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February 18, 2013

Mr. Alan Conroy
Executive Director
Kansas Public Employees Retirement System
611 South Kansas Avenue, Suite 100
Topeka, KS 66603

Re: Employer Normal Cost Rates Under Various Assumptions

Dear Alan:

At your request, we have calculated the expected employer normal cost rate for KPERS Tier 3 members under various sets of both actuarial assumptions and plan parameters. In particular, we were asked to determine the employer normal cost rate if the assumed rate of investment return was lowered to either 7% or 6%. This type of sensitivity analysis is helpful in understanding the impact of different rate of return assumptions, under the initial cash balance plan design and under any modifications to the design using authority specifically reserved to the Legislature under the enacting legislation.

Based on the current cash balance provisions for Tier 3, the guaranteed interest crediting rate is 5.25% per year with interest credited to the account balance quarterly. Additional interest credits (called dividends), not to exceed 4% per annum, may be granted at the discretion of the KPERS Board of Directors subject to certain conditions. When the member retires, the account balance must be converted to a monthly benefit, based on the form of payment selected by the member. The annuity amount (monthly benefit) is determined by the annuity conversion factors, which currently are based on a 6% interest rate and a mortality table selected by the Board.

HB 2333 specifically reserved to the Legislature authority to change the guaranteed interest crediting rate and the annuitization interest rate prospectively, in order to provide flexibility to respond to changing conditions, such as lower expected investment returns, and to share the associated risks with members. As a result, if the expected investment return assumption was lowered by 1% or 2% as modeled in the two scenarios requested, the Legislature might modify the parameters of the cash balance plan. Therefore, in a cost study using a lower investment return assumption, it is appropriate to evaluate the impact on the employer normal cost rate using both the current and a lower assumption regarding the interest crediting rate and the annuitization interest rate. For this reason, the employer normal cost rate under the 7% (or 6%) investment return assumption was also modeled by reducing the guaranteed interest crediting rate and annuity conversion interest rate by 1% (or 2%) to illustrate the cost impact of such a change. The findings of our study are summarized on the attached Exhibit A.

Actuarial Assumptions and Methods

In general, the same actuarial methods and assumptions that were used in the December 31, 2011 actuarial valuation were used in the modeling that generated the employer normal cost rates shown in Exhibit A, unless otherwise noted. The development of the normal cost rates for Tier 3 members in the Cash Balance Plan requires the use of two additional actuarial assumptions that were not used in the December 31, 2011 actuarial valuation. They are:

- The interest crediting rate (rate applied to the account balance each year prior to retirement) and
- The annuity conversion factors (which require a postretirement interest rate and a mortality assumption).

Each is discussed in the following paragraphs.

Interest Crediting Rate

As stated earlier, the guaranteed interest crediting rate for Tier 3 under current law is 5.25%. However, additional interest credits (called dividends) may be granted at the discretion of the KPERS Board of Directors, subject to certain conditions. If the total funded ratio of the system is less than 80%, the dividend shall be payable totally at the Board's discretion taking into account the funding of the system, market conditions, investment returns, and other related factors specified by the Board, with a maximum dividend of 4%. If the funded ratio of the system as a whole is equal to or more than 80%, the dividend cannot exceed the lesser of 4% or a percentage, equal to the funded ratio of the system multiplied by the rate of return on the system's assets that is above 8% for the fiscal year. In all cases, the dividend shall not be granted unless the rate of return on KPERS assets is at least 10% for that fiscal year.

Baseline interest crediting rate (8% assumed rate of return). Although the assumed rate of investment return on KPERS' assets is a level 8% per annum, investment returns are expected to vary from year to year, sometimes significantly. Given the criteria for dividends in the law and the standard deviation of the portfolio, the *actual* interest crediting rate (including dividends) is expected to be higher than the guaranteed interest crediting rate. Therefore, an actuarial assumption is used to anticipate the long term effective interest crediting rate. Based on an expected return of 8% and the standard deviation of the KPERS portfolio, our analysis indicates that the dividend rate would be around 1.75%, if the system's funded ratio were 80% to 100%. This would result in a total interest crediting rate of 7.0% under current law (5.25% + 1.75%). However, under current projections, an 80% funded ratio for the system, as a whole, is not projected to occur until about 2030. Therefore, the expectation is that the effective dividend rate will be lower in the short term. For this reason, the total interest crediting rate assumption used in the projections is 5.5% from 2015 through 2022, 6.0% from 2023 through 2030 and ultimately 7.0% thereafter. The expectation is that the effective dividend rate will be lower in the short term and a graded interest crediting rate is used to reflect the higher likelihood of a dividend being granted when the funded status of the system improves in later years. For purposes of this analysis, only the ultimate interest crediting rate assumption is pertinent because the analysis is focusing on the employer normal cost rate at the end of the projection period. It is important to note that, since the KPERS Board is able to exercise some degree of discretion in setting dividends, this assumption may need to be revised at a later date if the Board establishes a policy for setting dividends (either formally or informally) that is significantly different from that anticipated by the assumptions used in the projections.

