

PROPOSAL FOR ACTUARIAL AUDIT SERVICES



THE PUBLIC EMPLOYEES RETIREMENT SYSTEM OF OHIO

July 15, 2014

Submitted by:

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July 15, 2014

CONFIDENTIAL

Ms. Bethany Rhodes
Director
Ohio Retirement Study Council
88 East Broad Street, Suite 1175
Columbus, OH 43215

Dear Bethany:

Pension Trustee Advisors (PTA), partnering with KMS Actuaries (KMS), is delighted to present this competitive offer in response to Ohio Retirement Study Council's (ORSC) request for proposals (RFP) for actuarial audit services of the Public Employees Retirement System of Ohio (PERS).

This type of assignment is our primary business. Unlike most actuarial firms, most of PTA's work involves a second actuary. We would be privileged to continue to serve as your auditing actuary and look forward to the opportunity to present our qualifications to you and in person and on the following pages.

We understand the work to be done and will make a commitment to perform the work as scheduled. PTA and KMS have the ability, willingness, knowledge, experience and resources to not only meet your needs, but exceed them, subject to the terms of the RFP. William (Flick) Fornia and Linda Bournival will be the primary consultants for ORSC and PERS.

William B. Fornia, FSA, EA, MAAA

President

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Public Pension Focus

The recent turmoil in public pensions is not unique to Ohio. Flick Fornia and Linda Bournival have been involved considerably in this arena both currently as well as through our prior employers. Our participation has ranged from actuarial valuations and audits of numerous pension systems to working outside the pension systems to help our clients effect change. These engagements have been on all sides of the pension reform. For example, PTA is currently assisting the University of California Union Coalition with collective bargaining,

and is also working with bondholders on the bankruptcy of Detroit, the largest US municipal bankruptcy filing in history, with more than \$1.4 billion at stake. Flick has also assisted the City of Baltimore to defend reform which has saved the City millions of dollars, which included testifying in Federal Court. And of course, we are extremely proud of the role we played with ORSC leading to one of the most comprehensive and balanced pension reforms in the country.

We have substantial involvement in the forefront of the public pension scene. Linda has a sound foundation of public pension and health actuarial valuations both large and small, through KMS and prior firms. Flick is a nationally recognized public plan actuary and advisor. He was recently asked by the leadership of the Government Finance Officers Association, the Federal Reserve Bank of Cleveland, the International Foundation of Employee Benefit Plans and the National Conference of Public Employee Retirement Systems to educate their membership on key public pension issues. He is well known throughout the public pension community for his ability to explain complex matters to a lay audience.

Our Philosophy

Our objective is to provide ORSC and PERS with accurate, well-understood information so that they can make the right decisions. Pensions are controversial these days and difficult to understand. We analyze the facts and present them in a manner that will enable the best decisions to be made. We do this through (1) timely and responsive client service; (2) accurate, peer-reviewed, thorough actuarial analysis; and (3) effective oral and written communication of our findings. We encourage you to contact our clients (including ORSC Councilmembers and PERS representatives) to confirm how we have accomplished our mission in the past.

We are happy to answer any questions on this proposal and look forward to discussing this with you further.

Sincerely,



William B. Forna, FSA
President
Pension Trustee Advisors

Sincerely,



Linda L. Bournival, FSA
Consulting Actuary
KMS Actuaries, LLC

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SECTION 1 – MANAGEMENT SUMMARY

In response to your Request for Proposal (RFP) for an Actuarial Audit, we are pleased to provide this proposal presenting our services for providing actuarial audit, advisory and related consulting to the Ohio Retirement Study Council (ORSC) and the Public Employees Retirement System of Ohio (PERS).

We offer the extensive experience and expertise in performing these actuarial services that you require. Flick Fornia, founder and President of Pension Trustee Advisors, and Linda Bournival, founder and owner of KMS Actuaries, LLC, have provided actuarial services to many public sector clients and have, in combination, over 55 years of actuarial experience. Flick has provided actuarial consulting services in many retirement-related areas, including financing, plan design, bond analysis, asset-liability studies, retiree healthcare and legislative testimony. He has performed consulting services for 22 statewide retirement systems, including twelve audits for large defined benefit public retirement systems. Linda has provided actuarial services to a large number of public retirement systems and governmental entities, including state, regional and local retirement systems, small, medium and large cities, towns, counties and regional school districts.

Below we present a summary of our understanding of the services that are sought by the ORSC and PERS.

Based on information provided in the RFP and our experience with ORSC and PERS, we understand that PERS is a defined benefit pension plan created in 1935 that covers Ohio's state and local government employees. PERS provides retirement and disability benefits to eligible employees and their survivors and/or beneficiaries as well as retiree health care benefits. PERS is governed by a Board of Trustees that is comprised of eleven members.

As of September, 2013, PERS currently has 348,235 active members, 467,298 inactive members and 195,832 benefit recipients. As of December 31, 2013, PERS had assets totaling approximately \$88.6 billion. The plan is established and administered according to the Ohio Revised Code Chapter 145.

Currently, annual pension and retiree health care actuarial valuations are performed for PERS by Gabriel Roeder Smith & Company (GRS).

The ORSC has issued an RFP requesting proposals from qualified actuarial consulting firms interested in performing an actuarial audit of PERS. The RFP specifically is requesting the following services:

- Perform an actuarial audit for the primary purpose of independent verification and analysis of the assumptions, procedures and methods used by the consulting actuaries of PERS for
 - PERS' annual pension actuarial valuation as of December 31, 2013
 - the five-year experience review for the period January 1, 2006 – December 31, 2010
 - PERS' retiree health care actuarial valuation as of December 31, 2013, including GASB 43 disclosures

Further, the actuarial audit shall include the following elements and activities:

- Data Validity
 - assess whether the demographic and financial information used in the actuarial valuations are valid, complete and appropriate for PERS' structure and funding objectives.

- Actuarial Valuation Method and Procedures
 - determine whether the actuarial methods, calculations, actuarial cost method, asset valuation method utilized are technically sound and conform to the appropriate Actuarial Standards of Practice
 - report the impact, if any, of any material deviations from accepted standards found during the audit

- Actuarial Valuation Assumptions
 - determine whether the assumptions utilized in the actuarial valuations are technically sound and conform to the appropriate Actuarial Standards of Practice
 - include in the analysis demographic and economic assumptions such as mortality, retirement, separation rates, pay adjustments, rates of investment return and disability factors
 - determine whether actual experience is appropriately evaluated in the experience study and whether recent changes in assumptions are appropriate, reasonable and supported by the experience study
 - review the gain/loss analyses from the last four actuarial valuation reports

- Parallel Valuation
 - Perform parallel valuations of the pension retirement system and retiree health care benefits as of December 31, 2013 utilizing the validated member census data and actuarial assumptions used by the consulting actuary

- Review of Retiree Health Care Contributions
 - Assess whether the system appropriately, consistently and evenly determines retiree contributions to health care and whether the implementation of the system's health care policies differ from those determinations

- Report the impact, if any, of any assumption adjustments, if necessary, that more accurately reflect assets, liabilities and costs

- Provide a written report containing our findings, recommendations and conclusions

- Meet with the PERS Executive Director and Board of Trustees to present our written report

- Meet with the ORSC Board to present our written report

This proposal will demonstrate PTA's and KMS' ability to perform the audit and related consulting services that the ORSC requires. Flick Fornia and Linda Bournival can provide proactive, actuarial consulting advice based on years of experience with public sector plan sponsors. Not only should you review our qualifications and experience that we have detailed in Sections 2 and 4 but we encourage you to contact the references we provide in Section 3 so you can gain confidence in our ability to provide these services. The fact that we have provided actuarial services during the last 25-30 years to a large number of public sector clients speaks to our ability to provide satisfactory services.

Of course, our most important reference is ORSC itself. From November 2011 through July 2012, we worked with ORSC and PERS nearly every day reviewing plan details and actuarial calculations as a component of our pension reform study. We know PERS quite well and have a thorough understanding of its features and actuarial nuances. We recently conducted an audit of the School Employees Retirement System of Ohio (SERS) for ORSC, so we have been through this process once before with you.

Finns' Public Plan Experience

PTA and KMS have together provided actuarial consulting services to the following:

PTA/KMS Clients

- Ohio Retirement Study Council
- Ingham County, Michigan
- Municipal Employees Retirement System of Michigan
- Providence RI Retirees

Flick, the proposed lead actuary and consultant for ORSC, has conducted fourteen audits for large defined benefit public retirement systems. We believe that he has more recent experience with actuarial audits for statewide systems than anyone. Flick is well known for his ability to explain complex concepts to lay audiences. He is an author and frequent speaker at organizations such as the Pension Research Council, the National Association of State Retirement Administrators (NASRA), the National Council on Teacher Retirement (NCTR), the National Association of Public Pension Attorneys (NAPPA), the National Conference on Public Employee Retirement Systems (NCPERS), the Conference of Consulting Actuaries, the Western Pension and Benefits Conference, the International Foundation of Employee Benefit Plans, The Conference Board, the Government Finance Officers Association (GFOA), and the Brazilian Association of Pension Plans (ABRAPP).

PTA, founded in 2010, is the leading provider of specialized non-routine actuarial services relating to state and local government retirement systems. Following is a list of all PTA clients since inception in 2010.

PTA Clients – Governments

- Ohio Retirement Study Council
- City of Philadelphia
- City of Baltimore
- City of Colorado Springs
- San Antonio Water System
- New York City Office of the Comptroller
- City of Oakland, California
- State of New Hampshire
- City of Fort Worth
- City of Boulder, Colorado
- CollegeInvest [Colorado 529 College Savings Plan]
- Ingham County, Michigan

SECTION 2 – VENDOR CAPABILITIES AND EXPERIENCE

PTA Clients – Retirement Systems

- Puerto Rico General Employees Retirement System
- Puerto Rico Teachers Retirement System
- Municipal Employees Retirement System of Michigan
- Colorado Fire and Police Pension Association
- Fort Worth Employees Retirement System
- San Diego City Employees Retirement System

PTA Clients – Labor Organizations

- International Association of Firefighters’ Locals of:
 - Arizona
 - Atlanta
 - Fairfield, CT
 - Maine
 - Memphis
 - New Jersey
 - Stamford, CT
 - Stratford, CT
- Alaska Public Pension Coalition
- Rhode Island Retirement Income Security Coalition
- Washington State Patrol Troopers Association
- American Federation of Teachers
- AFSCME of Cook County, Illinois
- University of California Union Coalition

PTA Clients – Other Parties

- National Conference of Public Employee Retirement Systems (includes Police)
- Texas Association of Public Employee Retirement Systems (includes Police)
- Assured Guaranty Corporation
- Alvarez and Marsal [Advisor to Detroit COPs holders in Bankruptcy]
- Alpha Sites [Research organization]

Linda Bournival has provided actuarial consulting and retirement system valuation services for several municipalities and governmental entities over the past 25 years. In addition, she provides Governmental Accounting Standards Board Statement Number 45 (GASB 45) valuation services and retiree health care consulting services to many large, medium and small public sector clients. Over the years, she has provided a variety of services with respect to retirement plans, including the design and preparation of comprehensive employee benefit statements, the design and development of a complex automated benefit

calculation system, the administration and establishment of qualification procedures for domestic relations orders and pension valuations of retirement benefits in divorce situations. KMS, founded in 2011, already has a significant presence in the public sector, providing services to over sixty entities, including state and local retirement systems, cities, towns, counties, school districts and enterprise units. Following is a list of all KMS clients since inception in 2011.

KMS Clients – Governments

- Ashburnham, MA
- Assabet Valley Collaborative
- Ayer Shirley Regional School District
- Bedford, MA
- Belknap County, NH
- Belmont, MA
- Berlin, NH
- Blackstone, MA
- Boylston, MA
- Byfield Water District
- Canterbury, CT
- Clinton, MA
- Cohasset, MA
- Dukes County Pooled OPEB Trust
- Franklin, NH
- Gardner, MA
- Georgetown Municipal Light Department
- Greater Lawrence Technical School
- Hampshire Regional School District
- Hanover, NH
- Harvard, MA
- Hillsborough County, NH
- Hingham, MA
- Kingston, MA
- Lincoln-Sudbury Regional School District
- Littleton, MA
- Littleton Electric Light Department
- Lynnfield Center Water District
- Lynnfield Water District
- Manchester, NH
- Manchester, NH School District
- Massachusetts Water Resources Authority (MWRA)
- North Reading, MA
- North Attleboro Electric Department
- Plymouth, MA
- Raymond, NH School District
- Salem, NH
- Salem-Beverly Water Supply
- S.A.U. #6, Claremont, NH
- S.A.U. #21, Hampton, NH
- S.A.U. #41, Hollis, NH
- Shirley, MA
- Southbridge, MA
- Spencer-East Brookfield, MA Regional School District
- Sterling, MA
- Stratford Housing Authority, CT
- Sudbury, MA
- Sullivan County, NH
- Swampscott, MA
- Townsend, MA
- University of Maine System
- Wachusett Regional School District
- Weston, MA
- Winthrop, MA
- Worcester, MA

KMS Clients - Retirement Systems

- Braintree
- Franklin Regional
- Dukes County
- Hingham
- Lowell
- (Massachusetts) Public Employee Retirement Administration Commission
- Reading
- Worcester Regional

Flick Fornia has expertise in all retirement-related areas, including financing, plan design, bond analysis, asset-liability studies, retiree healthcare and legislative testimony. He has performed consulting services for 22 statewide retirement systems, including:

*Retirement System Audits**

- Alaska Public Employees' Retirement System and Teachers' Retirement System (Buck)
- California State Teachers' Retirement System (Milliman)
- Colorado Public Employees' Retirement Association (Watson Wyatt)
- Public School Retirement System of Kansas City (Hays)
- Teachers' Retirement System of Louisiana (Hall)
- North Dakota Public Employees' Retirement System (Segal)
- North Dakota Teachers' Fund For Retirement (GRS)
- Ohio School Employees Retirement System (Cavanaugh Macdonald)
- Oklahoma Police Pension and Retirement System (Mercer)
- Oklahoma Public Employees' Retirement System (Mercer)
- Omaha School Employees' Retirement System (Milliman)
- Seattle City Employees Retirement System (Milliman)
- Tacoma City Employees Retirement System (Milliman)
- Vermont Retirement Systems (Buck)

* audited actuarial firm noted

References

Below, we provide references that you can contact to references you can contact and learn more about our strength in providing actuarial services.

