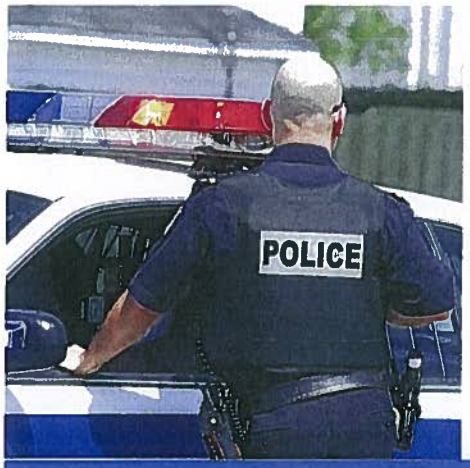
Ohio Retirement Study Council




ACTUARIAL AUDIT OF THE PUBLIC EMPLOYEES RETIREMENT SYSTEM OF OHIO

July 2014

Kim Nicholl, FSA, FCA, EA, MAAA
Senior Vice President and Actuary
312.984.8527
knicholl@segalco.com

75 THE SEGAL GROUP Founded in 1939

Segal Consulting

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Segal Consulting

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Kim M. Nicholl
Senior Vice President & Actuary
knicholl@segalco.com

July 14, 2014

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

Re: **Proposal to Provide Actuarial Audit Services**

Dear Ms. Rhodes:

Segal Consulting (Segal) is pleased to submit this proposal to provide actuarial audit services to the Ohio Retirement Study Council (ORSC) for the Public Employees Retirement System (PERS). Our proposal is intended to be fully responsive to your request. Segal has extensive experience serving in this capacity for a wide range of clients, including a dedicated practice supporting public sector entities. Our proposal describes our qualifications and experience and demonstrates our commitment to deliver strategic and technical insight in a responsive manner.

Segal is dedicated to total client satisfaction and is the architect of responsive and creative solutions to our clients' benefit needs. Our proposal describes in detail how Segal intends to approach this assignment and why we are ideally suited to provide these services. We want to highlight the following points:

- **Commitment to the Public Sector:** Segal has been working with public sector plans for more than 50 years, providing a valuable historical perspective and base of experience.
- **Commitment to Service:** We have assembled a consulting team that possesses extraordinary experience and talent. In addition to meeting the technical requirements of this contract, our approach couples our knowledge of industry practices and trends with our recommendations. We follow a consulting approach that emphasizes bringing new ideas and perspectives to our clients and to develop an excellent rapport to achieve your goals.
- **Commitment to Quality:** Actuarial work requires complex calculations and high-level computer programming. Our intensive quality review process not only checks the accuracy of the calculations, but also analyzes the results from the client's perspective.
- **Commitment to Dependability:** We will dedicate the staff and resources necessary to meet the timing requirements of this project. The trust that has developed over time with our clients is something we value and constantly strive to improve.

This proposal will remain valid until the ORSC selects a firm to provide the services contained in the Request for Proposal or terminates its search for a vendor. Segal and the actuarial consultants listed in the proposal are able and willing to meet the scope of services requirements contained in the RFP.

I, Kim Nicholl, Senior Vice President and National Public Sector Retirement Practice Leader, am authorized to bind Segal in contract and am designated as primary liaison to ORSC. I am also authorized to negotiate the contract on behalf of Segal. Requests for additional information and/or clarifications regarding our proposal may be addressed to my attention:

Kim Nicholl, FSA, FCA, EA, MAAA
Senior Vice President and Actuary
National Public Sector Retirement Practice Leader
101 North Wacker Drive, Suite 500
Chicago, IL 60606-1724
knicholl@segalco.com
312.984.8527 (phone) 312.896.9364 (fax)

We appreciate the opportunity to offer this proposal and would be pleased to discuss this material or to provide additional materials and explanations as needed.

Sincerely,

Kim Nicholl

Table of Contents

Proposal to the Ohio Retirement Study Council for an Actuarial Audit of the Public Employees Retirement System

July 2014

4.1 Proposal Summary

Provide a narrative summary of the proposal being submitted. This summary should identify all the services and work products that are being offered in the proposal and should demonstrate your firm's understanding of the project.

Our Understanding

We understand that the Ohio Retirement Study Council (ORSC) is requesting a qualified actuarial firm to perform an actuarial audit of the Public Employees Retirement System of Ohio (PERS). In addition to a review of the actuarial assumptions, methods, reports (valuation and experience study), and data, this full scope actuarial audit will include a complete actuarial valuation based on the same census data, assumptions, and methods used by consulting actuaries Gabriel Roeder Smith & Company (GRS). Segal will provide a detailed report of the findings.

Segal has provided independent actuarial reviews – including limited scope and full replication of results – to many statewide public retirement systems similar to the PERS. We have established a sound approach to completing these reviews that allows for a comprehensive study that can be completed at a reasonable expense to the ORSC.

Segal will express an opinion of the reasonableness and/or accuracy of valuation results of the actuarial assumptions, and application of the actuarial cost method, along with the determination of the funding policy contribution that PERS' retained actuary uses to value PERS.

Specifically, Segal will provide an audit of PERS' annual pension actuarial valuation as of January 1, 2014, the five-year experience review for the period January 1, 2006 to December 31, 2010 and the PERS' annual retiree health care actuarial valuation as of January 1, 2014.

A secondary purpose of the audit will be to determine whether retiree contributions to health care benefits and prescription drug costs (premiums) are being determined appropriately and consistently for all benefit groups.

These services include the following main objectives for this engagement noted in the RFP:

1. Data Validity

Segal will assess the validity, completeness, and appropriateness for PERS' structure and funding objectives of the demographic and financial information used by the consulting actuary in the valuation of PERS.

2. Actuarial Valuation Method and Procedures

We will assess whether the consulting actuary's valuation method and procedures are reasonable and consistent with generally accepted actuarial standards and practices appropriate for PERS' structure and funding objectives; and are applied as stated by GRS. If deviations from accepted

standards are found during the audit, Segal will obtain the rationale for the deviations and determine their effects, including their monetary impact.

3. Actuarial Valuation Assumptions

We will perform an assessment of whether the actuarial valuation assumptions are reasonable and consistent with generally accepted actuarial standards and practices; are reasonable based on PERS' experience; and are appropriate for PERS' structure and funding objectives. The assumptions evaluated will include both demographic and economic assumptions, such as mortality, retirement, separation rates, levels of pay adjustments, rates of investment return, and disability factors.

As part of this assessment, Segal will consider and specifically address whether actual experience is appropriately evaluated in experience studies conducted by the consulting actuary at least every five years and whether recent changes in assumptions are appropriate, reasonable, and supported by the experience studies. Also, we will review the gain/loss analyses from the last four actuarial valuation reports.

4. Parallel Valuation

We will perform parallel valuations of pension benefits as of December 31, 2013, and of retiree health care benefits as of December 31, 2013, using the validated member census data and the same actuarial assumptions.

If we recommend assumption adjustments to more accurately reflect present and future assets, liabilities, and costs of PERS, Segal will provide detailed rationale for our recommendations, and describe the general effect on PERS' condition resulting from the proposed changes in assumptions.

5. Review of Health Care

We will make an assessment of 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.

4.2 Capabilities and Experience

Describe your firm's capabilities and recent experience (at least during the last five years) in performing actuarial valuations, audits, or studies of public employee retirement systems. You should include information on the types and sizes of public employee retirement systems for which past work has been performed, including whether the systems were defined benefit or defined contribution plans, the types and number of participating employers, number of participants, and other relevant indicators of plan type, size, and comparability to PERS. You should include other information you believe may be relevant in demonstrating your capabilities in performing the actuarial audit, including other professional experience and data processing capabilities.

Our Qualifications

As employee benefits, actuarial, compensation and human resources consultants to the public sector, we serve the needs of a wide range of clients, including:

- State and local governments
- Statewide employee retirement systems and health benefit plans
- Public school and higher education institutions
- Federal government agencies and other public organizations and entities
- Special districts: transit, utilities, water, toll and port authorities

Our organizational structure is illustrated on the following page.

