service, the assumed pay scale becomes "much flatter" because most experienced employees are at or near the maximum pay grade attainable in their line of work.

Amortization of Unfunded Liabilities

TCERA's current funding policy is to amortize unfunded liabilities over a rolling 15-year period. We believe this is a sound policy. Critics of your policy may say that you will never fully amortize unfunded liabilities. This is true in a theoretical sense but there will be progress made in amortizing the unfunded liability. Also, we would point out that a System with a 90%-95% funded ratio is, paradoxically, more stable, than a fund with a 100+% funded ratio from a political standpoint. While we hope that plan sponsors learned a good lesson from 100+% funded ratios of a decade ago, there has always been pressure on the Trustees and the plan sponsor to provide more benefits or contribution relief if a system's funded ratio attains or exceeds 100%.

The Need For a Long-Term View

Regardless of the funding method selected, the results of one valuation are relatively inconclusive. The long-term nature of plan liability is illustrated by a new hire at age 21 possibly receiving benefits in 2090! Since there is no high degree of "ultimate actuarial truth" in any single valuation, it is only through a series of actuarial valuations over a period of 5+ years that increasing credibility can emerge. A pattern of both contribution rates and actuarial gains (losses) will likely emerge. If the selected actuarial assumptions are reasonable, such gains and losses will tend to offset each other over a period of time. If there are recurring actuarial gains, this indicates that selected assumptions are overly "conservative." Conservative means that current contribution levels are higher than the long-term contributions needed to support plan benefits. Conversely, if there are ongoing actuarial losses, selected assumptions may be overly "aggressive" in that long-term contributions will need to be higher than current contributions for a system to be financially sound.

A big note of caution: The inflation assumption and the real rate of investment return are usually the two most significant factors in determining contribution rates for a given set of benefits. The economic cycles in both bear and bull markets tend to be lengthy.

There have been four sustained market cycles over the past four decades:

1973-1982 BEAR

1983-2000 BULL

2001-2008 BEAR

2009-2014 BULL

In the actuarial valuation report, there should be enough historical information over the past ten years to give the reader a more appropriate long-term perspective. The need for a long-term view also argues strongly against changing actuarial assumptions too frequently. Frequent changes obscure reasonable comparisons of recent actuarial valuations and are inconsistent with the long-term nature of pension funding. If assumptions are changed more frequently than once every three years, a plan's decision makers should reflect whether undue micromanagement is occurring. Frequent assumption changes also open a political Pandora's box. Once this precedent is set, politicians or others with short-term agendas may find it easier to lobby for a set of assumption changes which produces a desired result.

The following indices should be provided in a valuation report over a period of 5-10 years to give the reader added perspective:

- Contribution rates
- Funded ratio (Actuarial Value of Assets *divided by* Actuarial Value of Liabilities)
- Unfunded liability
- Ratio of unfunded liability to active member payroll (This ratio should be declining over a period of years in absence of benefit enhancements)
- Overall actuarial gain (loss)
- Ratio of actuarial gain (loss) to Actuarial Value of Liabilities

Comparative schedules should be footnoted when an "apples to apples" comparison does not exist. This could occur when assumptions, benefits or funding methods are changed. When such changes are made, historical schedules should reflect both "before" and "after" status. The GASB disclosures in the valuation report do a good job of summarizing funded ratios, unfunded liabilities and employer contributions over the past decade. There was no historical reference to historical actuarial gains and losses over more than 4 years.

RECOMMENDATION: There should be a schedule in the report which shows actuarial gains (losses) in each of the past 6-10 years. We understand there is a schedule of this type in the County's CAFR. We recommend that such gains (losses) be split out between investment s and all other elements. The reason for the suggested bifurcation is that investment returns in the short run can vary dramatically. Even with asset smoothing, there are significant variations in the actuarial rate of return (which is determined based on smoothed asset values).

Mortality Rates

We recommend that Buck change their mortality rates for two reasons. A new mortality table exists, RP-2014, that is more up-to-date than the RP-2000 Table that has been the basis for recent valuations.