Municipal Employees' Retirement System of Michigan

Contact: Kristin Bellar, Senior Deputy General Counsel
 Address: 1134 Municipal Way
 Lansing, Michigan 48917

Phone: (517) 703-9030
 Email: kbellar@mersofmich.com

In 2013, PTA and KMS were hired to complete a specific actuarial review study for MERS.

Colorado Police and Fire

Contact: Dan Slack
 Address: 5290 DTC Parkway, Suite 100, Greenwood Village, Colorado 80111

Phone: (720) 479-2308
 Email: DSlack@FPPAco.org

Flick served FPPA as ongoing actuary from 1997 to 2006. He conducted actuarial valuations, experience studies and an asset liability study. In 2012 at PTA he conducted the strategic planning module at their annual board retreat.

Alaska Retirement Management Board and Alaska Public Pension Coalition

Contact: Sam Trivette
 Address: Glacier Hwy, Juneau, AK

Phone: (907) 723-3220
 Email: samtriv@gci.net

Flick provided actuarial review and services to ARMB from 2005 to 2006 and 2008 to 2009. Since 2010, he has worked with the APPC to support legislation returning a defined benefit program to certain employees. Sam is an ARMB trustee and member of APPC.

SECTION 3 – VENDOR REFERENCES

Worcester Regional Retirement System

Contact: Kevin Blanchette, Chairperson
Address: 23 Midstate Drive
Auburn, MA 01501

Phone: 508.832.6314
Email: kpblanchette@worcesterregionalretirement.com

KMS performs actuarial valuations of the Retirement System pursuant to Chapter 32 of the Massachusetts General Laws. Other services we have provided include a cost-of-living study to value the cost of increasing the COLA base, presentation of the valuation results to the 95 member units and a pension forum presenting the cost of disability retirements. Linda has provided services to Worcester Regional since 2010, and previously while with Buck Consultants, from 1992 – 2000.

SECTION 4 – STAFF QUALIFICATIONS

Pension Trustee Advisors (Flick Fornia) is partnering with KMS Actuaries (Linda Bournival) to provide actuarial consulting services to ORSC and PERS. Flick and Linda are both pension and retirement system actuaries with significant experience in providing actuarial consulting services to public sector clients. Flick and Linda are fully credentialed Fellows of the Society of Actuaries (FSA), the highest level of professional accreditation that an actuary can achieve. Both Flick and Linda are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries necessary to perform the services requested in this RFP and render actuarial opinions with respect to the calculations required.

As we did for our ORSC pension reform study, our team will include another experienced retirement system actuary who provides strategic planning and years of expertise working with public sector retirement systems. Paul Schrader has 45 years of experience with retirement and other employee benefit programs with major employers in both the private and public sectors. Paul retired from Buck Consultants and since retirement, has consulted with several public retirement systems in areas of strategic planning and policy setting, including the South Dakota Retirement System. Paul played an instrumental role in our ORSC pension reform study, and will serve ORSC and PERS in a similar role in the audit.

Flick will serve as the lead actuary and consultant to the ORSC and PERS. He will be responsible for management of the overall relationship and project. Linda will perform all the data processing, calculations and modeling using an actuarial valuation system called ProVal, widely used by many national firms. Paul will assist Flick and Linda and provide the necessary consulting and peer review of the work presented here. We estimate the time spent by each for completion of the audit to be as follows:

- Flick Fornia 40%
- Linda Bournival 55%
- Paul Schrader 5%

We provide a summary of Flick, Linda and Paul's professional qualifications and experience on the following pages.

SECTION 4 – STAFF QUALIFICATIONS

William B. (Flick) Fornia

Flick, the proposed lead actuary and consultant for the ORSC, has conducted thirteen audits for large defined benefit public retirement systems. We believe that he has more experience with actuarial audits for statewide systems than anyone.

He is founder and President of Pension Trustee Advisors (PTA). PTA provides consulting services on public pensions with focus on pension advice.

Previous Work History

He was senior vice president at Aon Consulting, leading their public sector pension actuarial consulting practice from 2006 to 2010. Flick has more than 30 years of consulting and actuarial experience, primarily in the areas of retiree pension and healthcare benefits. Prior to Aon, he managed the Denver Retirement Practice of Buck Consultants and has served nationally as a Senior Consultant for Gabriel, Roeder, Smith & Co., both specializing in public pensions.

Work Experience

Flick Fornia has expertise in all retirement-related areas, including financing, plan design, bond analysis, asset-liability studies, retiree healthcare and legislative testimony. His career includes serving as corporate actuary for The Boeing Company and as consultant for numerous multinational corporations in Brazil and Argentina during his ten years at Towers Perrin. Previously, he was corporate actuary for Boeing.

He has performed consulting services for 22 statewide retirement systems in Alaska, California, Colorado, Louisiana, Missouri, New Mexico, North Dakota, Oklahoma, Puerto Rico, Utah, Vermont, Wyoming and others. He conducted the first actuarial audits of Oklahoma Police Pension and Retirement System and Oklahoma Public Employees' Retirement System. Other clients have included the US Department of State, Cities of Baltimore, Oakland and Philadelphia, IBM, US WEST and Ford Motor Company.

Articles and Speech Presentations

Flick is well known for his ability to teach complex concepts to lay audiences. He is an author and frequent speaker at organizations such as the Pension Research Council, the National Conference of State Legislators (NCSL), National Association of State Retirement Administrators (NASRA), the National Council on Teacher Retirement (NCTR), the National Association of Public Pension Attorneys (NAPPA), the National Conference on Public Employee Retirement Systems (NCPERS), the Conference of Consulting Actuaries, the Western Pension and Benefits Conference, the International Foundation of Employee

SECTION 4 – STAFF QUALIFICATIONS

Benefit Plans, The Conference Board, the Government Finance Officers Association (GFOA), and the Brazilian Association of Pension Plans (ABRAPP).

Articles and speeches have addressed all aspects of retirement programs including retiree healthcare plans, and the challenges of public sector defined contribution plans. He co-authored “*A Better Bang for the Buck – The Economic Efficiencies of Defined Benefit Plans*” with the National Institute of Retirement Security in 2008.

Professional Organizations and Education

He is a Fellow of the Society of Actuaries, Enrolled Actuary, Member of the American Academy of Actuaries, and Fellow of the Conference of Consulting Actuaries. He currently serves on the steering committee of the Conference of Consulting Actuaries Public Pensions Subcommittee, and is on the faculty of the Society of Actuaries Fellowship Admissions Course. Flick earned a Bachelor of Arts in Mathematics at Whitman College.

Linda L. Bournival

Linda L. Bournival formed KMS Actuaries, LLC, after nearly 25 years of actuarial consulting experience with a wide-range of retirement plan and postemployment benefit assignments and issues. A significant portion of her experience includes consulting and actuarial services for pension plans and postemployment benefit programs for governmental entities, including states, cities, towns, school districts and authorities.

Previous Work History

Prior to forming KMS Actuaries, Linda was a Director and Consulting Actuary at Buck Consultants and most recently Executive Vice President at Ricci Consultants. Linda has over 25 years of consulting and actuarial experience and includes services for pension plans and postemployment benefit programs for private and public sector entities. She has worked with clients regarding qualified and non-qualified defined benefit and defined contribution plans.

Work Experience

She has provided a variety of services with respect to retirement plans, including the design and preparation of comprehensive employee benefit statements for the Vermont State Retirement Systems, the design and development of a complex automated benefit calculation system for the Massachusetts Bay Transportation Retirement Fund (MBTA), the administration and establishment of qualification procedures for domestic relations orders for Florida Progress Corporation and pension valuations of retirement benefits in divorce situations.

Since the implementation of Statement Numbers 43 and 45 issued by the Governmental Accounting Standards Board, Linda has been retained by a growing number of municipalities in New England, including the City of Manchester NH, the Manchester NH School District, Dukes County OPEB Trust, the University of Maine, the Towns of Belmont, Littleton and Weston, Massachusetts, Wachusett Regional School Districts and others.

Since 1988, she has provided pension valuation and consulting services to several public retirement systems in Massachusetts, including most recently Worcester Regional, Braintree, Hingham, Lowell and Reading. She also has provided actuarial consulting services to private sector clients, including Florida Progress Corporation, High Voltage Engineering Corporation, Massachusetts Hospital Association and MediaNews Group.

She recently presented on “Pension Reform and Plan Design: Around the Country” at Massachusetts Public Employees Retirement Administration Commission’s Emerging Issues Forum.

Professional Organizations and Education

She is a Fellow of the Society of Actuaries, an Enrolled Actuary, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. Linda graduated magna cum laude from Providence College earning a Bachelor of Arts in Mathematics.

R. Paul Schrader

Paul Schrader has 45 years of experience with retirement and other employee benefit programs with major employers in both the private and public sectors.

Previous Work History

Paul spent most of his career with A. S. Hansen, Inc. in Denver as a consulting actuary with responsibility for the firm's activities in the Rocky Mountain region. He served as a Vice President, member of the Board of Directors and Executive Committee of Hansen, and later as a Managing Director of William M. Mercer, Inc. after their acquisition of Hansen. Paul retired from Buck Consultants as a consulting actuary with responsibility for Buck's activities in this region.

Work Experience

Paul has assisted in the consolidation of several independent statewide public employee retirement systems into one unified system with common benefits and practices. He served as consulting actuary and principal consultant to a statewide public employee retirement system for over 35 years, and continues to serve as a strategic planning and policy consultant. He has designed a consolidated, total benefit plan for a multi-bank holding company after merger and consulted with a Fortune 500 employer on adoption of investment policy and funding actuarial assumptions and methods to match corporate objectives of minimizing future contributions to plan due to substantial over-funded status. Paul has conducted numerous asset/liability forecast studies to test long-term and most likely effects of alternative investment policies, actuarial assumptions and methods, and benefit changes.

Additional work experience includes the development of a strategic plan including benefit and funding policies for a retirement system covering over 50,000 members. Paul has also led numerous retirement plan reviews for public sector retirement systems considering the conversion of a defined benefit plan to a defined contribution or hybrid plan.

Professional Organizations and Education

Paul graduated from the University of Texas with a degree in Actuarial Science. He is an Associate of the Society of Actuaries, Member of the American Academy of Actuaries, Member of the Western Pension & Benefits Conference and an Enrolled Actuary.

Paul is a frequent speaker at professional and industry organizations, an author of several benefits articles, and has provided expert testimony in the development of public retirement policies.

SECTION 5 – PROPOSED METHODOLOGY, WORK PRODUCT AND TIMELINE

Based on our understanding of the requested services in the ORSC's RFP, we will perform an actuarial audit of PERS' actuarial work performed by the consulting actuaries GRS. As indicated in the RFP, the purpose of the audit is to review the work of the PERS consulting actuary GRS, for the purpose of independent verification and analysis of the assumptions, procedures and methods used by the PERS consulting actuary for the pension and retiree health care valuations as of December 31, 2013 and 5-year experience review as of December 31, 2010. In our review, we will make a determination as to whether the actuarial methods, considerations and analyses used by GRS in preparing the December 31, 2013 valuations are technically sound and conform to the appropriate Actuarial Standards of Practice as promulgated by the Actuarial Standards Board. Finally, we will prepare a written report summarizing our conclusions and recommendations, including appropriate documentation and attend three meetings to present to the PERS Executive Director, PERS Board of Trustees and the ORSC Board.

Our proposed methodology for completion of the scope of review and other consulting services, along with the desired work products and estimated timeline¹ for completion of the reviews, follows:

1. **Hold initial meeting** with ORSC and PERS to discuss project specifics, deliverables, timeline, etc. (Week 1)

This meeting will be a critical kickoff and will define the work to be completed, the staff support and consulting actuary requirements, deliverables and timeline.

2. **Collect data**, actuarial reports, actuarial calculations etc. used in the December 31, 2013 actuarial valuations of PERS pension and retiree health care benefits as well as five-year experience review ending December 31, 2010 (Weeks 2-3)

The following information would be required in order to complete the audit:

To be provided by PERS Staff:

- December 31, 2013 Retirement System actuarial valuation reports
- Member data submitted to GRS by PERS
- Financial data submitted to GRS by PERS
- Current plan provisions as contained in Ohio Revised Code Chapter 145
- All communications and reports pertaining to actuarial calculations

To be provided by GRS:

- Member data used by GRS
- Individual actuarial valuation results from a sampling of member lives
- Health claims cost calculations for retirees, disabled retirees, spouses and children

¹ Week 1 of the timeline is the week following the execution of the contract.

SECTION 5 – PROPOSED METHODOLOGY, WORK PRODUCT AND TIMELINE

We anticipate approximately five hours of PERS staff time to provide the materials above and approximately ten hours of GRS time to provide the member data and sample life calculations. Additional hours may be required from GRS if we are unable to match GRS' sample life calculations immediately and need to confer further with them.

3. **Review System information.** We will thoroughly review all available information gathered (Weeks 3-8)
4. **Review the valuation calculation results** (Weeks 3-8)

The valuation results are only as good as the methods and assumptions upon which they are developed. Our review would test the appropriateness of these building blocks.

Methodology

- We will review the methodology and process used by GRS to check for adherence to actuarial standards and comment on the appropriateness of the method and procedures.
 - We will quantify any issues in terms of actuarial impact.
5. **Verify the accuracy of the benefits valued and the data used by GRS** (Weeks 3-8)

We will verify that all appropriate benefits provided under PERS have been valued accurately. We will also verify that the data provided by PERS is consistent with the data used by GRS. Flick and Linda will perform all the data processing, calculations and modeling using an actuarial valuation system used by many national firms. KMS has a lease arrangement with Winklevoss Technologies (WinTech) for their software called ProVal, used for pension and OPEB valuations. ProVal can perform the following tasks:

- Funding valuations. The system can produce valuation results under any assumption set
- GASB 25, 27, 43 and 45 accounting valuations (and recently 67 and 68)
- Client-ready valuation report
- Deterministic and stochastic modeling of assets and liabilities for assessing future costs
- Detailed gain/loss analysis: This module produces a detailed gain/loss analysis by source
- Experience analysis: This produces experience results by decrement
- Multi-cycle valuations
- Data Base development and maintenance
- Data modeling

SECTION 5 – PROPOSED METHODOLOGY, WORK PRODUCT AND TIMELINE

The WinTech software, which is supported nationally and widely used by actuarial firms, provides us with extensive valuation flexibility including the support to value plan and assumption changes and the ease in conducting plan design studies. We both also use the Microsoft Office suite of software applications including Word, Access, PowerPoint, and Excel. While we will use the ProVal software to validate results, GRS uses their own proprietary actuarial valuation software. Flick worked at GRS from 2004-2006 and is familiar with that software, which will facilitate our review. Flick and Linda's involvement in every aspect of the PERS audit allows for a more streamlined consulting approach and in the end, better service to our clients.