Key Differentiators

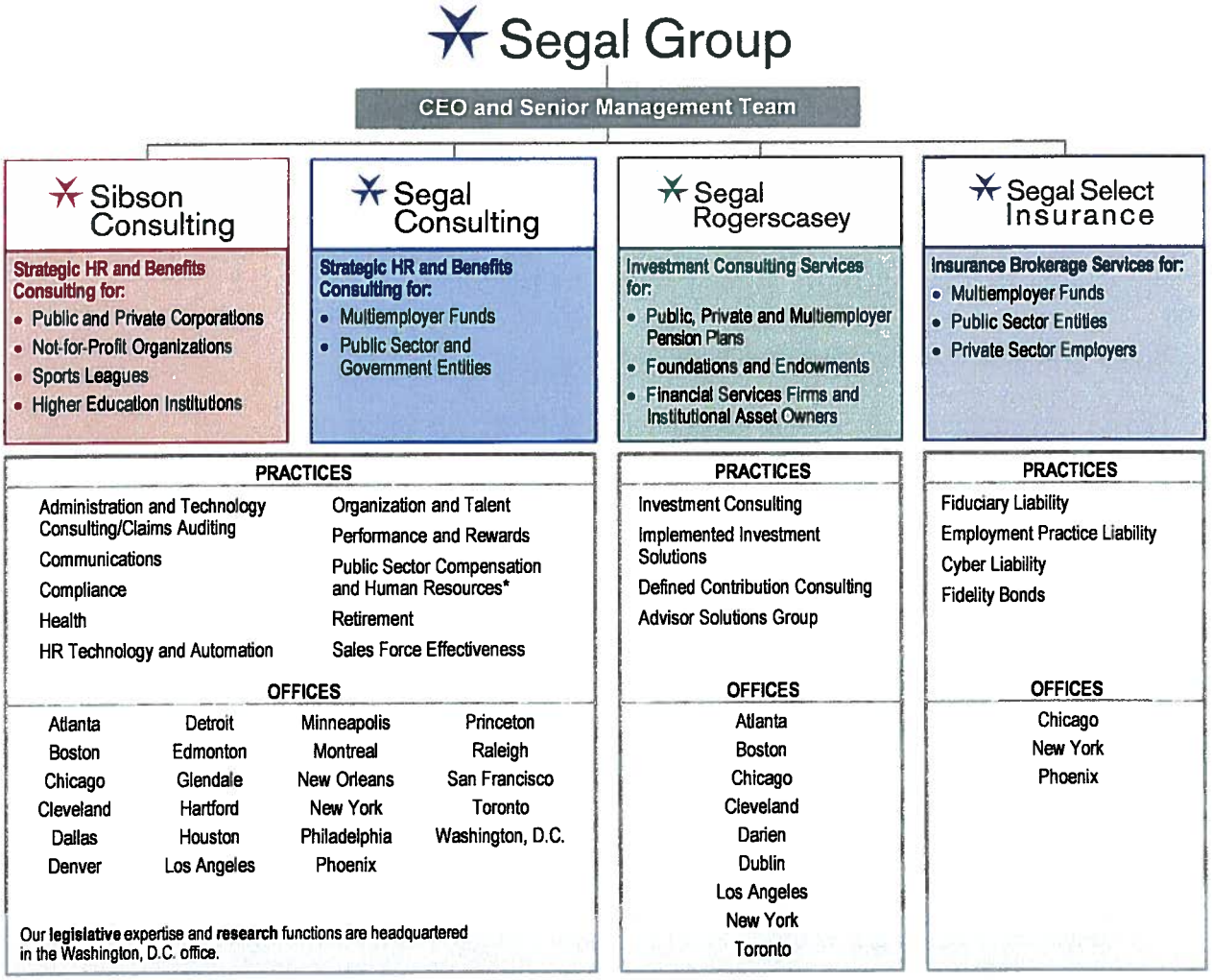
As you read through our proposal, we would like to call your attention to a few key items that we believe separate us from our competition.

1. We are experienced in working with large public sector organizations throughout the United States.
2. Segal's commitment to quality is demonstrated through its comprehensive peer review process. All calculations, correspondence, and reports are checked by an analyst, peer reviewed by a reviewing actuary, and final reviewed by another senior-level actuary. Not only does this procedure control the quality of our work, but it also allows several consultants to input their thoughts, insights, and expertise into the process, resulting in a more robust final product.
3. The proposed team assigned to this engagement has completed nine actuarial audits within the past five years and has developed a thorough approach that we believe creates value for our clients.

Conclusion

We understand that you are looking for a consulting team that has deep expertise in the subject matter, and we are confident that Segal can deliver on this expectation. We commit to provide all services described in the RFP, through an engagement team which has extensive experience serving clients on comparable endeavors. We have described our qualifications and experience in detail in the attached proposal and welcome the opportunity to further discuss how we would work with you on this important engagement

OUR ORGANIZATIONAL STRUCTURE



*Operating as Segal Waters Consulting

Segal's Public Sector consulting team provides benefit consulting services to approximately 400 total clients in 37 states, plus the District of Columbia, the U.S. Virgin Islands, the U.S. Government and Canada. Our first public sector retirement plan client for actuarial services was the Territory of Hawaii in 1950. Actuarial consulting services are provided to over 85 public sector funds including state, local, transportation, and both primary and secondary education venues.

Assets vary in size, with our larger systems representing between $1 billion and over $40 billion. Segal's retirement practice is known for the depth of its knowledge. Many of our consultants are recognized as national experts, testifying before Congress, leading professional associations and committees, and speaking at national and regional conferences and forums. We are also regular contributors to professional magazines and journals.

Many of our professionals have one or more professional certifications and advanced degrees. Our professional staff includes Fellows and Associates of the Society of Actuaries, Members of the American Academy of Actuaries, Fellows and Associates of the Conference of Consulting Actuaries, Enrolled Actuaries, Chartered Financial Analysts, and Certified Employee Benefits Specialists.

Segal's commitment to the public sector is demonstrated by our hiring in 2010 of Kim Nicholl to lead our Public Sector Retirement Consulting Practice. Ms. Nicholl is among the most experienced and respected public sector consultants in the country. She is a Fellow of the Society of Actuaries with over 25 years of experience as an actuarial consultant and has focused on public sector plans for the past 20 years. For over a decade, she has served as lead consulting actuary for retirement systems covering members in Illinois, Maryland, Minnesota, Missouri, North Dakota, Ohio, Pennsylvania, Texas, and Wisconsin. In these roles, she has gained unique insight into the issues facing large public sector retirement systems.

Having a large number of diverse public sector clients throughout the country exposes our firm to challenges faced by other similarly situated entities nationwide. Our actuaries routinely share and disseminate information on current and previous projects to other consultants throughout the firm through e-mail, intranet, technical meetings, and seminars. As a result, the team assigned to the PERS audit will draw upon their own personal consulting experiences and those of their peers.

Current Clients for Kim Nicholl and Matt Strom

Current Clients for Kim Nicholl*

Client Name	DB or DC Plan	Type and Number of Members	Type of Work and Year Work Performed	Asset Size	Role
State Teachers Retirement System of Ohio	DB	Covers approx. 500,000 members	Provides actuarial and consulting services, including annual actuarial valuations and periodic experience studies since 2013	$65 billion	Lead
Chicago Teachers' Pension Fund	DB	Covers approx. 60,000 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2012.	$9.4 billion	Support
Park Employees' Annuity and Benefit Fund of Chicago	DB	Covers approx. 6,000 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2012.	$440 million	Support
Duluth Teachers Retirement Fund Association of Minnesota	DB	Covers approx. 3,500 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2004.	$200 million	Support
City of St. Louis	DB	Covers approx. 600 actives and over 1,000 inactives, retirees and beneficiaries	Provides actuarial and consulting services including providing cost impact statements and projections since 2011.	$700 million	Lead
North Dakota Teachers' Fund for Retirement	DB	Covers approx. 10,000 members and 8,000 inactives, retirees and beneficiaries	Provides actuarial and consulting services including annual actuarial valuation, GASB disclosure information and quinquennial experience review since 2012.	$1.65 billion	Lead
Arizona State University	DB	Covers approx. 10,000 members	Expert witness work related to termination incentive liability calculation since 2012.	$1.5 billion	Lead
City of Houston	DB	Covers approx. 33,000 members	Expert witness analysis of Municipal Employees and Firefighter Funds since 2014.	$5.5 billion	Lead

Client Name	DB or DC Plan	Type and Number of Members	Type of Work and Year Work Performed	Asset Size	Role
City of Phoenix	DB	Covers approx. 15,000 members	Comprehensive plan design study for Phoenix Employees' Retirement System since 2012.	$2 billion	Support
Communication Workers of America New Jersey	DB	Covers approx. 430,000 members	Plan design consulting related to New Jersey Public Employee Retirement System since 2011.	$25 billion	Support
Illinois Commission on Government Forecasting and Accountability	DB	Covers approx. 460,000 members	Projection and cost analysis of Illinois statewide pension systems, including ERS, TRS, and SURS since 2012.	$68 billion	Support
New Jersey Education Association	DB	Covers approx. 240,000 members	Plan design consulting related to New Jersey Teachers Pension and Annuity Fund since 2011.	$26 billion	Support
New York State Teachers Retirement System	DB	Covers approx. 427,000 members	Consulting requests, including GASB 67/68 implementation since 2013.	$90 billion	Lead
North Dakota Public Employees Retirement System	DB	Covers approx. 15,000 general and public safety employees	Annual actuarial valuations, 5-year experience studies, and strategic design of 457 plan from 1977 to current.	$1 billion	Lead
Public Employees Retirement System of Nevada	DB	Covers approx. 180 employers and 122,000 general and public safety employees	Annual actuarial valuations for four retirement plans, 4-year experience studies, and cost estimates for proposed legislation from 1976 to current.	$20 billion	Lead
Teacher Retirement System of Texas	DB	Covers approx. 1,400,000 members	Full scope actuarial audit in 2014.	$120 billion	Lead

