Milliman

Actuarial Valuation Audit Results

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February 27, 2023

Purpose & Scope

- Purpose: Independent full scope actuarial audit of the July 1, 2021 actuarial valuations and related experience studies to provide an opinion regarding the reasonableness and accuracy of the actuarial assumptions, actuarial cost methods, valuation results, and contribution rates for retirement and insurance benefits
- State-administered Kentucky Retirement Systems (KYSRS)
  - Kentucky Employees Retirement System (KERS)
    - Includes hazardous (KERSHZ) and non-hazardous plans (KERSNHZ)
  - State Police Retirement System (SPRS)
  - County Employees Retirement System (CERS)
    - Includes hazardous (CERSHZ) and non-hazardous plans (CERSNHZ)
  - Teachers' Retirement System (TRS)
  - Judicial Form Retirement System (JFRS)
    - Includes Legislators' Retirement Plan (LRP) and Judicial Retirement Plan (JRP)

Purpose & Scope

- Audit Scope:
  - Comparison of raw demographic data (provided by each system) to valuation data (provided by each actuary GRS, CavMac and USI)
  - Comparison of data used in benefit calculations with data provided to the actuary by each system
  - Complete replication of actuarial liabilities and normal costs
  - Evaluation of actuarial asset method and calculation
  - Determination of the accuracy of funding computations including contribution rates and allocation to employers
  - Overall review of the funding policy
  - Peer review of actuarial economic and demographic assumptions
  - Assessment of compliance with actuarial standards of practice

Bottom Line

Overall Audit findings

- ***Favorable audit review for each of the systems and work performed by each actuary, but we have included some recommended changes and offered other changes for consideration.***
- Parallel valuation indicates no significant deviations from those calculated in the valuations
- Consideration for promoting a consistent framework in setting certain assumptions while reflecting each system's unique demographics and funding situations
- Adjustment to <u>assumed</u> interest crediting rate used by actuaries for hybrid plan benefits
- Reduction in the inflation assumption and investment return assumption for JFRS
- A review of the impact of the High-3 provision, specifically on SPRS
- Correction in the valuation of non-hazardous benefits for retirees with a hazardous benefit in KERS and CERS and the application of a mortality table in JFRS valuations
  - These items were estimated to have less than a 2% impact and were corrected in the 2022 valuations

Audit Findings – Data Validity

Audit findings

We found the individual member data used in the valuation to be reasonable, appropriate and complete *but have the following comments.*

Review consisted of valuation data files and 86 individual calculations

Recommended changes:

- Conduct a study to determine if a load should be incorporated into the actuarial valuation for Tier 1 SPRS members as the High-3 provision may produce a higher final average compensation than estimated in the valuation

Considerations:

- KPPA: Allocate a portion of the active liability to both Haz and NonHz based on service
- KPPA: Provide actual Haz and NonHz benefit for retirees with both (rather than % based on service)
- TRS: Review impact reciprocity service with KPPA may have on the actuarial valuation
- JFRS: USI review benefits reported in valuation for terminated vested traditional and hybrid members

Audit Findings – Valuation Methods and Procedures

Audit findings

We found the actuarial valuation methods and procedures to be in compliance with actuarial standards or practice and the funding policy in line with actuarial guidance (Conference of Consulting Actuaries White Paper) *but have the following comments.*

Considerations:

- KPPA: Establish minimum amortization payment based on greater of remaining fresh start period and 20 years for amortizing the unfunded liability
- KPPA: HB 8 allocations confirmed (NonHz liability adjustment not reflected; technical issue with insurance payroll resulting in $801k difference)
- KPPA: GRS detail adjustments made to determine the amortization payments
- TRS: Clarification be added regarding any special appropriations made by State
  - Offset against employer contributions or accelerate reduction in unfunded liability
- JFRS: Account for changes in costs in providing the employer contribution for the second year

Audit Findings – Valuation Methods and Procedures

Considerations: TRS: Discuss impact of Board policy to phase in employer contribution rate from 14.48% to 23.05%. Applicable rate as of June 30, 2021 was 16.18% (first year of 5-year phase-in).

Statutory Contribution Rates		
	Non-University	University
Member	9.105%	7.625%
Employer for Member Hired Prior to July 1, 2008	12.355%	10.875%
Employer for Member Hired July 1, 2008 and later	13.355%	*10.875%*

Actuarially Determined Contribution Based on Board Funding Policy	
	Rate
Weighted-Average Statutory Rates	21.68%
Special State Appropriation	2.38%
Additional Employer Contribution Rate	23.05%
Total Contribution Rate	47.12% [1]

Development of Additional Contribution Rate Based on Valuation Salaries of $3,784.4 million		
	Amount (in millions)	Rate
Gross Normal Cost	$613.2	16.20%
Unfunded Liability Contribution	$1,170.0	30.92%
Actuarially Determined Contribution	$1,783.2	47.12%
Statutory Contributions (Member + Employer)	$(820.7)	21.68%
Special State Appropriation	$(90.1)	2.38%
Net Additional Contribution to comply with Board Policy	$872.4	23.05%

Audit Findings – Actuarial Assumptions

Audit findings

We found the actuarial assumptions to be reasonable and in compliance with actuarial standards or practice *but have the following comments.*

Discussions:

- Inflation and Investment Return Assumptions
- Hybrid Interest Crediting Rate Assumption
- Mortality Rates Improvement Scale
- Healthcare Trend Rates and Aging Factors
- Consistent Framework

Inflation and Investment Return Assumptions

Recommended changes:

- Decrease JFRS inflation and investment return assumption 50 basis points (0.5%)
- Consistency to the extent possible while maintaining each plan's individual characteristics and funding situation