Methodology

- Analyze member data submitted by PERS to GRS
- Analyze member data used by GRS and compare aggregated data with that submitted by PERS
- Program the benefits in ProVal and develop actuarial results
- Compare actuarial results to actuarial valuations
- Review for conformity with Actuarial Standard of Practice No. 23, Data Quality

6. Evaluate the actuarial cost method and actuarial asset valuation method used by the System (Weeks 3-8)

PERS currently utilizes the Entry Age Normal funding method. This is the most common method used in the public sector. Entry Age Normal produces costs which are stable as a percentage of pay. PERS uses an actuarial asset valuation method which we have thoroughly modeled in our prior ORSC work.

Methodology

- We will first understand PERS funding objectives and review any statutory requirements relative to the selection of the funding and/or asset method.
- We will review the funding and asset methods and determine if the methods are technically sound and conform to the Actuarial Standard of Practice.
- If we find that the funding and/or asset methods are inappropriate, we will recast the costs and such using better methods. We will present in our report a detailed rationale for the recommendations.
- Review for conformity with Actuarial Standard of Practice No. 4, Measuring Pension Obligations and Actuarial Standard of Practice No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations.

SECTION 5 – PROPOSED METHODOLOGY, WORK PRODUCT AND TIMELINE

7. Verify the reasonableness of the unfunded actuarial accrued liability calculation and the amortization period utilized (Weeks 3-8)

Methodology

- Review the methodology to calculate the unfunded actuarial accrued liability and the amortization period used under the Entry Age Normal cost method for reasonableness.
- We will show actual projections of contribution patterns under various amortization approaches.
- Make recommendations, if necessary, for changes to the methodology.
- Review for conformity with Actuarial Standard of Practice No. 4, Measuring Pension Obligations.

8. Perform review of Demographic and Economic Assumptions (Weeks 3-8)

We will review the demographic and economic assumptions used by PERS in the December 31, 2013 actuarial valuations. Demographic assumptions to be analyzed include the rates of mortality, retirement and separation rates. Economic assumptions to be analyzed include the investment return rate, inflation rate, individual salary increases and payroll growth, health care cost trend rates and morbidity factors.

Methodology

- Review past experience based on information contained in the most recent experience study, comparing that experience with peers and standard benchmarks.
- Review demographic assumptions for consistency with plan provisions. Just as with the economic assumptions, demographic assumptions have a significant impact on funding.
- Compare current assumptions with prevailing actuarial practice utilizing the Public Fund Survey.
- Prepare forward looking assumptions using empirical methods. These methods look at the asset allocation used of the particular client and anticipated real and nominal returns of each asset class. The methodology is consistent from client to client, but the outcomes may be quite different.
- If we find that the economic or demographic assumptions are inappropriate, we will recast the costs and such using better assumptions.
- Review for conformity with Actuarial Standard of Practice No. 27, Selection of Economic Assumptions for Measuring Pension Obligations and Actuarial Standard of Practice No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations.

SECTION 5 – PROPOSED METHODOLOGY, WORK PRODUCT AND TIMELINE

9. Perform review of December 31, 2013 valuation reports (Weeks 8-10)

- Review the December 31, 2013 valuation reports prepared by GRS for conformity with Actuarial Standard of Practice No. 41, Actuarial Communications.
- Present any recommendations for improvement to the report.

10. Deliver preliminary draft report to ORSC and PERS (Weeks 11-16)

We will prepare a written report that is in language clearly understood by lay readers. Our audit report will be in a format similar to that included in Appendix A.

- During the course of the reviews, we will provide progress reports to ORSC and PERS on a biweekly basis.
- We will develop a written report containing details of the process of the audit, cost analyses, findings, detailed recommendations and conclusions where appropriate.
- Our report will be in language clearly understood by lay readers.
- Our report will contain a glossary of terms essential to an understanding of retirement system funding and actuarial valuations.

11. Present preliminary report to PERS Executive Director (after delivery of preliminary draft report)

- We will present the preliminary draft report to the PERS Executive Director prior to the release of the final report.
- We will hold an exit conference with the PERS staff and consulting actuary to discuss our findings and recommendations contained in our preliminary draft report.

12. Present final report (after meetings to present preliminary draft report)

- Make any required modifications to report and issue final report
- We will present the final report to the PERS Board of Trustees and the ORSC Board.

Below, we provide a glossary of all abbreviations, acronyms and technical terms used to describe the services contained in our proposal.

Actuarial Accrued Liability – The portion of the Actuarial Present Value of future benefits which is allocated to all periods prior to a valuation year and therefore is not provided by future Normal Costs.

Actuarial Assumptions – Assumptions as to the occurrence of future events affecting pension and OPEB costs, such as mortality, withdrawal, disablement and retirement; changes in compensation and Government provided pension benefits; rates of investment earnings and asset appreciation or depreciation; procedures used to determine the Actuarial Value of Assets; characteristics of future entrants for Open Group Actuarial Cost Methods; and other relevant items.

Actuarial Cost Method – A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Accrued Liability.

Actuarial Present Value of Future Benefits – The present value of the cost to finance all benefits payable in the future, discounted to reflect the probability of payment and the time value of money.

Actuarial Valuation – the determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets and related Actuarial Present Values for a retirement plan or an OPEB plan.

Actuarial Value of Assets – The value of plan assets used in an actuarial valuation. The Actuarial Value of Assets may reflect smoothing techniques intended to dampen year-to-year fluctuations in the market value of assets.

Chapter 145 of the Ohio Revised Code – The Ohio statutes governing PERS.

Funded Ratio – The Actuarial Value of Assets expressed as a percentage of the Actuarial Accrued Liability.

FSA – Fellow of the Society of Actuaries, the highest educational standard for actuaries.

GASB – Governmental Accounting Standards Board.

GASB 25 – Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans

GASB 27 – Accounting for Pensions by State and Local Governmental Employers

SECTION 6 – GLOSSARY

GASB 43 – Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans

GASB 45 – Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions

GASB 67 – Financial Reporting for Pension Plans (an amendment of GASB Statement No. 25)

GASB 68 – Accounting and Financial Reporting for Pensions (an amendment of GASB Statement No. 27)

GRS – Gabriel Roeder Smith & Company

KMS – KMS Actuaries, LLC.

OPEB – Other Postemployment Benefits including medical, dental, vision, hearing and life insurance benefits.

ORSC – Ohio Retirement Study Council.

PERS – The Public Employees Retirement System of Ohio.

Plan Assets – Investments segregated and restricted in a trust or similar arrangement under which:

ProVal – Winkelvoss Technologies actuarial software used for funding and accounting valuations of retirement benefits and OPEB.

PTA – Pension Trustee Advisors, Inc.

Substantive Plan – The terms of an OPEB plan as understood by the employer and plan members.

Unfunded Actuarial Accrued Liability – The excess of Actuarial Accrued Liability over the Actuarial Value of Assets.

SECTION 7 – COST

Fees are determined based on our estimate of the time required to perform the audit. We propose that invoices, which will include the hourly rate and number of hours worked on the audit by specific personnel, will be submitted on a monthly or quarterly basis.

Our cost proposal is presented below and includes hourly rates for the professional staff assigned to the actuarial audit and an estimate of the number of hours anticipated. In support of our commitment to the ORSC and PERS and to demonstrate our sincere desire to continue working with you, we have discounted our fees and provide a “not to exceed fee” as shown below:

ORSC / PERS Audit Fee Development

Task	Team Member Name	Hours	Hourly Billing Rate	Estimated Cost
<ul style="list-style-type: none"> • Initial Kick-off meeting • Data collection • Review Information 	William Fornia	13	\$430	\$5,590
	Linda Bournival	20	300	6,000
	Paul Schrader	1	300	300
	Total	34		\$11,890
<ul style="list-style-type: none"> • Data Validity 	William Fornia	1	\$430	\$430
	Linda Bournival	5	300	1,500
	Total	6		\$1,930
<ul style="list-style-type: none"> • Review of Methods and Procedures 	William Fornia	7	\$430	\$3,010
	Linda Bournival	4	300	1,200
	Total	11		\$4,210
<ul style="list-style-type: none"> • Review of Assumptions 	William Fornia	24	\$430	\$10,320
	Linda Bournival	12	300	3,600
	Paul Schrader	1	300	300
	Total	37		\$14,220
<ul style="list-style-type: none"> • Perform Parallel Valuations 	William Fornia	24	\$430	\$10,320
	Linda Bournival	84	300	25,200
	Total	108		\$35,520

SECTION 7 – COST

ORSC / PERS Audit Fee Development (continued)

Task	Team Member Name	Hours	Hourly Billing Rate	Estimated Cost
• Review Health Care Premiums	William Fornia	4	\$430	\$1,720
	Linda Bournival	8	300	2,400
	Total	12		4,120
• Prepare Written Report	William Fornia	20	\$430	\$8,600
	Linda Bournival	24	300	7,200
	Paul Schrader	10	300	3,000
	Total	54		\$18,800
• Briefings, Meetings and Exit Conference	William Fornia	37	\$430	\$15,910
	Linda Bournival	35	300	10,500
	Total	72		\$26,410
Total Estimated Cost				\$117,100
Travel Costs				\$10,000
Supplies and all other expenses				\$1,285
Discount for ORSC				(\$11,685)
Total Estimated Fee (not to exceed)				\$116,700

SAMPLE ACTUARIAL AUDIT REPORT

**FINAL
REPORT
TO ORSC**



**ACTUARIAL AUDIT
FOR THE
SCHOOL EMPLOYEES
RETIREMENT SYSTEM OF OHIO**

**William B. Fornia, FSA
Linda L. Bournival, FSA**

February 2014



February 21, 2014

Ohio Retirement Study Council

Re: SERS Actuarial Audit

Dear Councilmembers:

We have completed our actuarial audit of the School Employees Retirement System pursuant to R.C. §171.04(E). As shown in the attached findings, we have matched actuarial calculations quite closely, and have several related comments. None of the comments reflects a critical concern. Our audit finds that actuarial calculations were reasonable, consistent and accurate.

The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards to provide this statement of actuarial opinion.

We look forward to presenting these findings to you in April.

Sincerely,



William B. Forna, FSA
President
Pension Trustee Advisors



Linda L. Bournival, FSA
Consulting Actuary
KMS Actuaries, LLC

cc: School Employees Retirement System

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Section 1 – General Findings

The Ohio Statutes require that the Ohio Retirement Study Council (ORSC) contract for an independent audit of the state retirement systems' actuaries not less than once every ten years. ORSC elaborated that the firm conducting the audit is to express an opinion regarding:

- An overall opinion as to the validity, completeness, and appropriateness of the demographic and financial information used by the consulting actuary to meet SERS' financial objectives,
- An overall opinion as to the reasonableness of the consulting actuary's conclusions and the conformance of the consulting actuary's work with generally accepted actuarial standards and practices, and
- A detailed description of each audit exception and the estimated effects of each exception on SERS, and
- Detailed recommendations for improvement.

Our opinion is that these standards were met, as will be discussed in the following pages.

We have duplicated the actuarial valuations and actuarial experience studies conducted by Cavanaugh Macdonald Consulting (CMC) and the results match quite closely. The primary purpose of an actuarial audit is to confirm that there are no significant errors in the actuarial calculations. Based on our replication, we report that we have found no significant discrepancies and conclude that there are no significant errors.

We make the following recommendations:

- Address health care assumptions more rigorously in the next actuarial experience study
- Correct minor calculations as discussed in the following pages
- Reconsider certain actuarial assumptions in the next experience study, including:
 - Pre-retirement mortality
 - Merit pay increases for those with more than ten years of service
 - Early retirement for those retiring after August 1, 2017
 - Dependent children for those at normal parenting ages

The following table summarizes the actuarial liabilities and normal costs produced by CMC and PTA/KMS actuarial valuations.

Annual Basic Benefits and Retiree Health Care Valuations as of June 30, 2013						
	Actuarial Liability			Normal Cost		
	CMC	PTA/KMS	% Diff.	CMC	PTA/KMS	% Diff.
Retirement						
Basic Benefits	16,826,360	16,864,671	0.23%	304,074	305,327	0.41%
Medicare Part B	386,773	392,159	1.39%	5,768	6,334	9.81%
Death after Retirement	34,029	34,070	0.12%	549	540	-1.77%
Total	17,247,161	17,290,900	0.25%	310,392	312,201	0.58%
Health Care						
Actives	1,761,722	1,760,677	-0.06%	89,482	89,178	-0.34%
Inactives	1,156,578	1,156,295	-0.02%			
Total	2,918,299	2,916,972	-0.05%	89,482	89,178	-0.34%
Grand Total	20,165,461	20,207,872	0.21%	399,873	401,379	0.38%
*All numbers in thousands						

As mentioned above, the grand total actuarial liability calculated by PTA/KMS was within 0.21% of the same calculated by CMC. The grand total normal cost calculated by PTA/KMS was within 0.38% of that calculated by CMC.

Section 2 – Audit of Actuarial Method, Factors and Assumptions Used in Actuarial Valuations

The first step in the actuarial audit process is to review the actuarial method, actuarial factors and actuarial assumptions used in the actuarial valuations.

ACTUARIAL METHOD

CMC uses several actuarial methods in determining costs and liabilities for the School Employees Retirement System of Ohio.

- The actuarial funding method is the Entry Age actuarial cost method
- The actuarial asset valuation method is a four year smoothed market value
- The amortization method is a level payroll, closed period method
- The method of developing the health care claims cost assumptions is not clearly described in the reports.

Actuarial Funding Method

The Entry Age Normal actuarial cost method is used for actuarial valuations. This method is designed to maintain constant plan costs throughout each employee's career as a portion of pay. We believe this is a reasonable and appropriate method. It is the most common method used by large public pension systems such as the SERS. CMC is applying the method reasonably, consistently and accurately.