Current Clients for Matt Strom*

Client	DB or DC Plan	Type and Number of Members	Type of Work and Year Work Performed	Asset Size	Role
State Teachers Retirement System of Ohio	DB	Covers approx. 500,000 members	Provides actuarial and consulting services, including annual actuarial valuations and periodic experience studies since 2013	$65 billion	Support
Chicago Teachers' Pension Fund	DB	Covers approx. 60,000 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2012.	$9.4 billion	Lead
Chicago Park Employees' Annuity and Benefit Fund	DB	Covers approx. 6,000 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2012.	$440 million	Lead
Duluth Teachers Retirement Fund Association of Minnesota	DB	Covers approx. 3,500 members	Provides actuarial and consulting services including annual actuarial valuations and periodic experience studies since 2004.	$200 million	Lead
City of St. Louis	DB	Covers approx. 600 actives and over $1,000 inactives, retirees and beneficiaries	Provides actuarial and consulting services including providing cost impact statements and projections since 2011.	$700 million	Support
North Dakota Teachers' Fund for Retirement	DB	Covers approx. 10,000 members and 8,000 inactives, retires and beneficiaries	Provides actuarial and consulting services including annual actuarial valuation, GASB disclosure information and quinquennial experience review since 2012.	$1.65 billion	Support
Arizona State University	DB	Covers approx. 10,000 members	Expert witness work related to termination incentive liability calculation since 2012.	$1.5 billion	Support
City of Houston	DB	Covers approx. 33,000 members	Expert witness analysis of Municipal Employees and Firefighter Funds since 2014.	$5.5 billion	Support
City of Phoenix	DB	Covers approx. 15,000 members	Comprehensive plan design study for Phoenix Employees' Retirement System since 2012.	$2 billion	Lead

Client	DB or DC Plan	Type and Number of Members	Type of Work and Year Work Performed	Asset Size	Role
Communication Workers of America New Jersey	DB	Covers approx. 430,000 members	Plan design consulting related to New Jersey Public Employee Retirement System since 2011.	$25 billion	Lead
Illinois Commission on Government Forecasting and Accountability	DB	Covers approx. 460,000 members	Projection and cost analysis of Illinois statewide pension systems, including ERS, TRS, and SURS since 2012.	$68 billion	Lead
New Jersey Education Association	DB	Covers approx. 240,000 members	Plan design consulting related to New Jersey Teachers Pension and Annuity Fund since 2011.	$26 billion	Lead
New York State Teachers Retirement System	DB	Covers approx. 427,000 members	Consulting requests, including GASB 67/68 implementation since 2013.	$90 billion	Support
Teacher Retirement System of Texas	DB	Covers approx. 1,400,000 members	Full scope actuarial audit in 2014.	$120 billion	Support

***As of July 2014**

4.3 References

You must include a list of organizations that may be used as references for your work on actuarial valuations, audits, or studies. Selected organizations may be contacted to determine the quality of the work performed, personnel assigned to the project, and contract adherence. The following should be included for the references listed:

- *Date of the actuarial audit work or valuation;*
- *Name and address of client;*
- *Name and telephone number of individual in the client organization who is familiar with the actuarial work; and*
- *Description of the work performed.*

State Teachers Retirement System of Ohio

Mr. Paul Snyder
Deputy Executive Director and CFO
275 East Broad Street
Columbus, OH 43215
614.227.4002
snyderp@strsoh.org

Asset Value: $65 billion
Number of Years with Firm: Since 2013
Services Provided: Segal has provided actuarial and consulting services to the State Teachers Retirement System of Ohio (STRS Ohio), including pension and retiree health care actuarial valuations and experience studies. STRS Ohio covers 180,000 active members and 150,000 inactives, retirees and beneficiaries.

North Dakota Teachers Fund for Retirement

Ms. Fay Kopp
Deputy Executive Director
ND Retirement & Investment Office
1930 Burnt Boat Drive
Bismarck, ND 58507-7100
701.328.9885
fkopp@nd.gov

Asset Value: $1.65 billion
Number of Years with Firm: Since 2012
Services Provided: The North Dakota Teachers Fund for Retirement (NDTFFR) covers 10,000 active members and 8,000 inactives, retirees and beneficiaries. In 2012, Segal was engaged as the ongoing actuarial valuation and consulting actuary. In this capacity, Segal performs the annual actuarial valuation, prepares the GASB disclosure information, completes a quinquennial experience review, provides analysis and cost impact statements of proposed legislation, and advises Fund staff of current events related to public sector plans.

Park Employees' Annuity and Benefit Fund of Chicago

Mr. Dean J. Niedospial
Executive Director
Park Employees' Annuity & Benefit Fund
55 E. Monroe Street, Suite 2720
Chicago, IL 60603
312.553.9265
dean@chicagoparkpension.org

Asset Value: $440 million
Number of Years with Firm: Since 2012
Services Provided: Segal provides actuarial and consulting services to the Park Employees' Annuity and Benefit Fund of Chicago (PEABF) including annual actuarial valuations and periodic experience studies. PEABF covers 6,100 members.

Illinois Commission on Government Forecasting and Accountability

Mr. Daniel A. Hankiewicz
Pension Manager
Commission on Government Forecasting and Accountability
703 Stratton Office Bldg.
Springfield, IL 62706
217.785.3122
DanH@ilga.gov

Asset Value: $68 billion
Number of Years with Firm: Since 2012
Services Provided: Segal provides actuarial services to the Commission. Segal audits the actuarial valuations of the five statewide pension systems in Illinois and prepares legislative cost notes for special studies.

Chicago Teachers' Pension Fund

Dr. Kasthuri Henry, PhD, CTP
Chief Financial Officer
Chicago Teachers' Pension Fund
203 N. LaSalle, Suite 2600
Chicago, IL 60601-1231
312.604.1212
henryk@ctpf.org

Asset Value: $9.4 billion
Number of Years with Firm: Since 2012.
Services Provided: Segal provides actuarial and consulting services to the Chicago Teachers' Pension Fund (CTPF), including annual actuarial valuations and periodic experience studies. CTPF covers 60,000 members.

New Mexico Educational Retirement Board

Mr. Rick Scroggins
Deputy Director
NM Educational Retirement Board
PO Box 26129
Santa Fe, NM 87502-0129
505.476.6127
rick.scroggins@state.nm.us

Asset Value: $10 billion
Number of Years with Firm: Project in 2014.
Services Provided: In 2014, Segal completed a limited scope audit of the New Mexico Educational Retirement Board. As part of the audit, Segal commented on the reasonableness and consistency of the actuarial assumptions and methods, and reviewed detailed test life calculations to assess the reasonableness of the actuarial calculations performed by the consulting actuary.

4.4 Staff Qualifications

Describe the qualifications of all management and lead professional personnel who will participate in the audit. Include: (1) a resume; (2) a summary of experience each has had in performing actuarial valuations, audits, or studies of public employee retirement systems; and (3) a management plan identifying the responsibilities each will have on the audit.

The resume should include information on the current and past positions held with your firm, educational background, actuarial and other relevant credentials, and other relevant information to demonstrate the personnel's qualifications.

The experience summaries should include information on the types and sizes of public employee retirement systems for which the designated staff have completed actuarial work, including whether the systems were defined benefit or defined contribution plans, the types and number of participating employers, number of participants, and other relevant indicators of plan type, size, and comparability to PERS. You may reference, rather than repeat, duplicative information provided in the Vendor Capabilities and Experience section. The experience summaries also should describe the work performed and detail the roles and responsibilities that the individual staff had on the projects.

The management plan should specify the roles and responsibilities each of the management and professional staff will have on the actuarial audit and include an estimated portion of the audit's time that will be spent by each on the audit.

Actuaries included on the project team should meet the following criteria:

- *Be members of the American Academy of Actuaries;*
- *Be enrolled actuaries with experience in Governmental plans;*
- *Be, at a minimum, associates with at least five years of experience in public practice, although we prefer that actuaries are Fellows of the Society of Actuaries; and*
- *Have performed an actuarial valuation, audit, or study of a public employee retirement system within the last two years.*

We have assigned an experienced team of actuaries and consultants to the team. The team is very familiar with plans similar to the PERS plan. We will make other top Segal public sector consultants and actuaries available as resources to the team wherever their special skill sets may be required.

The following identifies the members of our team and describes their roles and experience relative to this engagement.

Kim Nicholl, FSA, FCA, MAAA, EA, Senior Vice President and Consulting Actuary and National Public Sector Retirement Practice Leader, will serve as Principal Actuary. Kim joined Segal in 2010 as the National Public Sector Retirement Practice Leader. Kim has over 25 years of experience with nearly exclusive focus on public sector clients. Kim graduated magna cum laude from Loyola University with a Bachelor of Science degree in Mathematics. Kim is a

Fellow of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. She is located in Segal's Chicago office.

Kim will lead this engagement. She is 100% committed to providing actuarial services to public sector clients, and her long career in this area provides her with an understanding of the issues specific to public sector retirement systems.

Kim has served as the lead consulting actuary for the Illinois Teachers' Retirement System, the Missouri Public School and Public Education Employee Retirement Systems, the North Dakota Teachers' Fund for Retirement, the State Teachers Retirement System of Ohio, Ohio Police & Fire Pension Fund, Pennsylvania Public School Employees Retirement System, and Texas Employees' Retirement System. In addition, she has served as lead actuary for other city, county, and municipal-level public pension plans, such as the City of Milwaukee Employees' Retirement System, the Milwaukee County Employees' Retirement System, the Employees' Retirement System of the City of Fort Worth, and the Baltimore County Employees' Retirement System.