Components of Investment Return Assumption					
	KERS NHz / SPRS Retirement	KERS / SPRS Insurance and KERS Hz Retirement	CERS Retirement and Insurance	TRS Retirement and Insurance	JFRS Retirement and Insurance
Inflation Assumption	2.30%	2.30%	2.30%	2.50%	3.00%
Assumed Real Return	2.95%	3.95%	3.95%	4.60%	3.50%
Investment Return Assumption	5.25%	6.25%	6.25%	7.10%	6.50%

We performed independent analysis of assumptions based on June 30, 2021 and 2022 capital market assumptions (CMAs). CMAs increased about 60 basis points (0.6%) during this period. Based on 2022 CMAs, Milliman analysis estimates 50th percentile return to be above the current assumptions of 5.25% and 6.25% used for KPPA and to slightly above the current 7.1% assumption for TRS.

Hybrid Interest Crediting Rate Assumption

Hybrid Account Interest:

- 4% plus
- 75% of average compounded return over past 5 years in excess of 4%

Milliman Analysis:

- Historical based on assumed returns of investment portfolios
- Forward Looking reflecting distribution of investment returns

Recommendation:

Each actuary perform similar analysis. Could have material impact on liabilities of hybrid plan

Hybrid Plan Assumed Interest Crediting Rate			
	KERS NHz / SPRS	KERS Hz / CERS	JFRS
75% of Assumed Excess Return over 4%	0.9375%	1.6875%	1.875%
Historical Analysis of 75% of Excess Return over 4%	1.5%	2.9%	2.8%
Forward Looking Analysis of 75% of Excess Return over 4%	2.4%	3.0%	2.3%
Assumed Interest Crediting Rate used in Valuation	4.9375%	5.6875%	5.875%
Assumed Interest Crediting Rate based on Historical Analysis	5.5%	6.9%	6.8%
Assumed Interest Crediting Rate based on Forward Looking Analysis	6.4%	7%	6.3%

Mortality Rates and Improvement Scale

Audit findings

Consideration for consistency in mortality improvement scale:

- KPPA: GRS uses the Society of Actuaries (SOA) MP-2014 ultimate table and does not use the 15-year select table produced by the SOA
- TRS: CavMac uses 75% of the SOA MP-2020 scale, including the select and ultimate scales
- JFRS: USI uses 100% of the SOA MP-2020 scale, including the select and ultimate scales

SOA research suggests base mortality rates vary by employee type, but not mortality improvement scale.

Considerations for Base Mortality Rates:

- KPPA: One mortality table is applied to all groups. Suggest separate tables by employee type.
- KPPA and TRS: Use a separate contingent survivor's mortality table for beneficiaries. Suggest using this table only after the death or assumed death of the member.

Other Assumptions

Audit findings

Consideration for consistency in healthcare trend and aging factors for insurance:

- Separate trend models used although all pre-Medicare (pre-65) members participate in the KEHP
  - Suggest using SOA Getzen Model with appropriate adjustments
- KPPA and TRS do not apply aging factors to pre-65 benefits but JFRS does

Considerations for Other Assumptions:

- JFRS: Technical issue in applying dual salary increase assumption (1% for 3 years; 3.5% thereafter)
- JFRS: 40% load applied to liability for active and inactive members for non-legislative salaries earned after termination with LRP

Audit Findings – Parallel Valuation

Audit findings

Based on the valuation data provided by each actuary, we independently programmed our valuation system with each system’s plan provisions and actuarial assumptions to replicate the results of the June 30, 2021 actuarial valuations. Our replication indicates no significant deviations from those calculated in the valuations *but have the following comments.*

Considerations:

- KPPA: NonHz retiree benefits were excluded for members with also a hazardous benefit impacting KERS and CERS NonHz. This issue was corrected in the 2022 valuation.
- KPPA and TRS: Incorporate an assumption for potential death benefits to be paid equal to a member’s remaining accumulated contributions (estimated length of death benefit is 32 – 36 months for KPPA and 49 months for TRS)
- JFRS: Correct the application of a mortality table in the valuation program. This issue was corrected in the 2022 valuation.

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Thank you

Caveats and Disclaimers

The findings presented in these materials detail our full replication actuarial audit review of the July 1, 2021 actuarial valuations performed by Gabriel, Roeder, Smith & Company (“GRS”) for KPPA, Cavanaugh Macdonald Consulting, LLC (“CavMac”) for TRS and Findley, A Division of USI (“USI”) for JFRS.

All calculations and determinations are based on each actuary’s actuarial valuation assumptions and methods as approved for use by each of the applicable Boards and benefit provisions as specified in Kentucky Revised Statute. The plan provisions, assumptions and methods used in this presentation are the same as those disclosed in each actuary’s July 1, 2021 actuarial valuation report.

In preparing this presentation, we relied, without audit, on information (some oral and some in writing) supplied by each system’s staff. This information includes, but is not limited to, benefit provisions, employee data, and financial information. In our examination of the data provided by each system, we found it to be reasonably consistent and comparable with data used for July 1, 2021 actuarial valuations as provided to us by each actuary. Since these 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 results may need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, our findings are 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 Code of Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

Milliman's work product was prepared exclusively for Public Pension Oversight Board (PPOB) for a specific and limited purpose. It is a complex, technical analysis that assumes a high level of knowledge concerning each system’s operations, and uses each system’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.

The consultants who worked on this assignment are retirement actuaries. Milliman’s advice is not intended to be a substitute for qualified legal or accounting counsel. The actuaries who prepared this presentation are independent of the PPOB and each system, and we are not aware of any relationship that would impair the objectivity of our work.

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.