Actuarial Asset Valuation Method

CMC employs a four year smoothed market value actuarial asset valuation method. Unlike actuarial funding methods, actuarial asset valuation methods are not precisely defined. Most actuaries use what could be categorized as a "five [or four] year smoothed market value actuarial asset valuation method" as does CMC, but might use quite different methods. We have reviewed the precise provisions of the method that CMC employs and find it to be reasonable, consistently applied, and accurate.

The CMC method is a very conventional and appropriate application of a four year smoothed method. They spread any investment gains or losses (relative to the actuarial assumption) over four years and apply a 20% maximum disparity from true market value. Health care assets are not smoothed, and subtracted from the total smoothed assets to determine the pension actuarial value of assets. This is a reasonable and appropriate method.

Amortization Method for Determining Funding Amounts

In addition to the Entry Age Normal actuarial cost method, CMC and SERS use a conventional method for amortizing components of unfunded liability. The method was a

closed period, decreased from thirty years as of 6/30/2012 to 29 years as of 6/30/2013. As this period gets shorter in future decades, CMC and SERS may wish to consider a layered method, meaning that each year's unplanned increase or decrease in the actuarial unfunded liability is amortized over a new period. This would still be considered a closed period.

Many if not most statewide pension systems continue to use an open period. The closed period approach tends to be more conservative than the open period approach. As discussed in our 2011 Pension Reform Solutions report, we believe that the closed period is appropriate.

The other amortization feature being used is to amortize the costs as an increasing percentage of payroll. We believe this is an appropriate approach for funding, despite the changes in the GASB rules which will not permit this method for GASB determinations.

In conclusion, we find the amortization method reasonable, consistent and accurate.

Amortization Method for GASB Determinations

The Government Accounting Standards Board (GASB) has very specific requirements for its amortization method. These requirements will be changing with the next actuarial valuation. CMC and SERS are using the same amortization method for GASB determinations as for calculating the pension funding requirement. This will change with next year's actuarial valuation. We find this current practice reasonable and appropriate.

Amortization Factors

CMC developed the 29 year amortization factor for allocating the cost of funding the unfunded liability. We confirmed that these calculations are correct. This is calculated based on the investment return assumption of 7.75% and payroll growth rate of 4.00%.

Cost Factors

CMC uses the Entry Age Normal actuarial cost method to determine actuarial cost factors which assign the liability to appropriate years. These "cost factors" are a natural byproduct of the actuarial valuation process and we confirm that they are being calculated correctly.

ACTUARIAL ASSUMPTIONS

We have reviewed the actuarial assumptions used by the actuary and find them to be reasonable, consistent, and accurate.

The actuary uses a large number of actuarial assumptions, including:

- Demographic Assumptions
 - Mortality During Active Service
 - Mortality After Retirement
 - Mortality After Disability Retirement
 - Withdrawal From Service Before Retirement
 - Retirement
 - Disability Retirement
 - Withdrawal of Contributions at Termination
 - Other Demographic Assumptions
- Economic Assumptions
 - Investment Return Rate
 - Inflation
 - Individual Salary Increases
 - Payroll Growth
- Post-employment Healthcare Assumptions
 - Base Claim Rate Derivation
 - Health Care Cost Trend Rate
 - Morbidity
 - Retiree – Paid Premiums
 - Health Plan Participation Rates and Elections
 - Spouse Coverage Rates
 - Medicare Coverage Rates

Brief comments on each assumption are included below and will be discussed in more detail in Section 4 of this report which focuses on the experience study.

DEMOGRAPHIC ASSUMPTIONS

Rates of Post-Retirement Mortality

CMC uses a static post-retirement mortality table which incorporated a margin of 12% to 15% to anticipate future increases in longevity. We find this approach reasonable. Although the table in use is the 1994 Group Annuity Mortality table (with one year adjustment) – a table that is twenty years old – the experience shows that this table as adjusted is appropriate.

Actuaries are getting more sophisticated in their techniques for anticipating future mortality improvements. CMC is using the traditional method of building in a margin in their static mortality table. This would tend to require that the table be changed every few years to continue to anticipate improved mortality. This approach is very reasonable. The more sophisticated method would be to use a “generational” mortality

table which assigns different mortality probabilities based not only on age but on generation. For example, an 80 year old retiree in 2014 (born 1934) would have higher mortality rates than a future 80 year old retiree born in 1984. At some point, CMC may wish to change methodologies, but because this adds complexities, many actuaries continue to use the “static” mortality table method that CMC now uses.

We also compared the CMC table with a commonly used current table known as “RP-2000” using a projection for improvement to 2013. We found that CMC’s assumptions are more conservative than this 2013 table for females for all ages from 55 up through age 95 and for males age 72 to 104. This is a useful comparison that shows that the table being used by CMC is probably still on track in 2013 and still with some margin for future improvement. We expect that CMC will continue to monitor SERS actual mortality experience carefully in each experience study and gradually modify the tables as the margin for mortality improvement erodes.

Rates of Disabled Post-Retirement Mortality

CMC’s mortality assumption for those disables appears reasonable, although this data is fairly sparse, with only 1,222 deaths in the five year period.

Rates of Pre-Retirement Mortality

CMC’s experience study found an extraordinary low number of pre-retirement deaths. Only 458 were observed, with 733 expected under the prior mortality table. Consequently, they recommended changing the mortality table to one which would produce 419 expected deaths.

The problem we see with this approach is that this would be based on a mortality table which is only 25% of the standard 1994 GAM table. This means that the standard table would predict 1,674 deaths, but only 458 were observed in the experience study. We find this almost impossible to believe that SERS members have four times better pre-retirement mortality than what would be predicted by a standard mortality table. This is even more astonishing because they actually have slightly worse mortality experience once they retire.

We suspect that rather than nearly immortal active SERS members, what is happening is that there is some kind of reporting discrepancy in counting the number of SERS members who die in active service. Perhaps some deaths are simply being reported as individuals quitting.

Although we recommend that CMC reconsider this assumption in the next experience study, and this is an interesting phenomenon, it is important to note that any error is trivial. Many more active members quit than die, so if there is an error in reporting or

setting actuarial assumptions in the pre-retirement mortality, it is likely more than compensated for in the withdrawal assumptions.

Withdrawal from Service before Retirement

We concur that the withdrawal tables used by CMC are reasonable, consistent and accurate. CMC uses a table based on service rather than one based on age. We find that this is a sound methodology because individuals do have higher likelihood of termination during their first few years of employment than later in their career.

Retirement

We concur that the retirement tables used by CMC are reasonable, consistent and accurate. CMC uses different retirement tables based on whether they are eligible for an unreduced retirement benefit. This is a sound method because individuals often are reluctant to retire if the benefit is subject to a reduction for early retirement.

One minor concern is that CMC does not assume that any individuals will retire under an early (reduced) retirement after August 1, 2017 under the new eligibility requirements. While this is not a critical assumption for pensions because the value of such early retirement subsidy is small, the value of early retirements under health care can be significant. Therefore, we would recommend that some future retirees are assumed to retire early. Of course, there is no experience to measure this assumption, as 2017 has not yet arrived. But we would anticipate that indeed some individuals will choose to retire early. Because current actuarial valuations measure liabilities for individuals who will retire later, it is important to predict future retirement incidence as accurately as practical.

Disability Retirement

We concur that the disability tables used by CMC are reasonable, consistent and accurate.

Withdrawal of Contributions at Termination

CMC does not have an explicit assumption for the likelihood of individuals withdrawing contributions at retirement. They use a more robust method of comparing the discounted value of the available annuity with the value of contributions on an individual-by-individual and year-by-year method. This is a sophisticated actuarial valuation method which we support. We did discover that discount rates had not been changed in this calculation, but find the discrepancy virtually immaterial. CMC would probably wish to correct this oversight.

Other Demographic Assumptions

We reviewed the other demographic assumptions which could be analyzed by CMC. We find their study reasonable, consistent and accurate. These assumptions include:

Marriage Rates – CMC assumes 80% of future retirees would be married. Current retirees use actual marriage data at the time of valuation. We support this approach.

Spouse Coverage Rates – CMC assumes 50% of future male retirees would have a covered spouse and 40% of future female retirees would have a covered spouse. Current retirees use actual spouse coverage data at the time of valuation. We support this approach.

Age Difference between Husbands and Wives – CMC assumes husbands are 3 years older than wives. We find CMC's analysis reasonable.

Number of Dependent Children – CMC did not disclose an assumption of dependent children in the actuarial valuation report or the experience study. Based on our analysis of test cases, we learned that CMC assumes that no members have dependent children (for pension and health care purposes). Because the pre-retirement survivor benefit is greater when there are dependent children, we recommend that this assumption be analyzed in the experience study, and that some assumption be made. For example, CMC could assume that members have two dependent children from when they are ages 25 to 47, then one from 47 to 50, then none once they become age 50. Keep in mind, however, that very few members die prior to retirement and collect these benefits. So although we believe some consideration should be made for dependent children, the financial implication is small. Further, no assumption for dependent children is made in the health care valuation, but there are 494 dependent children of retired members receiving health benefits as of the most recent valuation. Many of these dependent children receive health benefits until age 26, but there are a number of them, presumably disabled, who receive health benefits for life. We recommend that a small liability load or explicit assumption be considered for the value of these benefits.

ECONOMIC ASSUMPTIONS

Investment Return Rate

CMC uses a 7.75% investment return rate. This assumption is consistent with that used by most systems. According to the Public Funds Survey as of January 30, 2013, the median assumption for 126 large primarily state systems is 7.90%. In particular:

- 42 of the 126 (33%) use assumptions lower than 7.75%,
- 17 (13%) use a 7.75% assumption, and
- 77 (61%) use an assumption greater than 7.75%, the most common being 8.00%, which is used by 49 (39% of the total).

A 7.75% rate is also used by one other statewide system in Ohio. The other systems' expected rates are:

- Ohio Public Employees Retirement System – 8.00%
- State Teachers Retirement System of Ohio – 7.75%
- Ohio Police and Fire Retirement System – 8.25%
- Ohio Highway Patrol Retirement System – 8.00%

Of course, a simple comparison of what other systems are using is helpful, but not a sufficient criteria for establishing an assumed rate of investment return.

CMC used a very robust forward-looking “building block” method, where they developed an inflation assumption, a real return assumption and an assumption for expenses. Each of these components were calculated independently, then summed (subtracted for expenses) to develop the net investment return assumption. CMC went further and used the standard deviation of returns developed by SERS investment consultants to estimate the 25th, 50th and 75th percentile real return distribution.

Their 7.75% net return assumption is comprised of 3.25% inflation plus 5.25% real return minus 0.75% administrative expenses. Inflation is discussed in the section below, so we will focus on the real return component and the administrative expense component.

To calculate the assumed real rate of return, CMC used the SERS asset allocation along with the capital market assumptions developed by SERS' investment consultant (Summit Strategies Group). This can be illustrated by the following table:

CMC Development of Expected Real Return

Asset Class	Asset Allocation (Weight)	Expected Real Return
Cash	1.0%	0.0%
US Stocks	22.5%	5.0%
Non-US Stocks	22.5%	5.5%
Fixed Income	19.0%	1.5%
Private Equity	10.0%	10.0%
Real Assets	10.0%	5.0%
Hedge Funds / Multi-Asset Strategies	15.0%	7.5%
Total (Weighted Average)	100.0%	5.27%

We have three concerns with this calculation. The first is very minor. SERS reports that it has a 45% allocation to global equities. The analysis above assumed that the global equities were split half US and half non-US. Although we had not reviewed SERS actual

investment allocations, we would have expected that more would be invested in the US than outside of the US. SERS has advised us that they indeed have a 50/50 split of global equity investments between US and non-US. Although this is not material, we recommend that the next experience study explicitly confirm the global equity allocation between US and non-US.

Our second concern is that Summit in June 2010 reported an expected nominal return for private equity of 11.0%, which when combined with an expected inflation rate of 2.5% yields an expected real return for private equity of 8.5%. But instead of 8.5%, 10.0% was used in the experience study development. This was based on a later email from Summit to CMC. This may have been an oversight by Summit. This concern has a somewhat larger effect, reducing the 5.27% calculated weighted average to 5.12%. At this point it is important to point out that these return assumptions are just that – assumptions. Will private equity generate average 8.5% annual real returns or 10.0% average annual real returns? No one knows, of course. Other investment consultants may have more optimistic outlooks for private equity. So while the math suggests 5.12% instead of 5.27%, one should not put undue weight on these calculations.

Our third concern is that SERS appears to have modified its asset allocation between 2010 and 2014. The real estate allocation has been increased from 10% to 15% while the hedge fund (multi-asset strategies) allocation has dropped from 15% to 10%. In addition to this, according to its December 31, 2013 “Economic & Capital Market Review”, Summit has decreased its capital market assumptions substantially. For example, it’s expectation for US large capitalization stocks has dropped from 7.5% in 2010 to 5.5% in 2013. This is only partially explained by its drop in anticipated inflation from 2.50% to 2.25%. This drop might suggest that the next experience study might recommend much lower assumptions. These three factors might be represented by the following table (changed numbers are **bolded** and *italicized*):

Possible Development of Expected Real Return – Next Experience Study

Asset Class	Asset Allocation (Weight)	Expected Real Return
Cash	1.0%	<i>0.75%</i>
US Stocks	<i>25.0%</i>	<i>3.25%</i>
Non-US Stocks	<i>20.0%</i>	<i>4.75%</i>
Fixed Income	19.0%	<i>1.25%</i>
Private Equity	10.0%	<i>7.00%</i>
Real Assets	<i>15.0%</i>	5.00%
Hedge Funds / Multi-Asset Strategies	<i>10.0%</i>	<i>3.75%</i>
Total (Weighted Average)	100.0%	<i>3.83%</i>

This suggests that the next experience study might suggest a more than 1% drop in investment return, all other things being equal. Many other factors may change this conclusion, such as changes in underlying capital market assumptions or asset allocations. We would encourage CMC in its next experience study to look at capital market assumptions of other advisors in addition to Summit.