Kim has performed actuarial audits for the California State Teachers' Retirement System, the Illinois Municipal Retirement Fund, the Ohio Public Employees' Retirement System, Illinois State Universities Retirement System and the Wisconsin Retirement System. She has performed plan design studies for the City of Phoenix, City of St. Louis, and City of Kansas City. .

We anticipate that Ms. Nicholl will spend approximately 20 hours on this audit.

Matt Strom, FSA, MAAA, EA, Vice President, Consulting Actuary, will serve as a Secondary Actuary on our team, working directly with Kim, and will be an additional contact for the System. Matt has over 15 years of experience working with public sector, private sector, and multiemployer retirement plans.

Matt received a BS with high distinction in Actuarial Science from the University of Illinois at Urbana-Champaign. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

Matt serves as the lead consulting actuary to the Duluth Teachers Retirement Fund Association, Chicago Teachers Pension Fund, the Park Employees Annuity and Benefit Fund of Chicago, and the Chicago Housing Authority Retirement Plan and is responsible for the preparation of the annual actuarial valuation reports, periodic experience studies, and various cost study analyses periodically requested . Matt currently serves as Secondary Actuary to the North Dakota Teachers' Fund for Retirement and the State Teachers Retirement System of Ohio, as well as plan design engagements for the City of Phoenix, and the City of St. Louis. Matt recently completed limited scope actuarial audits for the New Mexico Educational Retirement Board, Texas County & District Retirement System, Illinois State Universities Retirement System, Illinois Teachers' Retirement System, the Illinois Municipal Retirement Fund, the Wisconsin Retirement System, and the Missouri Local Government Retirement System. Matt recently completed a full scope actuarial audit for the California State Teachers' Retirement System and the Alaska Retirement Management Board.

We anticipate that Mr. Strom will spend approximately 72 hours on this audit.

Brad Ramirez, FSA, FCA, MAAA, EA, Vice President, Consulting Actuary, will serve as Peer Review Actuarial Auditor, taking an active role in the review and analysis of the actuarial audit results, and will provide final peer review of the actuarial audit report. He has over 15 years of actuarial consulting experience with all types of pension plans.

Brad received a Master of Science degree in Mathematics from the University of Nevada. Brad is a Fellow of both the Society of Actuaries and the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

Brad serves as lead consultant and actuary to Public Employee Retirement System of Nevada and North Dakota Public Employee Retirement System.

We anticipate that Mr. Ramirez will spend approximately 8 hours on this audit.

Tatsiana (Tanya) Dybal, FSA, MAAA, EA, Senior Actuarial Analyst, will serve as analyst on the PERS team. Tanya performed a similar role for the actuarial audit of the Illinois Teachers' Retirement System, the Wisconsin Retirement System, and the Illinois Municipal Retirement Fund. Tanya received a Master's of Science degree in Physics and Mathematics from State University (Minsk, Belarus) and a Master of Science degree with high distinction in Actuarial Science from DePaul University. She is an Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary.

Tanya currently serves as the reviewing analyst for the North Dakota Teachers' Fund for Retirement and the State Teachers Retirement System of Ohio. Tanya has over seven years of experience working with public sector, private sector, and multiemployer retirement plans.

We anticipate that Ms. Dybal will spend approximately 55 hours on this audit.

William Gitterman, Actuarial Analyst, will serve as an analyst on the PERS team. Bill has experience in preparing valuation reports, actuarial experience studies, and performing benefit calculation reviews for clients. Bill received a Bachelor of Science degree in Actuarial Science from the University of Michigan.

We anticipate that Mr. Gitterman will spend approximately 110 hours on this audit.

Barbara Zaveduk, MAAA, EA, Vice President and Actuary, is an expert in the valuation of retiree health care plan liabilities. Barb will provide additional consulting insight and guidance and will lead the team of actuaries that will perform the analysis of the retiree health actuarial valuation and review all results. Barb will review the Actuarial Experience Analysis Report and the Assumptions letter as they relate to the GASB Statement 43 actuarial assumptions. Barb will review the valuation programs, draft all correspondence and retiree health reports, and will attend meetings with Kim and Matt.

We anticipate that Ms. Zaveduk will spend approximately 25 hours on this audit.

Yori Rubinson, FSA, MAAA, Retiree Health Actuary, will work under the direction of Barb, Kim, and Matt and will prepare the initial programming of the GASB Statement 43 actuarial valuation. Yori will review test lives and work with Barb to prepare the draft reports and correspondence.

We anticipate that Mr. Rubinson will spend approximately 50 hours on this audit.

Cathie Eitelberg, Senior Vice President, National Director, Public Sector Market, will provide advice and consultation on industry trends and national initiatives. She has over 30 years of public policy experience with a focus on employee benefits and public finance. Cathie graduated summa cum laude from the University of Maryland (College Park, Maryland) with a Bachelor of Science in Business Management and has completed coursework in the Executive Education program at Harvard's Business School.

Cathie's past and current clients include the State of Nevada Public Employees' Retirement System, the State of North Dakota Public Employees Retirement System, the Illinois Teachers' Retirement System, the Duluth Teachers' Retirement Fund Association, the Indiana Public Employees' Retirement Fund and Indiana Teachers' Retirement Fund, the American Federation of Teachers, and the New Jersey Education Association. She is located in Segal's Washington, DC office.

Please refer to Section 4.2, Capabilities and Experience for team members, Kim Nicholl and Matt Strom's client information that shows their proven commitment to the Public Sector arena.

We have included resumes on the following pages of the team members selected to perform the audits and review for ORSC of PERS.

KIM NICHOLL, FSA, FCA, MAAA, EA
Senior Vice President, Consulting Actuary, National Public Sector Retirement Practice Leader, Chicago

Expertise

Ms. Nicholl is a Senior Vice President and Consulting Actuary in Segal's Chicago office and is also the firm's National Public Sector Retirement Practice Leader. She has over 25 years of experience supporting the design and financing of retirement and other employee benefit programs for the public sector.

Ms. Nicholl has consulted on the design and interpretation of plan provisions for defined benefit and defined contribution retirement plans, and on their relationship to ERISA, IRS regulations and new legislation. Her experience includes all aspects of employee benefit programs.

Ms. Nicholl's specialized expertise includes:

- Supervising, reviewing, and certifying actuarial valuations and studies for defined benefit retirement plans and postretirement health care plans.
- Analyzing benefits provided from defined benefit, defined contribution and postretirement health care plans for purposes of restating retirement income policies, with recommendations based on client goals.
- Performing plan design analyses for public pension and postretirement health care plans.
- Performing experience analysis studies resulting in changes to actuarial assumptions used in the actuarial valuations of defined benefit retirement plans.
- Performing asset/liability modeling studies for large retirement plans.

Ms. Nicholl's clients have included: Teachers Retirement System of the State of Illinois, Metropolitan Water Reclamation District of Greater Chicago, Missouri Public School and Public Education Employee Retirement Systems, North Dakota Teachers' Fund for Retirement, Ohio Police and Fire Pension Fund, State Teachers Retirement System of Ohio, Commonwealth of Pennsylvania, Pennsylvania School Employees' Retirement System, Texas Employees Retirement System, and Virginia Joint Legislative Audit and Review Commission.

Professional Background

Prior to joining Segal, Ms. Nicholl served as National Leader of Public Sector Retirement Consulting at another consulting firm.

Education/Professional Designations

Ms. Nicholl graduated magna cum laude from Loyola University with a BS degree in Mathematics. She is a Fellow of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary under ERISA.

Publications/Speeches

Ms. Nicholl speaks and presents frequently at professional organizations, including the National Council on Teacher Retirement, the National Association of State Retirement Administrators the National Conference on Public Employee Retirement Systems, the International Foundation of Employee Benefits and the Conference of Consulting Actuaries. Additionally, she has provided educational sessions for the Boards and Staff of public pension retirement systems. Ms. Nicholl has testified before state legislative bodies in Illinois, Wisconsin, Maryland, Ohio and Texas. She currently serves on the American Academy of Actuaries Public Pensions Subcommittee.

Recent presentations and publications include:

- "Public-Sector Pension Plans: Major Challenges and; Common-Sense Solutions," Kim Nicholl, *Government Finance Review, April 2013*
- "GASB Approves New Accounting Standards for Public Sector Pension Plans and Sponsoring Employers," Kim Nicholl and Paul Angelo, *Pension Section News, November 2012*
- "Hybrids in the Public Sector," IFEBP 58th Annual Employee Benefits Conference, November 2012
- "GASB's Proposed Changes to Pension Accounting Standards for Public Sector Employers," Paul Angelo, Rocky Joyner and Kim Nicholl, *Benefit Magazine (IFEPB), June 2012*
- "Planning a Successful Pension Funding Policy," Kim M. Nicholl, Paul Angelo, and Cathie G. Eitelberg, *Segal Public Sector Letter, November 2011*
- "Public Pension Plans," SOA 2011 *Annual Meeting & Exhibit, October 2011*
- "Actual Cost vs. Market Price: Does Market Valuation of Pension Liabilities Fit the Public Sector?," Paul Angelo, Kim M. Nicholl and Cathie G. Eitelberg, *Segal Public Sector Letter, June 2011*
- "Pension Plan Design and Costs," *Pew Center on the States Public Pension Conference, June 2011*

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MATTHEW A. STROM, FSA, MAAA, EA
Vice President and Actuary, Chicago

Expertise

Mr. Strom is a Vice President and Actuary in Segal's Chicago office with over 15 years of experience consulting to sponsors of defined benefit pension plans. His responsibilities include reviewing actuarial valuations, preparing actuarial cost studies, and managing other special projects for multiemployer, corporate, and public sector retirement plans. Mr. Strom's expertise includes deterministic cost and funding level projections, plan design analyses, experience studies, asset/liability modeling, and actuarial audits.