For certain purposes, such as the derivation of employee contribution rates, Buck is using the RP-2000 Table with projected improvements. We laud their use of projected mortality improvements since greater longevity is borne out by studies. We do believe their projection approach could be improved. In their projections to 2021, the end result is that the male mortality rates at age "x" are close or less than female projected rates at age "x+1." We have not seen this relationship in any other mortality table comparison. Usually, there is much larger gap between male and female mortality rates. For example, in the RP-2014 Table, there is a differential of 3-4 years at typical retirement ages. Therefore, in addition to updating the mortality table to the RP-2014 Table, we also recommend that any projections use an approach be used to preserve such historical differences between male and female mortality.

In another regard, Buck handles eligibility to receive a benefit with probability decrements very well. When an employee becomes eligible to service retire, the decrements of vesting and terminations are "turned off." Otherwise, you would potentially be undervaluing a potential service retirement benefit if the actuarial process allowed a service retirement-eligible employee to take a refund and thereby forfeit a significant pension. We whole heartedly agree with this approach and do suggest there be disclosure as such in their report.

Contingency Reserve

Buck has included the \$34 million contingency reserve in valuation assets. We concur with this approach. We apply a simple, Forrest Gump approach as to the inclusion or exclusion of reserves from the actuarial value of assets: If a reserve can be used to pay a benefit valued and included in actuarial liabilities, such reserve should count as an actuarial asset; otherwise, it should not.

RECOMMENDED CHANGES

Because of the audit, Buck will make changes in the following areas:

- Using disability mortality for disabled retirants
- Incorporating employee turnover rates for General Tier 4 actives at ages 50-51
- Using the benefit start dates for deferred vesteds which are consistent with the valuation report
- Using the correct marital probabilities in the survivor benefit allowances
- Project the maximum pay ceiling on Tier 4 in accordance with assumed inflation
- Changing the manner in which disability is applied to Tier 4 actives
- Correcting the Tier 4 issue for prematurely leaving the active work force

We recommend that Buck make a change in the manner in which they project mortality improvements.

As TCERA's assumed rate of return goes down annually, the issue as to how this impacts the assumed rate of inflation and the real rate of return needs to be addressed. The current 4% inflation assumption is above median in our latest California Funding Ranking Survey.

We recommend that Buck use the same assumed compensation increases for reciprocal deferred vesteds as for current actives unless there is a significant practical issue in doing so.

There were five elements in which the valuation report did not reflect Buck's sample life input. Our understanding is that Buck will update the valuation report as needed.

We encourage Buck and staff to develop consensus in the following areas:

- The pattern of assumed pay increases
- Whether the lower level of benefits in Tier 4 should result in later assumed retirement ages
- Whether the assumption of General members, eligible to service retire with 10-15 years of service, have higher probabilities of retiring than General members with 15-20 years, should be maintained

OVERVIEW

Buck has made numerous changes as a result of this audit process and has done so in a receptive manner. We wish to reiterate their high degree of cooperation and their desire to improve their valuation process for you.

Buck has undergone considerable recent transition, both in the valuation systems and personnel used. We did not see evidence that they have one actuary who really gets “their hands around” the many technical nuances of your system. Regardless of the valuation system used, TCERA’s valuation is complex enough to necessitate some manual tweaking .

Further, we found their set of internal controls to be inadequate, particularly for a plan of your complexity. To attribute certain valuation issues to “coding errors” is tantamount to saying that the checking process was inadequate and there was the lack of a competent, second pair of eyes. An actuarial audit should not be the “first line of defense.” The audit should be the second line.

In the course of the audit, there were times we were sent information which looked significantly wrong at first blush. This may speak to a lack of experience or expertise from the support staff with whom we worked.

Similarly, there was not enough care in the preparation of the valuation report to reflect the numerous changes associated with PEPRA’s Tier 4.

If TCERA continues to use Buck, we strongly recommend the following:

- Buck designates a qualified actuary who has **both** the time and the expertise to fully understand your system
- Buck establishes a system of internal control which is subject to the approval of TCERA staff and/or the TCERA Retirement Board
- Confirm that Buck would be enthusiastic about continuing the relationship
- Optionally, some degree of outside actuarial oversight after the issuance of the next actuarial valuation report.

Some of these recommended changes will offset each other to some degree. After the changes, there may be an overall reduction in TCERA’s contribution rates due to the large reduction due to the disability mortality correction. We make no comment on the overall contribution rates charged to the County unless there was a valuation that reflected both the technical changes and considers possible assumption changes.

The audit work was primarily done and completed by the undersigned party.

Sincerely,

Rick Roeder, FSA, MAAA