According to the Public Funds Survey as of January 30, 2013, the median real rate of return assumption for 126 large primarily state systems is 4.50%. Although not specifically asked, this is presumably after reduction for administrative expenses in most responses. In particular:

- 30 of the 126 (24%) use assumptions lower than 4.50%,
- 35 (28%) use a 4.50% assumption, the most common assumption,
- 61 (48%) use an assumption greater than 4.50%, and
- a 5.00% real rate of return is assumed by all four other Ohio statewide systems.

CMC assumed that SERS administrative expenses would be 0.75%, based on the following history of expenses:

History of Administrative and Investment Expenses

Fiscal Year Ending June 30:	Total Expenses (\$000)	Expense Ratio (to assets)
2006	68,071	0.66%
2007	76,754	0.63%
2008	95,995	0.86%
2009	86,203	1.01%
2010	95,458	1.02%
Average	84,496	0.84%

We recommend continuing to monitor the expenses and expense ratios. The trend had been that expenses were increasing. With the recent run-up in the market, hopefully the expense ratio has returned to the 0.75% range that CMC assumes. We understand that changes in asset allocation have also recently reduced these administrative and investment expenses since 2010. CMC may wish to incorporate expenses in its table of experience gains and losses by risk area.

In addition to the building block assumption development, CMC analyzed recent SERS historical returns and long term national equity and fixed income returns. We believe a three pronged approach (forward looking, historical, and peer comparison) is appropriate, and that despite our minor concerns, the CMC 7.75% return assumption is reasonable.

CMC uses a 5.25% investment return assumption for the healthcare plan. In order to develop this return assumption, CMC reported in the experience study that it was

based on the short term return of employer assets. We recommend that CMC develop this assumption more rigorously in the next experience study report. Notwithstanding our recommendation for more robust development, we find the assumption to be reasonable, consistent and accurate.

Inflation

We reviewed the confirmation of the 3.25% inflation developed by CMC. We find that the methodology used by CMC is reasonable, consistent and accurate. CMC's use of forward looking data such as the yields on inflation-indexed treasury bonds is particularly robust. The data supported the reduction from 3.50% to 3.25%, and may support an even further reduction in the next experience study.

According to the Public Funds Survey as of January 30, 2013, the median assumption for 126 large primarily state systems is 3.00%. In particular:

- 76 of the 126 (60%) use assumptions lower than 3.25%, the most common being 3.00%, which is used by 52 (41% of the total).
- 11 (9%) use a 3.25% assumption, and
- 39 (31%) use an assumption greater than 3.25%.

A 3.25% rate is also used by one other statewide system in Ohio. The other systems' expected rates are:

- Ohio Public Employees Retirement System – 3.00%
- State Teachers Retirement System of Ohio – 2.75%
- Ohio Police and Fire Retirement System – 3.25%
- Ohio Highway Patrol Retirement System – 3.00%

Payroll Growth

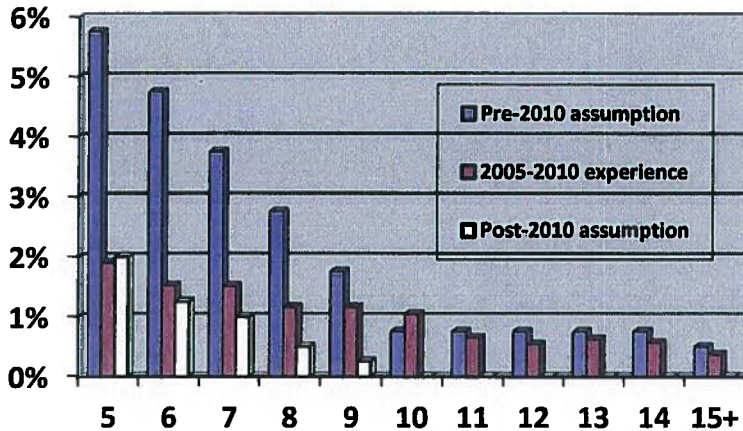
CMC proposes a real payroll growth rate of 0.75%, based substantially on the Social Security Administration's data over the last fifty years. When added to 3.25% inflation, this results in a total payroll growth assumption of 4.00%. We find this to be reasonable, consistent and accurate.

Individual Salary Increases

CMC analyzed individual salary increase rates, and appropriately considered the impact of inflation on the increases. It is a common mistake to improperly attribute low salary increases between inflation and other components. CMC handled this correctly. For example, as CMC mentioned in their experience study, inflation during the experience study period was only 2.3%, while the assumed rate of inflation was 3.5%.

We do have some concerns with CMC’s development of merit increase assumptions for individuals with more than ten years of service. This can be illustrated by the following chart.

Merit Increase Assumptions by Years of Service



This shows that merit increase experience was lower than expected across most of the spectrum. While CMC’s new reduced assumption for up to five years of service seems appropriate, we question whether it is appropriate to assume no merit increase for anyone with ten or more years of service.

Three considerations mitigate our concern, however. First, there have been actuarial gains due to salary in at least the last ten actuarial valuations. This means that while our observation may be appropriate based on the data as of 2010, their assumptions appear to have predicted recent experience more accurately. Second, as mentioned previously, the inflation assumption might be higher than need be. Since salary growth is the sum of payroll growth and merit, and since payroll growth is the sum of inflation plus real wage growth, if merit is slightly understated but inflation is slightly overstated, the total may be right. Third is an even more arcane point. When CMC developed their 2005-2010 experience (red bars above), they subtracted out the prior real payroll growth assumption of 0.50% from the total real salary growth. One could make a case that they could have subtracted out the new real payroll growth assumption of 0.75% instead. This would make each of the red bars lower by 0.25%, which significantly diminishes the disparity between what we might have recommended and what CMC actually did recommend.

The bottom line is that we recommend that CMC study this very carefully in their next experience study. The allocation of salary growth between merit and payroll growth is actually an important distinction in the cost development. This is because higher total

salary growth increases actuarially calculated costs, but higher payroll growth can decrease the current period amortization costs.

POST-EMPLOYMENT HEALTHCARE ASSUMPTIONS

Base Claim Rate Derivation

It is common practice for actuaries to project future claim costs by measuring past experience and adjusting it to reflect the effects of inflation and plan design. It is not well documented in the actuarial report how CMC set the expected claims costs.

Because retiree health care actuarial valuations are a more recent development than pension actuarial valuations, common actuarial practice is less robust in terms of disclosure of methods and assumptions. The CMC disclosure of health assumptions is consistent with general practice, but not as strong as their disclosure of pension assumptions or ideal practice.

Based on discussions with CMC and review of certain calculations, we find that the health care claim cost assumption is reasonable. However we recommend that this be more rigorously documented either in an actuarial experience study for healthcare or through expanded disclosure in the actuarial reports or both.

In order to develop the core health care claims cost assumption, CMC took the following steps.

- Identify the medical cost, or vendor rates, for each plan type and tier (Medicare Mutual PPO, Kaiser HMO, etc.)
- Develop a factor to adjust medical trend by one-half year
- Calculate Aging Factors based on the average of the aging factors of the entire age distribution of the applicable groups
- Utilize assumed participation factors for each plan type
- Calculate weighted average based on all of these factors to arrive at assumed age 65 core health care claims cost

We have reviewed these factors and find them reasonable, appropriately calculated and accurate.

During our initial review, we had a concern with the under-65 spouses of currently retired members. When CMC developed the base claim cost for this group, they averaged expected claims (based on the vendor rates) for this group. But approximately 30% of these under-65 spouses were indicated as subscribed in lower-cost Medicare plans. This was unexpected that a significant number of pre-65 spouses would be on Medicare, so we recommended that SERS review the data for this group. SERS finance staff and healthcare

staff verified that all of the spouses under age 65 were indeed subscribed in the lower-cost Medicare plans as indicated in the data.

Health Care Cost Trend Rate

To properly measure future liabilities, actuaries apply trend rates (health inflation) to the base claim costs described above. Standard practice is to use prevailing national trend rates and grade down to an ultimate trend rate that is slightly higher than prevailing CPI rates. It is reasonable to alter these national rates by applying population-based credibility factors to the Plan's experience and using a blended set of trend rates. CMC did not disclose the process which they used to develop their health care cost trend rates in either the experience study or the actuarial valuation reports. When asked, they replied:

"The Actuarial Standards Board has issued Actuarial Standard of Practice (ASOP) No. 6, "Measuring Retiree Group Benefit Obligations", which provides guidance to actuaries in selecting economic assumptions for measuring obligations of postretirement plans other than pensions. As noted in ASOP No. 6, the actuary should consider the following key components in setting the health care cost trend rate: inflation, medical inflation, definition of covered charges, frequency of services, leveraging caused by plan design features not explicitly modeled, and plan participation. The actuary should not consider aging of the covered population when selecting the trend assumption for projecting future costs.

In projecting medical and prescription drug costs, we assume the health benefit plan cost trend rates will decrease from an initial rate to an ultimate level. For the initial trend rate, our methodology includes the use of published annual health care inflation surveys in conjunction with actual plan experience, where credible. Given the volatile nature of medical and prescription drug costs, the initial trend rate assumption is subject to continued update and review with each valuation performed.

As for the decrease to the ultimate trend rate, there are various approaches used to determine the timing and level of the decreases (e.g., multi-year grading period, SOA-Getzen Model). The assumed decrease in medical and prescription drug trend rates reflects the belief that health care inflation cannot indefinitely outstrip the growth rate of employer budgets and the overall economy. As a standard of practice, we typically assume a grading period of five to ten years, depending on the level of change (i.e., larger differences between the initial trend rate and the ultimate trend rate are assumed to require a longer reduction period).

For the ultimate trend rate assumption, we believe the use of an assumption of price inflation plus 1.0% to 2.0% is reasonable for an ultimate rate of medical trend as healthcare costs have historically risen at higher rates than general price inflation.

We typically assume an ultimate trend rate of 5.0%. Although in our last experience study we lowered the Ohio SERS price inflation assumption from 3.50% to 3.25%, we decided to keep the ultimate trend assumption at 5.0% since it still fell in the range of 1.0% to 2.0% above price inflation. As with any standard of practice, the specifics of each plan are reviewed to ensure there is nothing unusual that would necessitate a long-term trend rate that is either higher or lower than what is typical. It appears to be reasonable to use an ultimate rate of 5.0% as there appears to be nothing unusual about Ohio SERS's medical plans that would necessitate a long-term trend that is either higher or lower than what is typically used for this type of calculation."

We find this approach reasonable, and the trend rates which it produces reasonable. It is possible that the ultimate trend rate will be closer to the price inflation assumption of 3.25%, but CMC's conservative assumption of 5.00% provides some cushion for higher than anticipated health care costs. As mentioned previously, we recommend that this process be documented more rigorously in the next experience study report, the actuarial valuation report or both

Morbidity

In a health insurance valuation, morbidity is sometimes defined as the difference in claims costs at different ages. Morbidity rates are also known as aging factors. They are used to transform average health cost assumptions to health care cost assumptions which vary by age. CMC did not disclose what data was used for development of aging factors in the reports. Upon request, they did disclose to us that:

"Our first OPEB valuation for Ohio SERS was as of June 30, 2008. The prior actuary had completed an OPEB valuation as of 1/1/2008 and had adjusted the age related morbidity factors, using them for the 1st time as of 1/1/2008. Since the factors had been recently analyzed and updated, we retained them for our 6/30/2008 valuation. We have since that time closely monitored all publications and research projects undertaken by the SOA regarding age related morbidity and have seen no indication that these factors are no longer appropriate."

We encourage CMS to review these factors in the next experience investigation to the extent data is available. At the very least, we would recommend that the experience study report disclose the process used for choice of these aging factors. We reviewed the aging factors developed by CMC and found them appropriate.

Retiree - Paid Premiums

The true measure of a plan's liability is the difference between total claims costs and the amount that retirees contribute to offset those total costs. For Retiree-Paid Premiums, CMC used actual retiree contribution percentages by class under the current provisions of the plan. CMC does not assume any increases to the share of the costs

covered by premiums. This means that they would increase by the same health care trend factors as underlying health costs. These are beginning at 8.50% (6.75% for Medicare) and grading down to 5.0%. This is a reasonable approach.

Health Plan Participation Rates

The actuary assumes that 94.4% of future retirees elect coverage under the PPO versus HMO. No supporting documentation is provided for this assumption, although it appears to be consistent with the actual coverage selection for the current retiree population. Upon further questions to CMC as to the elections, they responded:

“The basis for the participation assumptions include: consideration of the prior actuary’s assumptions, general rules of thumb for anticipating participation based on employer subsidy levels, and actual plan experience. Our general rule of thumb for anticipating participation based on subsidy levels is 1.0 minus the square of the retiree’s (or spouse’s) percentage contribution. At some contribution levels, the assumed “rule of thumb” participation percentages were higher than the prior actuary’s assumptions and, after analyzing actual plan experience, we found the prior actuary’s assumptions to be more appropriate. We plan to do a more robust analysis of plan participation in our next experience study now that we have credible experience on the post 8/1/2008 service retirees, keeping in mind that it will have to be closely monitored, particularly for pre-Medicare eligible retirees due to the ACA (subsidized coverage on the Exchanges and the expansion of Medicaid).”

We find this to be a reasonable and appropriate approach, and agree with their intention of performing a more robust analysis.

Section 3 – Audit of Compilation of Actuarial Valuations

The cornerstone of an actuarial audit is a replication of the actuarial valuation. As mentioned above, we matched quite closely the costs and liabilities developed by CMC for the retirement system. Consequently, we conclude that the valuation results are reasonable, accurate and consistent.

The following table summarizes the actuarial liability and normal cost for the Annual Basic Benefits produced by CMC and PTA/KMS actuarial valuations.

Annual Basic Benefits Valuation as of June 30, 2013						
	Actuarial Liability			Normal Cost		
	CMC	PTA/KMS	% Diff.	CMC	PTA/KMS	% Diff.
Active Members						
Retirement	6,870,958	6,938,189	0.98%	184,037	207,876	12.95%
Death	93,779	99,480	6.08%	4,395	4,734	7.72%
Disability	270,826	267,066	-1.39%	21,151	20,490	-3.12%
Termination	-204,730	-220,735	7.82%	94,491	72,227	-23.56%
Medicare Part B	131,656	136,417	3.62%	5,768	6,334	9.81%
Death after Retirement	7,512	7,553	0.54%	549	540	-1.77%
Total	7,170,002	7,227,969	0.81%	310,392	312,201	0.58%
Retirees						
Retirement	7,752,714	7,738,283	-0.19%			
Disability	822,617	822,617	0.00%			
Beneficiaries	654,406	653,983	-0.06%			
Medicare Part B	243,515	244,140	0.26%			
Death after Retirement	25,246	25,246	0.00%			
Total	9,498,497	9,484,268	-0.15%			
Deferred Vested						
Retirement	281,639	281,639	0.00%			
Medicare Part B	11,602	11,602	0.00%			
Death after Retirement	1,272	1,272	0.00%			
Total	294,512	294,512	0.00%			
Inactive Members						
	284,150	284,150	0.00%			
Total	17,247,161	17,290,900	0.25%	310,392	312,201	0.58%
*All numbers in thousands						

The following table summarizes the actuarial liability and normal cost for the Retiree Health Care Benefits produced by CMC and PTA/KMS actuarial valuations.