Professional Background

Prior to joining Segal, Mr. Strom was a Senior Consultant at another large benefits consulting firm. In this position, he managed and analyzed defined benefit and post-retirement welfare benefit valuations and assisted clients with various administrative and plan design issues. His clients range in size from several hundred to over 450,000 participants.

Education/Professional Designations

Mr. Strom received a BS with high distinction in Actuarial Science from the University of Illinois at Urbana-Champaign. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

Publications/Speeches

"Understanding Pension Obligation Bonds," Benefits and Compensation Digest (IFEBP), July 2007

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BRAD RAMIREZ, FSA, FCA, MAAA, EA
Vice President and Consulting Actuary, Denver

Expertise

Mr. Ramirez is a Vice President and Consulting Actuary in Segal's Denver office and has over 16 years of consulting experience. His expertise is in the funding, design, and administration of defined benefit pension plans. Mr. Ramirez works with public and private institutions to help manage the financial risks of providing stable retirement income to their former employees. His clients include public retirement systems, funds established by regional transportation authorities and multiemployer trusts covering union-represented building trade employees.

Mr. Ramirez is a member of Segal's National Public Sector Retirement Practice and serves as lead consultant and actuary to:

- Public Employee Retirement System of Nevada
- North Dakota Public Employee Retirement System
- Weld County (Colorado) Retirement System
- Denver Regional Transit District
- Utah Transit Authority Retirement Plan

Professional Background

A former math teacher, Mr. Ramirez has experience communicating complicated actuarial concepts to people of all backgrounds.

Education/Professional Designations

Mr. Ramirez received a BS in Mathematics and an MS with an emphasis in Abstract Algebra from the University of Nevada. He was awarded a Graduate Teaching Fellowship at the University of Oregon, where he taught Advanced Algebra and Statistics.

Mr. Ramirez is a Fellow of both the Society of Actuaries and the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary. He also serves as Chairman of the Society of Actuaries Retirement Design and Accounting Fellowship Examination Committee, where he tortures a future generation of pension actuaries by making actuarial examinations as difficult as possible.

Publications/Speeches

Mr. Ramirez routinely testifies in front of trustee boards and legislative bodies on matters involving actuarial estimates and pension financing. He is also a regular speaker at professional conferences involving actuarial issues including the Enrolled Actuaries Meeting, the Made in America Benefit Fund Summit, and Segal's internal Technical Actuaries Meeting. Recent articles by Mr. Ramirez include:

- "Implications for Plan Sponsors of Obesity's Designation as a Disease," *Public Sector Letter, July 2014*
- "Communicating Change Effectively Requires Taking Control," *Public Sector Letter, April 2014*
- "Expanding Wellness Programs Beyond Information: Why It's Time and How to Measure the Return on Investment," *Public Sector Letter, November 2013*

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TATSIANA DYBAL, FSA, MAAA, EA
Senior Actuarial Analyst, Chicago

Expertise

Ms. Dybal is a Senior Actuarial Analyst in Segal's Chicago office with over five years of experience in actuarial consulting. She is responsible for preparing annual valuations for pension plans in the corporate markets, conducting plan design studies, and developing cash funding projections.

Professional Background

Ms. Dybal joined Segal in 2007 as an Actuarial Analyst in the firm's Retirement Practice. She was promoted to Senior Actuarial Analyst in 2009. Prior to joining Segal, Ms. Dybal worked in the marketing department of a technology firm for seven years, and managed the supply chain of a foreign diamond exchange.

Education/Professional Designations

Ms. Dybal received an MS in Physics and Mathematics from State University (Minsk, Belarus) and an MS with high distinction in Actuarial Science from DePaul University. She is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary.

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WILLIAM GITTERMAN, MBA
Actuarial Analyst, Chicago

Expertise

Mr. Gitterman is an Actuarial Analyst in the Retirement Practice in Segal's Chicago office. He completes actuarial valuations and projections in accordance with ERISA and PPA'06.

Mr. Gitterman assists clients with a variety of technical and professional services, including:

- Completing valuation and actuarial projects using advanced analytical and problem-solving skills
- Analyzing alternatives in funding methods, asset smoothing methods, and amortization of unfunded liabilities
- Developing and modifying Rehabilitation Plans/Funding Improvement Plans
- Developing and presenting actuarial results via interactive deterministic modeling

Professional Background

Prior to joining Segal, Mr. Gitterman spent 5 years consulting for an information technology firm.

Education/Professional Designations

Mr. Gitterman received a BS in Mathematics and Economics from the University of Michigan at Ann Arbor and an MBA from Loyola University in Chicago. He is studying to become an Associate of the Society of Actuaries.

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BARBARA ZAVEDUK, MAAA, EA
Vice President and Actuary, Chicago

Expertise

Ms. Zaveduk is a Vice President and Actuary in Segal's Chicago office with over 25 years of experience working with retirement and retiree health plans. She currently manages the firm's Postretirement Health Benefits team, who measure OPEB liabilities for public sector plans in accordance with GASB 43 and 45, for corporate plans in accordance with FASB ASC 715 (previously FAS 106), and for multiemployer plans in accordance with FASB ASC 965 (previously SOP 92-6). Ms. Zaveduk is the signing actuary for numerous valuations and other assignments. In addition, she is actively involved in Segal's software development, training, and peer review initiatives.

Professional Background

In a previous position with Segal, Ms. Zaveduk co-managed the Retirement Practice Actuarial Department for the Chicago office.

Education/Professional Designations

Ms. Zaveduk graduated from the University of Illinois at Chicago with a BA in Economics and Psychology. She has been a Member of the American Academy of Actuaries since 1993 and an Enrolled Actuary since 1992. Ms. Zaveduk meets all continuing education requirements, and remains up-to-date on the Code of Professional Conduct, relevant Actuarial Standards of Practice, Qualification Standards, and other guidelines published by the Actuarial Standards Board.

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YORI B. RUBINSON, FSA, MAAA
Retiree Health Actuary, Chicago

Expertise

Mr. Rubinson is a Retiree Health Actuary in Segal's Chicago office with over fifteen years of experience working with retirement and retiree health plans. He assists clients by measuring OPEB liabilities for public sector plans in accordance with GASB 43 and 45, for corporate plans in accordance with FASB ASC 715 (previously FAS 106), and for multiemployer plans in accordance with FASB ASC 965 (previously SOP 92-6), as well as long-term disability and life insurance plans. Mr. Rubinson is the signing actuary for numerous valuations and other assignments.

Professional Background

Prior to joining Segal, Mr. Rubinson worked for another international human resource and benefits consulting firm.

Education/Professional Designations

Mr. Rubinson received a BS in Actuarial Science and a BA in Finance from the University of Illinois. He also obtained an MBA from the Graduate School of Business at the University of Chicago. Mr. Rubinson is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries.

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4.5 Methodology, Work Product, and Timeline

*Describe the proposed methodology for each element of the components listed in the **Scope of Audit** section of the Proposal Specifications. The description should include specific techniques that will be used, including anticipated sampling techniques and sizes, and proposed sources of data and information. You may propose alternative ways of addressing the elements of the audit scope.*

In describing your proposed methodology, also identify the type and level of assistance that you anticipate will be needed from the staff of PERS and Gabriel Roeder Smith & Company, including assistance to understand the operations and records of PERS; to understand the actuarial assumptions, method, and procedures; and to access, obtain, and analyze information needed for the audit. Identify meetings, interviews, programming support, space needs, etc., that you anticipate needing from PERS and Gabriel Roeder Smith & Company.

Describe the final work product, including written reports, briefings, and availability of working papers. Include one or more examples of work products for actuarial valuations or audits that may help to illustrate the proposed methodology and final work product.

Provide an estimated date that the final report will be submitted and the projected timeline or the anticipated work requirements and milestone dates to reach that date.

Actuarial Review Work Plan and Process

Our analysis will specifically focus on the accuracy, consistency, reasonableness, and appropriateness of PERS' consulting actuary's, work in the context of actuarial soundness and in light of the governing plan rules and regulations. Segal recognizes that "actuarial soundness" is neither an absolute nor a unique concept, but must be considered in relation to the issues at hand and the accuracy with which future experience can be predicted.

Our proposed services with regard to the actuarial audit include the following:

Verification of Data Collection and Validity

An assessment of the validity, completeness, and appropriateness of the data used by GRS, the degree to which data is sufficient to support the conclusions of the investigation, and the use and appropriateness of any assumptions made regarding the data.

We will examine the participants' individual data for internal consistency. Accuracy will be assessed by comparing the input data from the employer to the output data from the actuary and by reviewing the methods used by the actuary to reconcile participant data from year to year. We will also assess the use and appropriateness of estimation methods used when certain data is missing or unavailable.

We also will review the financial information provided by the PERS and compare this information to that reported in the actuarial valuations.