Interest crediting rate under lower assumed rate of return. With a lower assumed rate of investment return, the assumed dividend rate portion of the total interest crediting rate would be expected to change. Under the scenarios when the investment return assumption is changed to 7% or 6%, the expected return of the portfolio is also assumed to be the lower return (7% or 6%), which in turn changes the statistical modeling of investment returns over the long term. The change in the distribution of investment returns, *without a corresponding change in the plan provisions that set the criteria for payment of the dividend*, results in a lower assumption for the dividend rate and therefore, the total interest crediting rate. For example, using the current 8% assumption the expected long term dividend rate is 1.75%, but using a 7% investment return assumption results in an expected long term dividend rate of 1.50%. When this rate is added to the guaranteed interest rate of 5.25%, the assumption for the total interest crediting rate, including dividends, drops to 6.75% (5.25% + 1.50%). The interest crediting rate is reduced in this manner for all scenarios considered.

Based on the existing statutory dividend criteria, the assumed dividend rate would be reduced in any scenario in which the assumed rate of investment return is lowered. However, the Legislature would have the option of retaining or changing the guaranteed interest crediting rate in response to the lower assumed rate of return. Because the cash balance plan was designed to share the preretirement investment risk with employees, the cost study includes scenarios in which the guaranteed interest crediting rate is lowered by the same percent to reflect the lower expected rate of return on KPERS' assets. Under those scenarios, the combination of a lower expected dividend rate over the long term plus a lower guaranteed interest crediting rate results in a lower total interest crediting rate assumption. For example, the dividend rate with a 7% assumed rate of return is 1.50% based on the criteria for granting dividends. If the guaranteed interest crediting rate is lowered from 5.25% to 4.25%, the assumption for the total interest crediting rate becomes 5.75% (4.25% + 1.50%). As a result, the employer normal cost rate is also lower when compared to the 6.75% assumed total interest crediting rate.

Annuity Conversion Factors

The annuity conversion factors are used to convert the account balance in the Cash Balance Plan into monthly benefit amounts at retirement. The factors are based on an interest rate and mortality assumption. The interest rate in current law for the annuity conversion factors is set at 6.0% as part of the basic plan design. This rate was set based on an assumed investment return for KPERS of 8%. It seems likely that the annuity conversion interest rate might be lowered if the investment return assumption for KPERS was lowered dramatically as reflected in the studies at 7% and 6%. Therefore, to test the sensitivity of the results to different interest rates for annuity conversion, studies were run where the annuity conversion interest rate was assumed to decrease to 5% when the investment return was lowered to 7% and to 4% when the investment return was lowered to 6%.

In addition, the Board of Trustees has the authority to set the mortality table to be used for the conversion factors. Since the Board has not yet had time to set this assumption, the RP 2000 Mortality Table projected to 2035, using Projection Scale AA, with a 50/50 male/female blend was used as the mortality assumption for the annuity conversion factors for this cost study. To the extent the Board elects to use a different mortality table, the actual costs for Tier 3 may vary from those estimated in this study.

Results

The normal cost rate for Tier 3 members will unfold gradually over time as current Tier 1 and Tier 2 members leave covered employment and are replaced by Tier 3 members. A number of years must pass before the demographic profile of the Tier 3 covered population stabilizes as reflected in the normal cost rate. In order to ensure that Tier 3 normal cost rate calculations were representative of the long term cost, the ultimate normal cost rate at the end of the projection period was used for comparison among the various alternatives. The employer normal cost rate is calculated by subtracting the employee contribution rate of 6% from the total normal cost rate. Because the employee contribution rate is a large portion of the total normal cost rate, the percent of change in the total normal cost rate will not equal the percent of change in the employer normal cost rate. For example, when the investment return is lowered to 7%, the total normal cost rate changes from 7.46% to 9.00%, an increase of 20%. However, the employer normal cost rate doubles from 1.46% to 3.00%. Consequently, Exhibit A shows the total normal cost rate, the employee contribution rate, and the employer normal cost rate under the following scenarios:

Scenario	Assumed Investment Return	Guaranteed Interest Credit	Total Interest Crediting Rate Assumption	Annuity Conversion Interest Rate
1. Baseline (No change)	8.0%	5.25%	7.00%	6.0%
2. 7% Return Assumption Current Plan Design	7.0%	5.25%	6.75%	6.0%
3. 7% Return Assumption Revised Plan Design	7.0%	4.25%	5.75%	5.0%
4. 6% Return Assumption Current Plan Design	6.0%	5.25%	5.50%	6.0%
5. 6% Return Assumption Revised Plan Design	6.0%	3.25%	4.50%	4.0%

It should also be noted that scenarios (2) through (5) above do not provide the same amount of retirement benefits for Tier 3 members of the system as is provided under the current plan. This, in turn, has an impact on the cost of the plan designs. Therefore, the cost projections should not be evaluated in isolation from the benefit amounts provided by the plan design.

Disclaimers, Caveats, and Limitations

The table of normal cost rates that comprises this study is based primarily on the results of projected valuation results in the future using a projection model prepared by the System's actuary, Cavanaugh Macdonald Consulting, LLC. That model is based on the December 31, 2011 valuation results and the actuarial assumptions used in that valuation (other than as noted elsewhere in this letter). Significant items are noted below:

- The investment return assumption in all future years is assumed to be 8%, 7% or 6% on a market value basis, as indicated.
- All demographic assumptions regarding mortality, disability, retirement, salary increases, and termination of employment are assumed to hold true in the future. Please note that the actuarial assumption assumes that mortality will improve in the future (i.e. people will live longer).
- Changes in the plan design and resulting benefit amounts for Tier 3 members may have an effect on future termination and retirement patterns. Whether, and how, retirement and termination of employment patterns will ultimately be impacted cannot be known at this time. Therefore, no change in those assumptions was reflected in our modeling results.

- The number of active members covered by KPERS in the future is assumed to remain level (neither growth nor decline in the active membership count). As active members leave covered employment, they are assumed to be replaced by new employees who have a similar demographic profile as recent new hires.
- Tier 3 benefits are as provided under current law unless otherwise noted.
- The funding method used for the calculation of the normal cost rates was the entry age normal cost method.

Models are designed to identify anticipated trends and to compare various scenarios rather than predicting some future state of events. The projections used to measure the normal cost rate project future events using one set of assumptions out of a range of many possibilities. A different set of assumptions would lead to different results. Over time, a defined benefit plan's normal cost rate will depend on a number of factors, including the age of covered members at hire, probability of leaving covered employment at various ages prior to retirement, the growth of salaries while members are actively working, the date of retirement, the duration of the benefit payments, plan expenses, and the amount of earnings on assets invested to pay benefits. These amounts and other variables are uncertain and unknowable at the time the projections were prepared. Because not all of the assumptions will unfold exactly as expected, actual results may differ from the projections. To the extent that actual experience deviates significantly from the assumptions, results could be significantly better or significantly worse than indicated in this study.

We, Patrice A. Beckham, FSA and Brent A. Banister, FSA, are consulting actuaries with Cavanaugh Macdonald Consulting, LLC. We are members of the American Academy of Actuaries, Fellows of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

If you have any questions or additional information is needed, please let us know. We are available to provide additional analysis or explanation.

Sincerely,

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Brent A. Banister

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Pension Actuary

EXHIBIT A

Comparison of Alternative Plan Designs and Actuarial Assumptions
KPERS Tier 3 Cash Balance Plan

	Scenario Number				
	(1)	(2)	(3)	(4)	(5)
	Baseline (No Change)	**7% Return Current Plan Design**	**7% Return Revised Plan Design**	**6% Return Current Plan Design**	**6% Return Revised Plan Design**
Investment Return Assumption	8.00%	7.00%	7.00%	6.00%	6.00%
Guaranteed Interest Crediting Rate*	5.25%	5.25%	4.25% *	5.25%	3.25% *
Total Interest Crediting Assumption	7.00%	6.75%	5.75%	6.50%	4.50%
Interest Rate for Annuity Conversion*	6.00%	6.00%	5.00% *	6.00%	4.00% *
Total Normal Cost Rate (State/School)	7.46%	9.00%	7.24%	10.96%	7.06%
Employee Contribution Rate	(6.00%)	(6.00%)	(6.00%)	(6.00%)	(6.00%)
Employer NC Rate	**1.46%**	**3.00%**	**1.24%**	**4.96%**	**1.06%**

* Sub HB 2333 permits the Legislature to change these features of the Cash Balance Plan prospectively.

This exhibit is an attachment to a letter that contains important information and explanations regarding the numbers shown. Therefore, the exhibit should only be considered with the accompanying lett from Cavanaugh Macdonald dated February 18, 2013.
Note: All assumptions are assumed to be met each year in the future.