Retiree Health Care Valuation as of June 30, 2013						
	Actuarial Liability			Normal Cost		
	CMC	PTA/KMS	% Diff.	CMC	PTA/KMS	% Diff.
Active Members						
Service Retirements	1,573,760	1,572,362	-0.09%			
Disability	121,019	121,071	0.04%			
Termination	65,651	66,030	0.58%			
Death	1,293	1,215	-6.00%			
Total	1,761,722	1,760,677	-0.06%	89,482	89,178	-0.34%
Retirees						
Service Retirements	943,175	943,099	-0.01%			
Disability	177,343	177,343	0.00%			
Spouses	15,155	15,178	0.15%			
Children	6,570	6,346	-3.41%			
Total	1,142,243	1,141,965	-0.02%			
Deferred Vested	14,335	14,330	-0.04%			
Total	2,918,299	2,916,972	-0.05%	89,482	89,178	-0.34%

*All numbers in thousands

Summary of Deviation of Results

	Basic Benefits Valuation Results	Retiree Health Care Valuation Results
Accrued Liability	0.25%	0.05%
Normal Cost	0.58%	0.34%

Actuaries generally use a 5% deviation as an acceptable range of error. As the total actuarial liabilities and normal costs deviations calculated by PTA/KMS were well within this “margin of error”, we are quite satisfied that numbers are appropriate.

Although we did match quite closely, there are several areas which we would encourage CMC to explore further:

- In valuing the Pension benefits, the following are a few items we uncovered that could be corrected, but overall would be immaterial to the valuation results:
 - Value deferred vested Post-Retirement Death Benefit coverage at retirement. The death benefit is available to each recipient of a service or disability benefit. While the benefit is correctly valued for retirees and disabled members, the benefit is not correctly valued for deferred vested members.
 - Make minor correction to the early retirement factors table. CMC provided us with the table of early retirement factors. For retirements before August 1, 2017, there are two entries at age 65 of “0” (at 23 and 24 years of service) which should be “1”.
 - Develop the lump sum annuity conversion factors using a 7.75% discount rate. We asked CMC to provide the parameters used to develop these factors, and they replied,

“The lump sum factors are developed using ProVal. These are internal calculations used to compare the value of the member contributions vs. the accrued benefit to select the benefit of greater value. We looked at what the basis that is loaded for these and note that the interest rate used was 8.0% rather than 7.75%. This item did not get updated after the last experience study which changed the discount rate. We have looked at the impact of correcting this and find it would be immaterial to the valuation results.”
 - The Medicare Part B benefit is valued as a Joint & Survivor payment form when the retired member turns 65. This benefit could be valued separately for the member and the spouse so that the benefit is payable at age 65 for each.
- We recommend that CMC incorporate the following in the Pension Valuation Report:
 - Include the chart or comment about the health care fund expected solvency period, which had been included in prior valuation reports.
 - The breakout of liabilities and employer contribution rates provided in “Required Contribution Rates” on page 9 and Appendix A should be consistent.
 - Indicate that the Medicare Part B reimbursement continues to the spouse upon the death of the retiree only if the retiree elects a Joint & Survivor payment form.

- We recommend that CMC incorporate the following in the Health Care Valuation Report:
 - Include in Schedule C information regarding the \$35 monthly surcharge.
 - Provide greater detail on the determination of the Monthly Expected Medical/Prescription Drug Premiums and Claims.
 - Include blended claims costs for Children.
 - Describe the blended claims costs as “Annual”.
 - Service Retirement eligibility requirements should be described the same as Pension report.
 - An assumption regarding the Health Care Premium Discount Program should be stated regarding future eligible retirees.
 - Include an assumption regarding valuation of future children’s benefits.

Section 4 – Review of Retiree Health Care Premium Rates

We performed an assessment of whether SERS/CMC appropriately, consistently, and evenly determines retiree contributions to health care and whether the implementation of the system's health care policies differ from those determinations.

For our review, we relied on the Board's funding policy, Board meeting minutes, Health Care Actuarial reports, Health Care Enrollment Guides, Comprehensive Annual Financial Reports (CAFR) and other documents as provided by SERS staff. We compared the total vendor costs, and in the case of self-funded plans, the actuarial costs, to the actual premiums charged. Our analysis took into account changes to plan design, reimbursements, and employer contributions available to fund health care and the projected health care trust solvency period.

The Board's funding policy (most recently reviewed January, 2013) describes the funding philosophy and objectives regarding pension and health care benefits. The funding policy states as its purpose the following:

"The purpose of this Statement of Funding Policy is to describe the funding philosophy and objectives of the Retirement Board of the School Employees Retirement System of Ohio (Board). This Statement sets forth policy and describes the organization and division of responsibilities to prudently implement the Board philosophy and objectives in accordance with sections 3309.21 and 3309.211 of the Ohio Revised Code. It also establishes the framework and specific objectives to monitor the System's funded status and to promote effective communication between the Board and SERS staff."

The funding policy includes the following statement regarding access to health care:

"Access to health care is provided in accordance with section 3309.69 of the Ohio Revised Code, and is financed through a combination of employer contributions and retiree premiums, copays and deductibles on covered health care expenses, investment returns, and any funds received as a result of SERS' participation in Medicare programs. The System's goal is to maintain a health care reserve account with a twenty-year solvency period in order to ensure that fluctuations in the cost of health care do not cause an interruption in the program. However, during any period in which the twenty-year solvency period is not achieved, the System shall manage the Health Care Fund on a pay-as-you-go basis.

The Ohio Revised Code permits SERS to offer access to health care to eligible individuals receiving retirement, disability, and survivor benefits and to their eligible dependents. Health care coverage may be changed at any time, resulting in adjustments in the required funding of the health care program.

Included within the aforementioned employer contribution is a surcharge determined in accordance with Ohio Revised Code section 3309.491. The surcharge is levied against employers whose employees earn less than a specified minimum salary. In order to avoid shifting an onerous financial burden to our members and retirees, the employer surcharge will continue to be an important source of health care revenues.”

SERS staff provided Board policies that relate to health care, however none of the policies provided dictate a precise method or specific guidelines on setting premium rates. These would be consistent with the SERS funding policy for health care which is Pay-As-You-Go. We believe the Board has discretion in setting premium rates and is not bound by any formal policy.

Actuarial calculations are performed each year to determine the annual cost to pre-fund retirement, disability and survivor benefits. The Board then determines how much of the total contribution will be allocated for these benefits, and how much is allocated for health care benefits. Based on the amount allocated for health care, the Board also determines the amount of health care benefits that are currently provided, balancing long-term solvency of the health care program with the desire to provide current health care benefits.

Currently, resources available to provide health care benefits to SERS retirees include:

- Dedicated employer funding of health care benefits (after retirement benefits are funded)
- Additional 1.5% of payroll premium surcharge for lower-paid employees
- Health care trust fund investment earnings
- Retiree premiums
- Federal subsidies and reimbursements

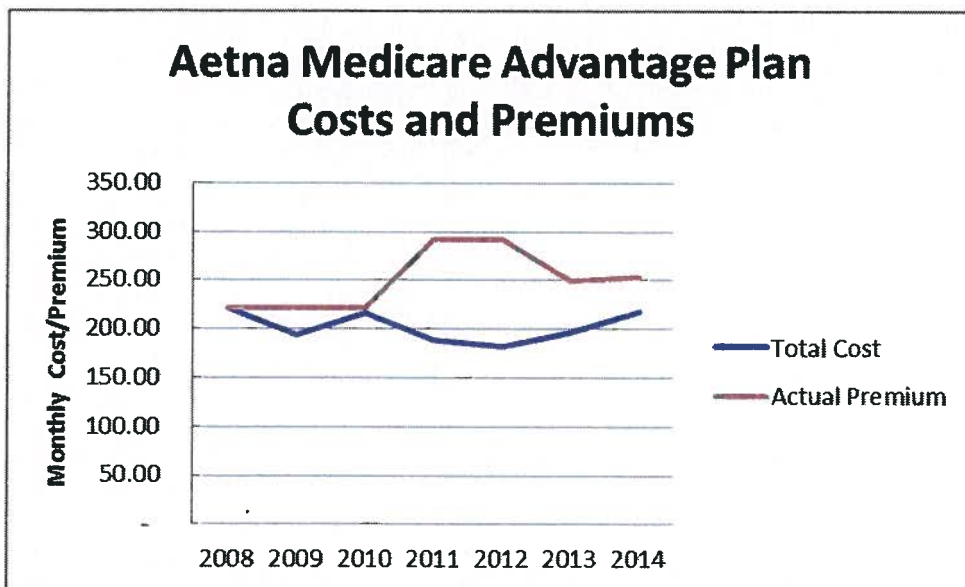
Section 3309.49 of the Ohio Revised Code limits the total employer contribution rate for retirement benefits and health care to 14% of pay. Employer contributions in excess of those required to support the basic retirement system benefits are allocated to the retiree health care fund. The following table shows a five-year history of the employer contribution rates allocated to health care.

Valuation as of June 30	Employer Contribution
2013	1.64%
2012	1.66%
2011	2.05%
2010	2.93%
2009	1.96%

The employer contribution rates shown above include the 1.5% payroll surcharge that is levied against employers whose employees earn less than a specified minimum salary.

The following analysis focuses on the most common medical and prescription drug plan available to Medicare-eligible retirees – the Aetna Medicare Advantage Plan and the self-insured prescription drug program - for years 2008 through 2014. The following table and chart show the actual costs and premiums for the Aetna Medicare Advantage plan and prescription drug program for years 2008 through 2014.

Calendar Year	Medical Cost	Rx Cost	Total Cost	Actual Premium
2014	\$86.52	\$131.00	\$217.52	\$253.00
2013	65.07	131.00	196.07	248.00
2012	74.43	107.00	181.43	291.00
2011	87.61	100.00	187.61	291.00
2010	87.61	128.00	215.61	221.00
2009	71.00	122.00	193.00	221.00
2008	57.00	164.00	221.00	221.00



A summary of the major Board actions with respect to Health Care as well as our observations for years 2009 through 2014 follows:

2009 Health Care Premiums

SERS Actions

- Move Medicare recipients enrolled in Medical Mutual Medicare Advantage Plan to the Aetna Medicare Advantage Plan creating a single vendor model and an additional savings of \$2 PMPM
- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- Maintain 2008 premium rates for 2009

PTA/KMS Observations

- 2008 CAFR reports Health Care Fund solvency extends to fiscal year 2019
- Prescription drug costs reduced by 26% Medicare (with RDS credit) and 10% for non-Medicare
- Prescription drug costs increased by 2% Medicare (without RDS credit)
- Although cost for Aetna Medicare Advantage Plan increased \$14 and prescription drug cost decreased \$42, SERS Board elected to maintain the 2008 premium rates for this plan
- Given concerns with solvency, we believe this was a prudent and reasonable approach

2010 Health Care Premiums

SERS Actions

- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- Maintain 2009 premium rates for 2010

PTA/KMS Observations

- 2009 CAFR reports Health Care Fund solvency extends to fiscal year 2014
- Prescription drug costs increased by 5% (Medicare with RDS credit) and 17% (non-Medicare)
- Although cost for Aetna Medicare Advantage Plan increased over \$16 and prescription drug cost increased \$6, SERS Board elected to maintain the 2008 premium rates for this plan
- Given concerns with solvency, we believe this was a prudent and reasonable approach

2011 Health Care Premiums

SERS Actions

- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- Offer additional wellness program incentives
- Approve plan changes, including increased deductibles for non-Medicare plans
- Approve subsidy changes
- Implement Prescription Drug Plan (PDP)
- Assess a \$35 PMPM premium surcharge designed to balance health care expenses with annual resources
- Retain savings from plan changes to further balance health care expenses with annual resources
- Set premium rates to include cost plus savings from plan changes plus premium surcharge

PTA/KMS Observations

- 2010 CAFR reports Health Care Fund solvency extends to fiscal year 2018
- Prescription drug costs increased by 13% (Medicare with RDS credit) and 21% (non-Medicare - prior to plan changes)
- CMS reimbursements decreased by 1.7% from 2010 rates
- Total cost for Aetna Medicare Advantage Plan remained the same while prescription drug costs decreased \$28
- Premium rates increased 16%, but now includes \$35 premium surcharge
- Given concerns with solvency, we believe this was a prudent and reasonable approach

2012 Health Care Premiums

SERS Actions

- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- Maintain 2011 premium rates for 2012

PTA/KMS Observations

- 2011 CAFR reports Health Care Fund solvency extends to fiscal year 2023
- SERS received federal reimbursement for Early Retiree Reimbursement Program (ERRP)
- Prescription drug costs increased by 7% (Medicare with RDS credit) and 22% (non-Medicare)
- Implemented discount program on brand name prescription drugs, generating estimated savings of \$15 million to \$17 million a year
- No employer contributions available in 2012 for health care beyond the 1.5% health care payroll surcharge

- Total cost for Aetna Medicare Advantage Plan decreased \$13 and prescription drug costs increased \$7
- Premium rates remained level from prior year
- Given concerns with solvency, we believe this was a prudent and reasonable approach

2013 Health Care Premiums

SERS Actions

- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- ERRP funds have been exhausted
- Utilized Aetna and Medicare reimbursement to offer premium support to Aetna Medicare enrollees

PTA/KMS Observations

- 2012 CAFR reports Health Care Fund solvency extends to fiscal year 2020
- Minimal employer contributions available in 2013 for health care beyond the 1.5% health care payroll surcharge
- No further funds from ERRP
- About 50% of new retirees in 2011 did not enroll in SERS
- Total cost for Aetna Medicare Advantage Plan decreased \$9 and prescription drug costs increased \$24
- Premium rates decreased 16%; rate includes \$35 premium surcharge
- Given concerns with solvency, we believe this was a prudent and reasonable approach

2014 Health Care Premiums

SERS Actions

- Apply the savings from Medicare Part D Retiree Drug Subsidy (RDS) to the Medicare rates as was done in prior years
- Remove \$300 deductible from Medicare Advantage plan
- Implement Silver Sneakers benefit
- Change Medicare co-pays
- Renegotiated Express Scripts contract resulting in 8% savings

PTA/KMS Observations

- Prescription drug costs did not change (Medicare) and decreased 3.6% (non-Medicare)
- PDP savings passed on to Medicare-eligible retirees only
- Total cost for Aetna Medicare Advantage Plan increased \$21 and prescription drug costs remained the same as 2013
- Premium rates increased 2%; rate includes \$35 premium surcharge

- Given concerns with solvency, we believe this was a prudent and reasonable approach

Overall, we believe that the premium rates established for the years 2009 through 2014 are reasonable and align with the costs of the underlying benefits offered. As stated in the Board's funding policy, health care coverage may change at any time, resulting in adjustments in resources of the required funding of the health care program. Premiums should not only be based on current costs, but also take into account the many factors discussed above, including maintaining the health care trust fund with a twenty year solvency period, changes to plan design, reimbursements, future enrollment of younger, healthy retirees and available employer contributions to fund health care.