Validation of Actuarial Calculation Processes and Benefits Valued

We will review the economic and non-economic actuarial funding assumptions and consider whether the actuarial valuation assumptions are reasonable, internally consistent, and adhere to generally accepted actuarial standards and practices. This assessment will help determine whether the assumptions are reasonable, based on PERS' experience, and appropriate to the current benefit structure. A comparison with national benchmarks will be made. Segal will also review and assess the December 31, 2010 Experience Study for the actuary's approach and recommendations. We will also identify areas, if any, not addressed in the current actuary's experience reviews that may be appropriate for future evaluation. The assumptions we review will include, but are not limited to, mortality, retirement and separation rates, level of pay adjustments, rates of investment return and disability factors.

Evaluation of Actuarial Methods and Procedures

We will review the current actuary's valuation procedures and adjustments to determine whether they are reasonable and consistent with generally accepted actuarial standards and practices, and with the particular features of the PERS that they are intended to value. This assessment will determine whether the current actuary's procedures and adjustments are appropriate for the benefit structure of the PERS and any funding policies, and whether the procedures, adjustments, and funding method are applied as stated by the actuary. The proper applications of actuarial assumptions and plan provisions will be verified within the PERS actuary's software, based on a detailed analysis of sample life projections. Test lives will be selected that allow for a stratified sampling of combinations of service, age, and salary as well as key benefit breakpoints and decrements. Test lives will check all plan provisions, including the benefits as they compare to the statutes. Complete cooperation of the retained actuary will be required to ensure an understanding of the accuracy of processing details.

We will review any discovered deviations from accepted standards with GRS to discover the rationale for such deviation and the effect on the PERS. If we recommend any adjustments to the valuation procedures or results, we will provide a detailed rationale for our recommendations and a description of the general effect on the PERS.

Evaluation of Actuarial Methods and Procedures

We will evaluate the appropriateness of PERS' actuarial funding method (including the resultant actuarial accrued liability, normal cost, and amortization period) and determine whether it is reasonable and consistent with generally accepted actuarial standards and practices, and with the particular benefits, investments, demographics, and funding objectives of PERS. We will review PERS' funding method based primarily on the cost pattern it can be expected to produce. Among the considerations we will consider are the development of the annual normal cost percentage, the amortization of the unfunded actuarial accrued liability, and the derivation of the amortization period.

We will also review the actuarial asset method. We believe Segal can offer significant value to the PERS with respect to the topic of asset smoothing. Our firm has recently undertaken a detailed study of the value (in terms of impact on volatility) and reasonableness (in terms of Actuarial Standards of Practice #44 – Selection and Use of Asset Valuation Methods for Pension Valuations) of using an asset smoothing method versus market value and the interrelationship of the length of the smoothing period and size of the corridor around market. The results of our analysis can be adapted to the PERS and a customized presentation would be included as part of our review.

Review of Actuarial Assumptions

We will review the economic and non-economic actuarial funding assumptions, and consider whether the actuarial valuation assumptions are reasonable, internally consistent, and adhere to generally accepted actuarial standards and practices. This assessment will help determine whether the assumptions are reasonable, based on PERS experience, and appropriate to the current benefit structure. A comparison with national benchmarks will be made. The most recent experience study will be assessed for the actuary's approach and recommendations. We will also identify areas, if any, not addressed in the current actuary's experience reviews that may be appropriate for future evaluation. The assumptions we review will include, but are not limited to, mortality, retirement and separation rates, level of pay adjustments, rates of investment return and disability factors.

Parallel Valuation

Using the census data provided by GRS and the actuarial assumptions stated in the valuation report, we will perform a parallel valuation of the pension benefits as of December 31, 2013, and of the retiree health care benefits as of December 31, 2013. If any adjustments are recommended to assumptions or methods to more accurately reflect present and future assets, liabilities, and costs of PERS, we will provide detailed rationale for our recommendations, and describe the general effect on PERS' condition resulting from the proposed changes.

Review of Health Care

We will review the retiree health care information and 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.

The initial phase of this evaluation process consists of a review of all relevant plan documents, summary plan descriptions and any other related documents concerning the OPEB benefits provided to PERS' retirees. Where needed, we will raise questions to assure that we fully understand all aspects of the program.

Our data requirements include four primary types of information:

- Plan descriptions and documents, including clarification of the eligible groups;
- Participant data for active and retired individuals; and

- Retiree claims experience data for recent years.
- Financial information about the program, including previous financial statements to show how the cost for retiree health benefits has been reported in past years.

Written Actuarial Review Report

We will prepare a written report summarizing the results of our actuarial review. The report will include our specific findings with regard to each of the actuarial review elements:

- A recap of any specific discrepancies, variations or exceptions identified, the estimated impact of those items, the resolution of those items, and any items that remain outstanding;
- Our opinion as to the reasonableness of the current actuary's valuation assumptions, methods and conclusions, and their conformance with generally accepted actuarial standards and practices;
- A description of any improvements that can be made to the annual actuarial valuation, including the valuation process, the valuation results and the form of presentation;
- Our comments on the overall profile of PERS, including benefit design, the actuarial funding method and actuarial valuation asset method;
- Comparative tables displaying the valuation results and sample test life evaluations; and
- Detailed recommendations based on all of the above findings. These recommendations will be identified within the report and within an executive summary.

Segal will first complete a preliminary report of findings, which we will invite PERS staff and GRS to review and provide feedback to be incorporated into the draft and final reports.

Task Outline and Timing

The following is our proposed work plan for completing the actuarial review and all steps outlined in the scope of services contained in the Request for Proposal. This timeframe allows us to deliver the final report by December 1, 2014. If desired, we will present the results of the actuarial audit to the ORSC and PERS Board of Trustees. Our work plan assumes that the necessary data and materials will be available to us immediately after commencement of this engagement. If the ORSC wishes, Segal can alter the schedule if a different timeline for delivery is desired.

Step	PERS Involvement	GRS Involvement	Time
1. Initial conference call with PERS staff	Yes	No	08/01/2014

If selected to perform this study, Segal will conduct a conference call with the PERS staff to discuss data collection, timing, and any other aspects of the process that require clarification before work can commence.

Step	PERS Involvement	GRS Involvement	Time
2. Data/document gathering and initial analysis	Yes	Yes	08/15/2014

Once we have all of the necessary census information and relevant documents, our analysts will commence the initial analysis of the data and reconciliation process. As part of this step, sample participants for whom detailed calculations will be checked are selected and relevant information will be requested from the current actuary.

Step	PERS Involvement	GRS Involvement	Time
3. Validate the actuarial computations for select sample participants	No	Yes	08/21/2014 to 09/05/2014

After the detailed calculation information is received from GRS, our analysts will begin the sample test life review. The analysts will document their steps and findings as they work, which aids in the peer review process and begins to lay the framework of the content for our written audit report. These notes are retained in the project file as part of the work papers for this engagement.

At this point, Segal will provide a progress report to the PERS staff.

Step	PERS Involvement	GRS Involvement	Time
4. Analysis of current actuarial methods and procedures	No	Minimal	09/05/2014 to 09/19/2014

Each actuary involved in this case will review the actuarial report and most recent experience study and independently note their findings and comments with respect to assumptions, methodology, report content, etc. We will discuss all our observations in an internal meeting and outline those points that will be included in our written report. An assessment will be made as to the reasonableness of the methods and procedures and the consistency with generally accepted actuarial standards of practice. Any deviations will be discussed with the PERS and GRS before inclusion in our draft report.

Step	PERS Involvement	GRS Involvement	Time
5. Analysis of actuarial assumptions and experience study	No	No	09/26/2014 to 10/09/2014

Statistical information contained in the experience study report will be used to analyze the reasonableness of the assumption setting process (and the reasonableness of the assumptions themselves) that takes place concurrent with each experience study review. Demographic and economic assumptions will be reviewed, including, but not limited to, mortality, retirement, turnover, incidence and type of disability, levels of pay adjustment, and rates of investment return. Any recommended adjustments will include a detailed rationale as well as a general impact on the PERS funding levels.

When analyzing the investment return assumption, we will project an expected long-term real rate of return for each asset class that PERS includes in their investment policy. These results, combined with an underlying expectation for future inflation and weighted in proportion to investment policy guidelines, will allow us to create an independent investment return assumption and compare that to the current assumption.

Step	PERS Involvement	GRS Involvement	Time
6. Parallel valuations of pension benefits and retiree health care benefits	No	No	10/10/2014 to 10/24/2014

Using the census data provided by GRS and the programming completed in step 3, we will run the valuations for both pension benefits and retiree health care benefits. To the extent that our review of the actuarial assumptions and/or methods resulted in any recommended changes, we will demonstrate the impact of such changes to PERS.

Step	PERS Involvement	GRS Involvement	Time
7. Report preparation	Yes	Yes	10/24/2014 to 11/17/2014

A draft report will be compiled based on the findings from the steps above and will include Segal's overall opinion as to the reasonableness of the current actuary's conclusions and a detailed account of any items noted as exceptions. This draft will be submitted to the PERS staff and GRS for review. Based on the comments and feedback received, we will adjust and finalize our report accordingly.

A sample actuarial audit review report has been attached as an Appendix.

Step	PERS Involvement	GRS Involvement	Time
8. Presentation of results to the PERS Board of Trustees and the ORSC	Yes	Yes	10/24/2014 to 11/17/2014

We recommend Segal present the findings of our study to the ORSC, the PERS Board and/or interested parties at the conclusion of our review.

4.6 Additional Information

Include additional information that will be helpful to gain an understanding of the proposal. This may include diagrams, excerpts from reports, or other explanatory documentation that would clarify and/or substantiate the proposal. Any material included here should be specifically referenced elsewhere in the proposal.

Experience and Qualifications of the Firm

Segal has been providing actuarial services for 75 years. Our company was founded in 1939 by Martin E. Segal. From the beginning, Segal has been involved in developing health and retirement programs that meet the needs of employees and employers. Segal is organized to provide services to three major markets: public sector, corporate, and multiemployer.

Segal has remained a leading, independent firm of benefit, compensation and human resources consultants.

Segal provides a broad range of professional services to many retirement systems sponsored by states and political subdivisions. The range of services offered include:

- Actuarial funding requirements and related governmental certifications;
- Defined benefit, defined contribution, and deferred compensation plan design;
- Retirement plan valuation audits;
- Post-Retirement medical plan valuations and related plan design/cost modeling;
- Calculations and disclosures under accounting regulations;
- Asset/liability modeling and related projections; and
- Comprehensive consulting advice in each of the above-mentioned areas.

Segal is a leading firm in performing independent actuarial audits of large government retirement plans for which we are not the ongoing actuary. The reasons we are selected to conduct these audits include the high level of respect in which we are held by the public sector plan community and our expertise and knowledge of the particular actuarial issues that are uniquely important to governmental plans.

The chart below represents Segal's Public Sector clients by asset size ranging from $1 billion to over $5 billion.

Size of Client	Public Sector Clients
$1 billion – 5 billion	30
Over $5 billion	13

Segal stands out in a number of ways from others providing services in our field, including the following:

- **Client-Focused, Unbiased Advice** – We have extensive experience in providing consulting and actuarial services to public employee benefit programs. Segal is employee owned and independent of any financial, insurance or investment entity.

- **Serving Three Markets: Public Sector, Corporate and Multiemployer** – By identifying these three markets separately, our consultants have been able to develop expertise that responds to each market's unique characteristics, needs, and decision-making processes.

- **Top-Tier Employee Benefits Consulting Firm** – As a trusted consulting partner to our clients, Segal has approximately 1,000 employees (including benefits consultants, actuaries and analysts) in 23 offices throughout the U.S. and Canada. Our offices are located in Atlanta, Boston, Calgary, Chicago, Cleveland, Denver, Detroit, Edmonton, Glendale, Hartford, Houston, Los Angeles, Minneapolis, Montreal, New Orleans, New York, Philadelphia, Phoenix, Princeton, Raleigh, San Francisco, Toronto, and Washington, DC.

- **Top Talent** – We have assigned a team of consultants, led by an experienced public sector consultant who has worked on similar relationships and projects with governmental employers. This team is well qualified to provide all requested services and has expertise in a broad range of your benefits needs.

- **Cutting-Edge Approaches** – Segal brings new ideas and concepts to our clients. We focus on strategic benefits and compensation planning as a key tool in assessing future directions. Segal continually analyzes its evolving markets and proactively brings solutions to meet clients' changing needs.

- **Consulting Approach** – We listen. While our team of consultants and actuaries draws upon years of experience, our focus is on the particular environment in which a client operates. We work closely with a client to develop strategic solutions to the current challenges and to identify future directions.

- **Quality Commitment** – We follow a process of full peer review of consulting advice and recommendations. Our internal quality control standards require a three-stage review process for actuarial and technical work. On a regular basis, our senior consultants assess our performance with clients.

- **Clear Communication** – We recognize that large public benefit programs have the attention of a wide range of people with a diversity of interests. We acknowledge our duty to inform all of these parties fully and fairly. Realizing that these audiences may not be benefits or human resources experts, we construct our written and oral reports in "plain" language that can be readily understood by our audience.

As described in this proposal, Segal has significant experience providing actuarial services, including actuarial audits to the public sector retirement plans. In the past 18 months, the proposed team has performed five actuarial audits for public sector retirement systems with assets over $1 billion including the California State Teachers' Retirement System and the Wisconsin Retirement System. In addition, Kim Nicholl has served as lead actuary to statewide

teacher retirement systems in Illinois, Missouri, North Dakota, Ohio, and Pennsylvania. This vast experience gives Segal a competitive advantage over others.

We have included a sample Audit Report in the Appendix for your review.

4.7 Glossary

Provide a glossary of all abbreviations, acronyms, and technical terms used to describe the services or products proposed. This glossary should be provided even if the terms are described or defined when first used in the proposal response.

ASA – Associate of the Society of Actuaries

EA - Enrolled Actuary

FCA - Fellow of the Conference of Consulting Actuaries

FSA - Fellow of the Society of Actuaries

GRS - Gabriel Roeder Smith & Company

MAAA - Member of the American Academy of Actuaries

OPEB - Other Postemployment Benefits

ORSC - Ohio Retirement Study Council

PERS - Public Employees Retirement System

RFP – Request for Proposal

Segal - Segal Consulting

4.8 Cost Information

The cost estimates in the pricing summary must include all necessary charges to conduct the audit and must be a "not to exceed" figure. The pricing summary should include per element: personnel costs (including hourly rates and estimated hours for professional and clerical staff assigned to the audit), travel and lodging, data processing costs, materials, and any other potential costs.

For the services described in this proposal, we propose a fee of $94,750. The fee is inclusive of personnel costs, travel and lodging. Segal does not separately bill for data processing expenses or materials (subject to the note on "clean data" below).

Segal is fully aware of the sensitivity of budget allocations for public sector employers. Our pricing approach is focused on achieving the client's objectives in the most cost-effective manner consistent with quality, accuracy, and timeliness. If our proposed fees are inconsistent with your understanding of the engagement, we request the opportunity to explain our pricing assumptions or to modify the scope of services to best fit your objectives for this important assignment.

The fees above are based on receipt of "clean" data from PERS and GRS where a "reasonable amount" of standard data scrubbing would be required to reconcile the census and prepare for the use in the validation and parallel valuation processes.

Description of Element	Position Classification	Estimated Hours	Hourly Rates	Total
Personnel Costs				
	Senior Actuary	100	$400	$40,000
	Reviewing Actuary	80	$255	$20,500
	Actuarial Analyst	160	$200	$32,500
Sub Totals		**340**		**$93,000**
Travel and Lodging				$1,750
Data Processing				$0
Materials				$0
Other				$0
Total				**$94,750**

Appendix – Sample Audit Report

We have included an Actuarial Peer Review Audit of Actuarial Valuations and Experience Study on the following pages for your review.

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Peer Review Audit of Actuarial Valuations and Experience Study

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June 11, 2013

Board of Trustees
Alaska Retirement Management Board
Department of Administration
Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Re: **Actuarial Peer Review Audit of Actuarial Valuations and Experience Study**

Ladies and Gentlemen:

We are pleased to present the results of Segal's actuarial peer review audit of the June 30, 2011 actuarial valuations for the Public Employees' Retirement System (PERS), Teachers' Retirement System (TRS), and Defined Contribution Retirement (DCR) systems, and the June 30, 2010 actuarial valuations for the Judges Retirement System (JRS) and National Guard Naval Militia Retirement System (NGNMRS). The scope of the audit also included a peer review of the Actuarial Experience Study for the period July 1, 2005 to June 30, 2009 for PERS and TRS. The purpose of this audit is to conduct a review of the actuarial methods, assumptions, and procedures employed by the Alaska Retirement Management Board (ARMB) and the System's actuary, Buck Consultants (Buck). This audit includes the following:

1. ***Report review*** – a review of the valuation/experience study reports to evaluate how they comply with actuarial standards, and whether such reports reflect appropriate disclosure information under any required reporting.

2. ***Methods and assumptions review*** – an analysis of the actuarial assumptions (including an independent reproduction of the experience study) and a review of the actuarial methods utilized in determining the funded status and accrued liability in each valuation for compliance with generally accepted actuarial principles.

3. ***Valuation results and data review*** – an evaluation of the participant data, valuation results, and projections, with a detailed review of the findings. This includes reproducing the June 30, 2011 (PERS, TRS and DCR) and June 30, 2010 (JRS and NGNMRS) valuation results.

This review was conducted under the supervision of Kim Nicholl, a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries, and an Enrolled Actuary under the Employee Retirement Income Security Act (ERISA), and Matthew Strom, a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. This review was conducted in accordance with the standards of practice prescribed by the Actuarial Standards Board.

The assistance of the ARMB staff and Buck is gratefully acknowledged.

We appreciate the opportunity to serve as an independent actuarial advisor for the ARMB and we are available to answer any questions you may have on this report.

Sincerely,

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matthew A. Strom, FSA, MAAA, EA
Consulting Actuary

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Table of Contents

I. Introduction

Statement of Project

The ARMB retained The Segal Company (Segal) to conduct an independent review of the System's current actuarial calculations, assumptions and methods. ARMB requested an independent review of the reasonableness, consistency and accuracy of:

- The method, factors and assumptions used in the actuarial valuations;
- The compilation of the actuarial valuations; and
- The results and the actuarial assumptions generated from the experience study.