To summarize, we find that the rates were accurate, consistent and reasonable.

Section 5 – Other Considerations

We found CMC's work to be strong. It was reasonable, consistent and accurate. We do not believe that any methods, assumptions, or calculations are erroneous to the level of necessary recalculations.

As indicated above, our primary recommendations are:

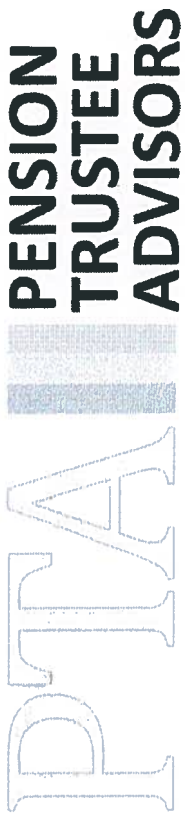
- Document the development of health care claim costs more rigorously either in the actuarial reports or in the experience study or both
- Examine several minor actuarial assumptions (discussed above) more rigorously in the next experience study
- Correct minor discrepancies in the next actuarial valuation

For the most part, we found the CMC actuarial valuation reports and experience study reports to be very well written, and focusing on important issues. Actuarial Standard of Practice (ASOP) No. 41 provides extensive guidance to actuaries regarding actuarial communications. We find that the CMC reports complied with the guidance of ASOP 41.

Additionally, the reports generally are consistent with Government Finance Officers' guidelines for reporting. The CMC signers of the reports are qualified actuaries.

Cavanaugh Macdonald, the Ohio Retirement Study Council and particularly the School Employees Retirement System of Ohio staff were fully cooperative and responsive, which assisted in the process. Finally, we wish to reaffirm that the work done by CMC was reasonable, consistent and accurate.

**SAMPLE ACTUARIAL AUDIT
PRESENTATION**



Presentation on the Actuarial Audit of
School Employees Retirement System of Ohio
for Ohio Retirement Study Council

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To SERS March 20, 2014
To ORSC April 10, 2014

Agenda

- Major Findings of Actuarial Review
- Actuarial Assumptions
 - Demographic
 - Economic
 - Healthcare
- Actuarial Methods
- Actuarial Liability
- Healthcare Premium Rate Review
- Audit Conclusions

Findings of Actuarial Review - Recap

Actuarial Assumptions

- Reasonable and consistent
- Some minor concerns

Actuarial Methods

- Reasonable and consistent
- Some minor concerns with disclosure

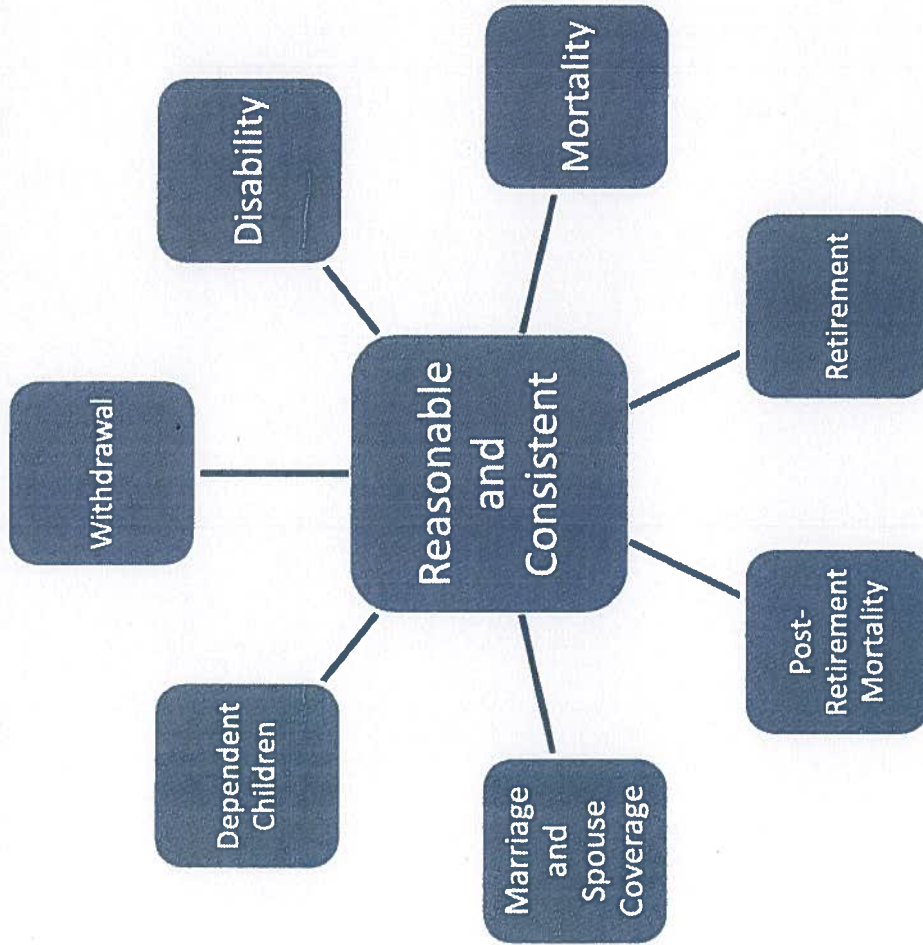
Actuarial Valuation Replication

- Very close match (0.21% on total liability)
- Reasonable, consistent and accurate

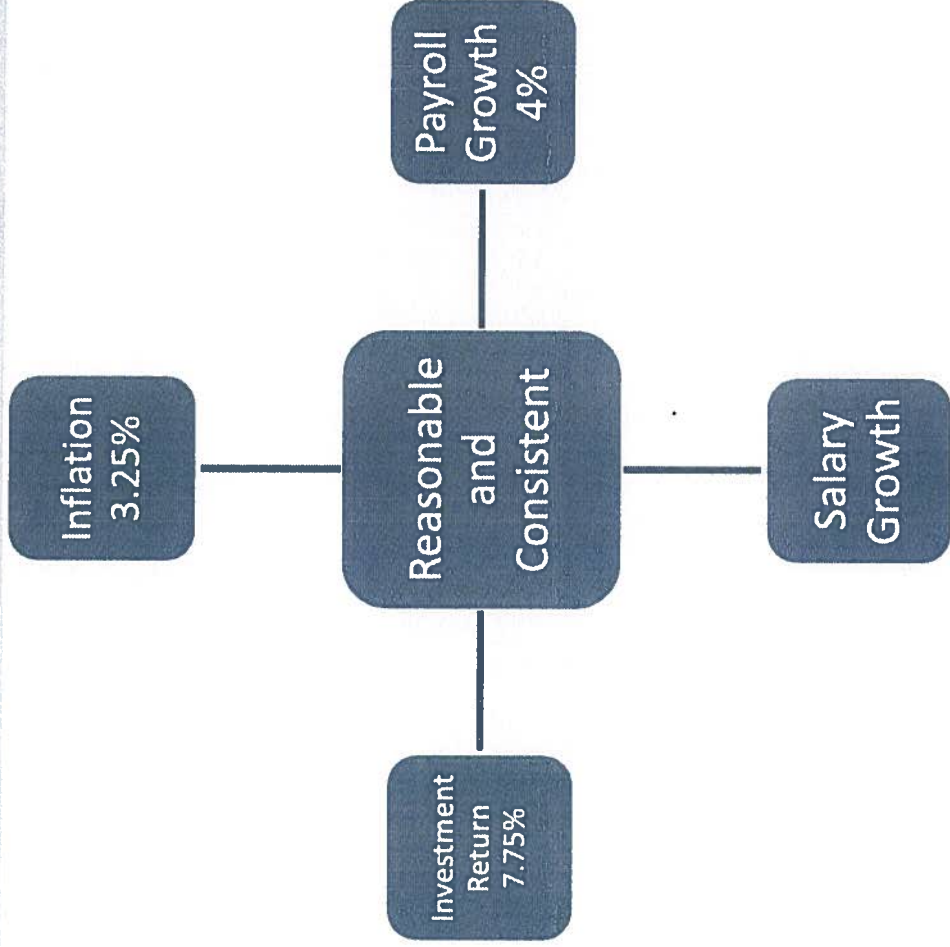
Premium Rate Analysis

- Reasonable, consistent and accurate
- Some minor concerns with disclosure

Demographic Assumptions



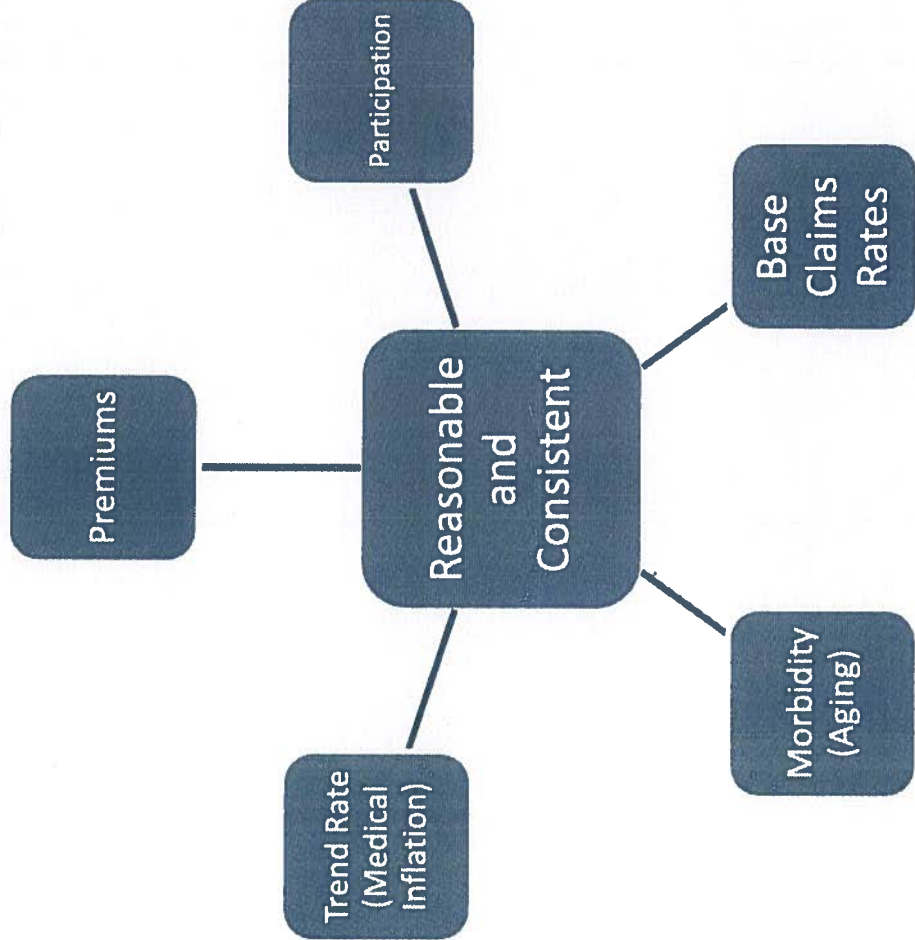
Economic Assumptions



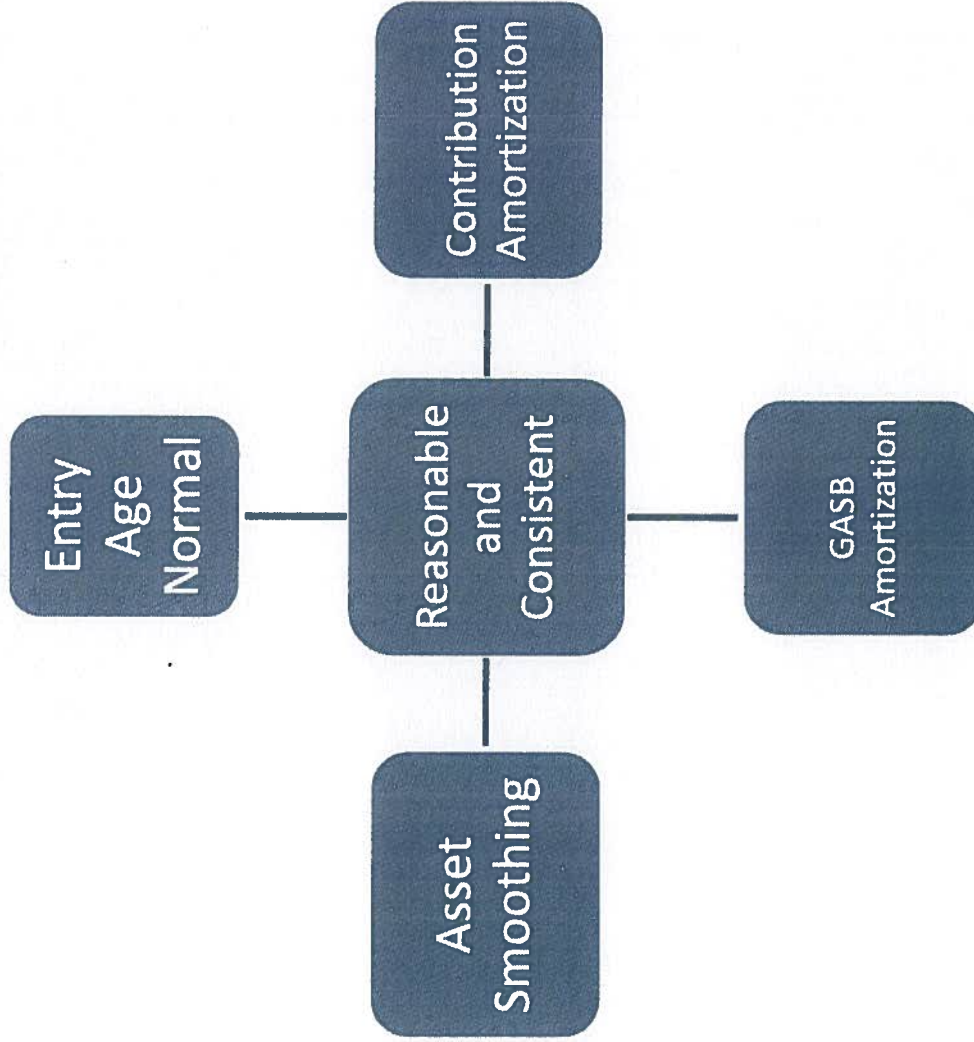
Economic Assumptions

- Investment Return Rate of 7.75%
 - Consistent with other systems
- Inflation Rate of 3.25%
 - Consistent with other systems
 - Current market rate is much lower
- Payroll Growth of 4%
 - Reasonable
- Salary Growth Rate
 - Reasonable
 - Recommend analysis of merit increases in next experience study

Healthcare Assumptions



Actuarial Methods



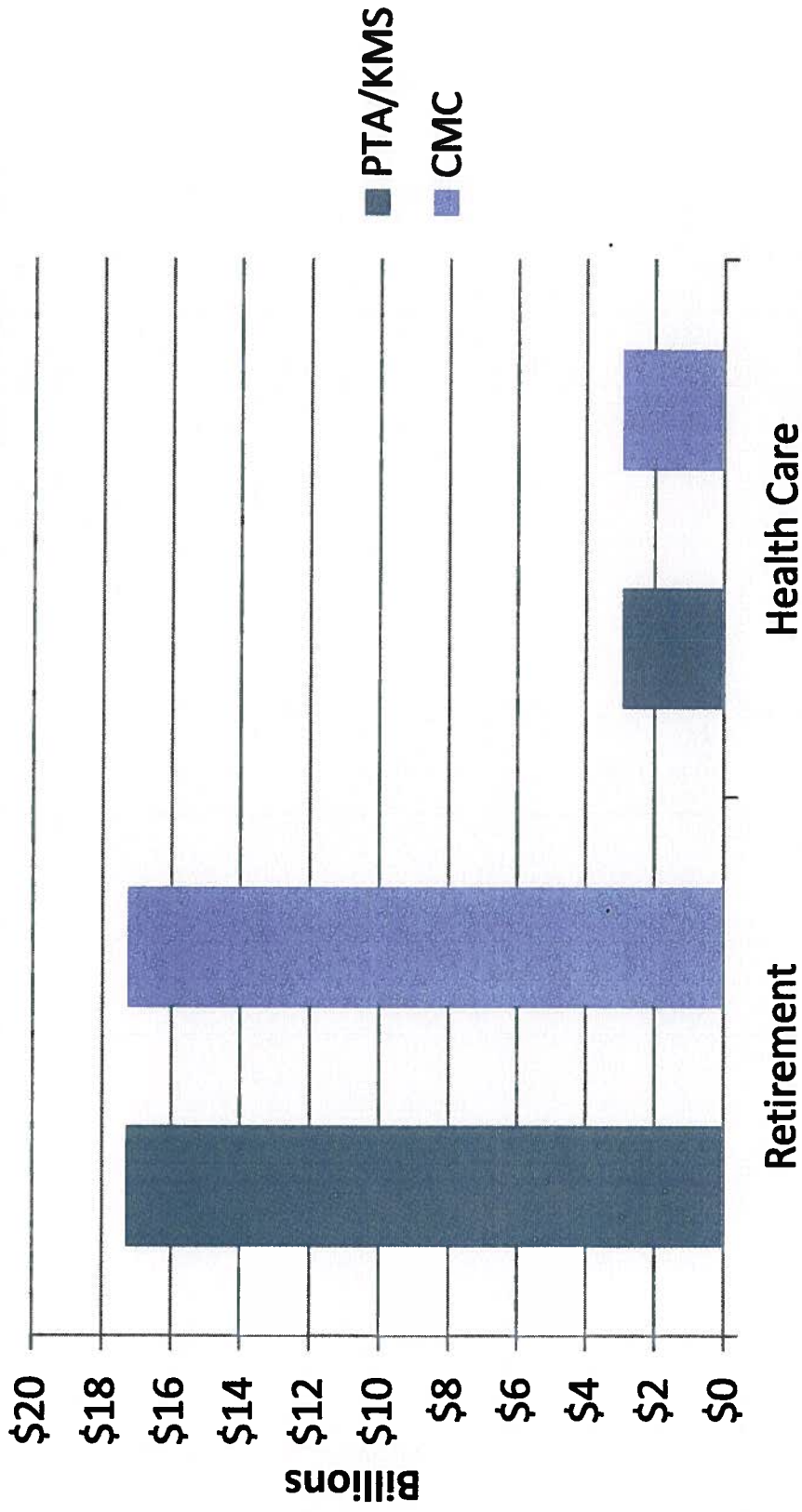
Amortization Methods

- For determination of contribution requirements
 - Based on increasing payroll (4% of total payroll)
 - Closed 30-year amortization period from 6/30/2012
 - Each year's activity currently amortized over 29 years
 - As period gets shorter, may consider a layered method
 - Healthcare premium allocation based on remaining contributions net of pension contribution
- For determination of GASB "Annual Required Contribution"
 - CMC tests that amortization policy satisfies GASB
 - GASB new rules will not permit 4% increase
 - GASB now permits 30 years
 - Currently satisfies GASB, but not for next and future valuations under new rules

Actuarial Valuation Replication

- Strong match
- Actuarial liabilities match within 0.21% in total
- Thorough, complete work by Cavanaugh Macdonald Consulting (CMC)

Actuarial Liability



Health Care Premium Rate Review

- Premium rates are reasonable
- Align with costs of underlying benefits
- Considerations for setting premium rates
 - Health care trust solvency
 - Plan design
 - Reimbursements
 - Future enrollments
 - Employer contributions

Audit Conclusions

- Excellent match in valuation replication
- Assumptions, Methods and Factors
 - Reasonable
 - Consistent
 - Accurate
- Premium rates are reasonable
- CMC reports well written
- Recommend that CMC review a handful of minor issues mentioned in report

Minor Concerns and Areas for Improvement

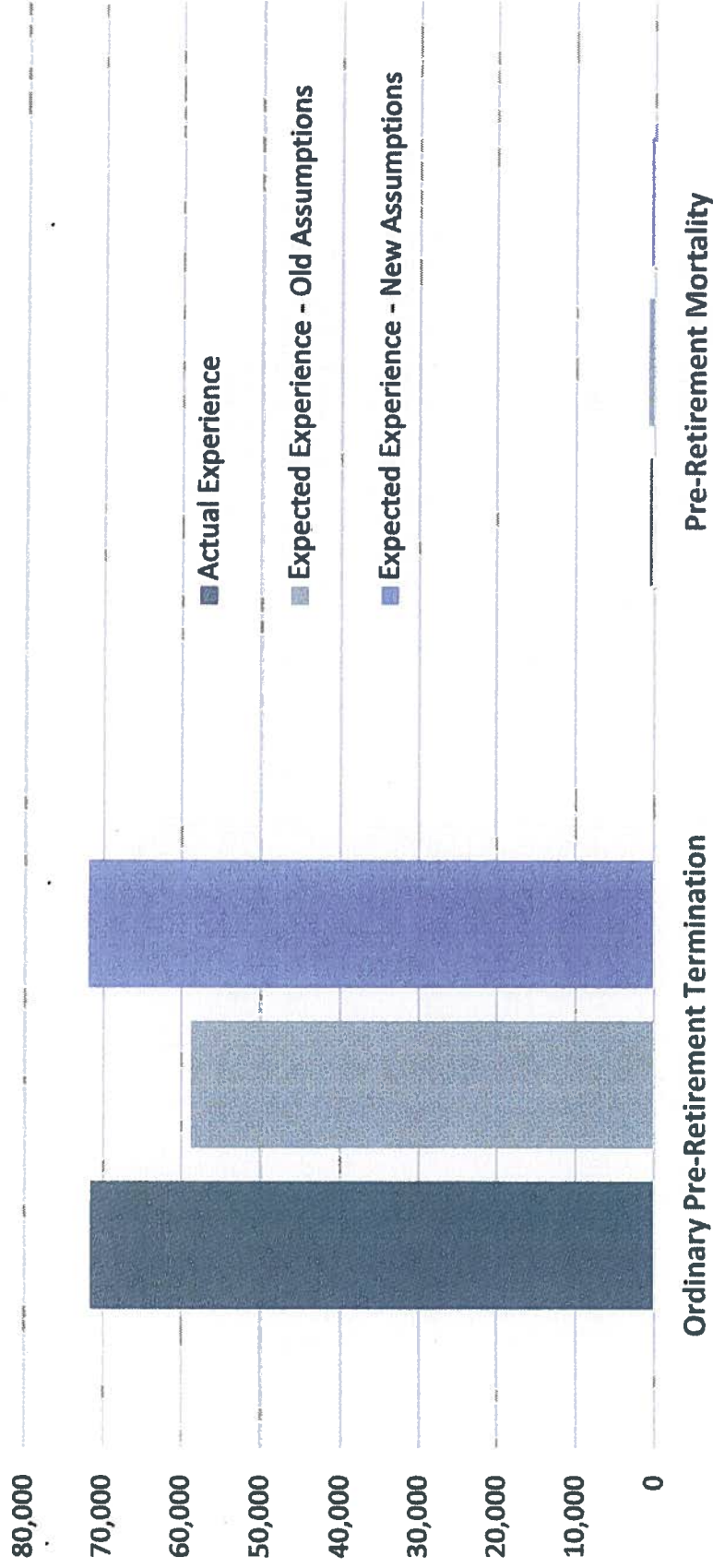
- Actuarial Assumptions
 - Pre-Retirement Mortality
 - Merit Pay for those with more than ten years
 - Early Retirement for future retirees
 - Dependent Children
- Health Care assumption and method disclosures
- Some minor calculation errors

Pre-Retirement Mortality Assumption Concern

- Based on extremely low SERS pre-retirement mortality experience, CMC recommended actuarial table with 75% less than normal mortality
 - This experience seems extremely unlikely
 - Only 458 deaths occurred, when 1,678 would have been expected by standard table
 - Might be some kind of coding error
- But this difference is insignificant when considering that 71,570 terminated

Pre-Retirement Mortality Assumption Concern is Insignificant

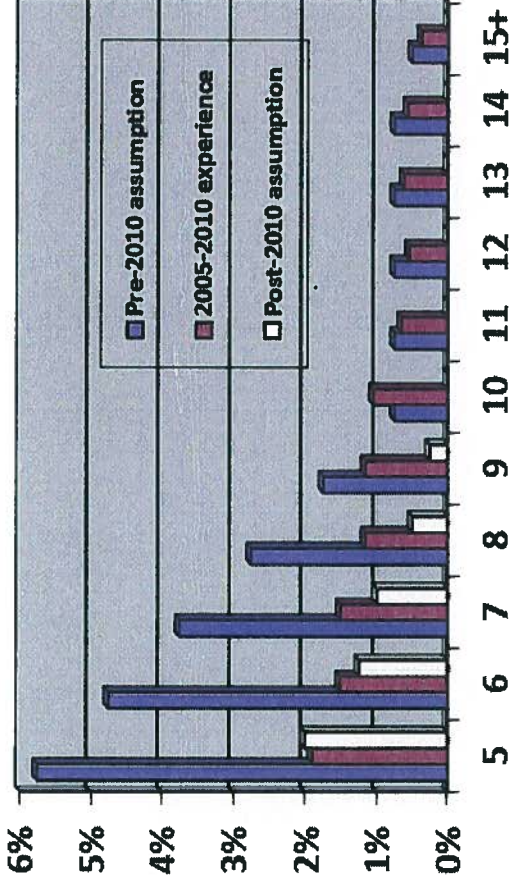
Pre-Retirement Terminations: 2005-2010



Actuarial Assumption Concern with Merit Pay for those with More than Ten Years

- CMC assumes no merit increases after ten years
- These individuals did experience merit increases of about 0.5%

Merit Increase Assumptions by Years of Service



- Impact of assumption could be modest, when considering inflation

Other Minor Actuarial Assumption Concerns

- **Early Retirement for future retirees**
 - Those retiring early after August 1, 2017 will have new benefit schedule
 - Will need to develop some assumption for this
 - No data yet, but assumption is necessary
- **Dependent Children**
 - None are assumed, although benefits are provided to dependent children of certain deceased members
 - Explicit assumption could be considered for those of normal parenting age
 - Alternatively, a load on pre-retirement survivor normal costs and liabilities could be implemented

Actuarial Audit Replication – In a Perfect World

- Auditing actuary receives:
 - From pension system:
 - Plan provisions,
 - Member data, and
 - Asset information
 - From system actuary:
 - Actuarial valuation reports, and
 - Experience study reports
- Auditing actuary is able to:
 - Match calculations of system actuary, and
 - Opine that system actuary's assumptions and methods are reasonable and appropriate

Actuarial Audit Replication – In the Real World

- Actuarial valuation report is not 100% complete in its description of plan benefits, actuarial assumptions, and actuarial methods
- Actuaries and retirement system have ongoing conversations clarifying ambiguities
- System actuary provides test cases illustrating precise calculations

Actuarial Audit Replication – In SERS World

- SERS was extremely helpful and responsive in clarifying plan provisions
- CMC test cases were extremely helpful in illustrating actuarial methods
- We recommend that CMC expand documentation of health care assumptions and methodologies
 - In the actuarial reports, and/or
 - In the next experience study report

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