The ARMB also asked for an evaluation of the data used for performance of the valuation, including the degree to which data is sufficient to support the conclusions of the valuations and experience study, and the use and appropriateness of any assumptions made regarding the data. The ARMB requested an assessment of the conclusions of the valuation report for completeness and accuracy. Finally, the ARMB requested an assessment of whether the actuarial assumptions, procedures and methods are consistent with the actuarial parameters of the Governmental Accounting Standards Board (GASB) Nos. 25, 27, 43 and 45, updates thereof, and any applicable professional pronouncements with which the systems are required to comply.

We reviewed all information supplied to us. We also requested and reviewed additional information provided by Buck. Finally, we considered the reasonableness of the actuarial assumptions and methods by virtue of a replication of the four-year experience analysis, in the context of our own experience, and those of other state and local pension systems.

Summary of Findings

This audit validates the findings of the actuarial valuations and experience review we studied. We believe the stated methods and assumptions were properly employed in determining the cost of the systems.

The data appears complete and we believe it is sufficient to support the conclusions reached in the valuation reports and experience study. For the most part, we were able to match valuation results within an acceptable degree of accuracy. In general, the items identified in Section IV of this report (regarding actuarial liability replication) are minor relative to the total liability of the System and do not have a significant impact on plan costs. All parameters and methods appear consistent with current GASB standards and generally accepted actuarial practices as promulgated in the various Actuarial Standards of Practice applicable to State of Alaska systems.

Improvement Recommendations

As a result of our analysis, we would like to highlight the following issues, concerns, and recommendations:

I. Introduction

- The post-termination mortality assumption is developed based on head counts of actual deaths and exposures. We recommend weighting the experience and exposures by benefit amount to take into consideration any correlation between the health of the annuitants and their benefit size.

- Turnover experience was analyzed without regard to terminated employees who are subsequently rehired. We recommend that the turnover rates reflect the significant number of employees that are rehired.

- Actual salary increase experience was significantly greater than expected for all groups in all years (except fiscal 2007 for TRS). In the valuations during the study period, there were consistent experience losses due to salaries (again, except for fiscal 2007 for TRS). We would have recommended that the assumption be brought at least half way up to actual increases over the period; Buck's recommendations were for relatively minor increases. In the two valuations subsequent to the assumption change, the net impact of salary experience has been actuarial losses.

- Buck's recommendation for retirement rates included raising the 100% retirement age for all three groups: age 70 for PERS Peace Officer/Firefighter, age 85 for TRS, and age 90 for PERS Others. In our opinion, this extends the assumed retirement age beyond what we believe is reasonable and could lead to experience losses in future valuations.

- We were unable to match Buck's figures for the percentage of PERS members that terminate vested and elect a refund of contributions. We recommend that Buck review the data, monitor this experience, and revise this assumption if warranted.

- In the economic assumptions section of the report, the inflation assumption should be analyzed first, followed by the investment return and other related assumptions. The inflation assumption is the base component of all the economic assumptions under the "building block" approach, and therefore we believe it makes sense to discuss and establish a recommendation for this assumption prior to the other economic assumptions.

- In 2010/2011, many funds were lowering their investment return assumptions to below 8%. However, an 8% assumption was adopted as a result of the experience study. As it stands in 2013, expectations are slightly better than they were three years ago. Using capital market expectations from today, Segal would likely recommend an investment return assumption of 7.75% to 8%.

- When reviewing the age difference between husbands and wives, Buck looked at the age spread for all retirees electing the joint and survivor form of payment. Since the assumption is applied to future retirees, we would suggest that Buck instead focus on new retirees when evaluating the appropriateness of the assumption. In many plans, we have observed a trend over time towards a smaller age spread between husband and wife among new retirees. While the age spread between husbands and wives for younger (newer) female retirees is

I. Introduction

similar to the age spread for the entire female retiree population, the age spread for male retirees is noticeably younger for newer retirees. While the current 3-year age spread assumption for both male and female retirees is not unreasonable, Buck should consider a separate assumption for male and female retirees, and monitor any trend towards a smaller age spread among new retirees.

- In the Defined Contribution Retirement Plan valuations, the full plan premiums (per capita costs) used to determine the retiree rates do not take into account the plan's anticipated Medicare Part D reimbursements. If these reimbursements are factored into the premium rates charged to retirees, then the projected retiree contributions would be lower and the projected retiree health obligation would be higher.

Each of these concerns is described more fully in this report.

We offer ideas to improve the quality and understanding of the valuation reports. Several suggestions and recommendations are made throughout this document. We would classify them as either: a) presentation suggestions to enhance the valuation processes or reports; b) something to be examined during the next experience review; and c) something that may affect the cost of the program. Where we make a comment in this regard in this report, we have identified the location in the margin with the following icons:


Enhancement to valuation process or report


Examine during next experience review


May affect the cost of the program

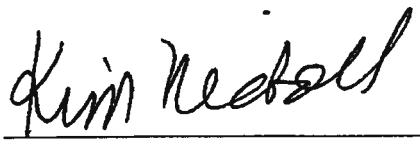
II. Actuarial Certification

This is to certify that Segal Consulting, a member of The Segal Group, Inc. ("Segal") has replicated and reviewed the Experience Study as of June 30, 2009 for PERS and TRS, the June 30, 2011 PERS, TRS and DCR actuarial valuations, and the June 30, 2010 JRS and NGNMRS actuarial valuations in accordance with generally accepted actuarial principles and practices. The opinions presented in this report have been made on a basis consistent with our understanding of the applicable Actuarial Standards of Practice.

The actuarial valuations are based on the plan of benefits verified by ARMB and reliance on participant, premium, and expense data provided by ARMB or from vendors employed by ARMB. Segal did not audit the data provided by the Plan Administrator. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. To the extent we can, however, Segal does review the data for reasonableness and consistency. Based on our review of the data, we have no reason to doubt the substantial accuracy of the information on which we have based this report and we have no reason to believe there are facts or circumstances that would affect the validity of these results.

The actuarial computations made are for purposes of replication and review of the reports described above. Determinations for purposes other than as described here may be significantly different from the results reported here.

We are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, this report is complete and accurate.



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III (A). Experience Study and Assumptions: Data

As part of our analysis, we have performed a peer review audit of the actuarial experience study for the four-year period ending June 30, 2009. For this purpose, we have conducted our own analysis of the census data files (supplied to us by Buck) for the years ending June 30, 2005 through June 30, 2009. Five years of census data allowed us to track experience over four "valuation" years.

Presumably, the census data files provided to us by Buck are substantially the same as those used in connection with the performance of their experience study report dated March 2011. Each file contains identifying information, basic census fields (e.g., date of birth, date of hire, gender, etc.), credited service, salary for the prior year, and each member's status as of the census file date. The identifying information and status field allow us to track each member's demographic movement between valuation dates. For example, in the June 30, 2005 data, a member is coded as active and in the June 30, 2006 data, the same member is coded as retired. This tells us to count this person as an "actual retirement" for the 2005-2006 year. All members in the June 30, 2005 data that *could have* retired during the 2005-2006 year are counted as retirement exposures. In this example, the retirement assumption applied to the corresponding cohort of exposures generates "expected" retirements. Therefore, with these handful of fields, the actuary is able to track and analyze much of the demographic experience of the group for items such as mortality, active turnover, incidence of disability, and retirement.

Other assumptions require additional data to analyze. For example, evaluating the assumption for percentage of retirees that reside in Alaska and receive a special Cost of Living Allowance (COLA) requires a separate data field for Alaska COLAs currently being paid. We believe there are only a few assumptions where the necessary data fields are not sufficient or not available. One such assumption is that for the number of dependent children; the pension census data does not include information related to dependents of active members so a general assumption must be applied. In this case, the general assumption ("members who are married and between the ages of 25 and 45 have two dependent children") is reasonable and the impact on overall valuation results is immaterial, so we do not believe additional data needs to be collected to analyze this assumption.

An example of an assumption where there is insufficient data to properly analyze, but might have a material impact on results, is the occupational vs. non-occupational death benefits. According to Buck's experience study report, data is not available to determine whether occupational or non-occupational death benefits are paid. The occupational death benefit is generally more valuable than the non-occupational counterpart, so the ability to predict what portion of active death benefits would be payable under each form would be desirable.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

DEMOGRAPHIC ASSUMPTIONS

Mortality

We matched the expected and actual counts for post-termination mortality to within a reasonable tolerance for the PERS Peace Officer/Firefighter and TRS groups. For PERS Others, our counts were low compared to Buck, but the ratio of actual deaths to expected deaths is substantially the same. Buck recommended a change in post-termination (healthy) mortality tables that was based on the 1994 GAM Table (no margin), projected to 2013 with age setbacks to better align with actual experience. Their analysis was based on comparing the actual number of deaths to the expected number, and built in margins of 5-15% to allow for future improvements in mortality.

The approach used by Buck is sound. We would point out some possible alternatives (and potential improvements) that could be considered in the future. For example, rather than perform the actual versus expected analysis using head counts, another approach is to perform the analysis on a benefits-weighted basis. This methodology takes into consideration any correlation between the health of the annuitants and their benefit size.

A comparison of the two methodologies based on our analysis of the experience is shown below:

Post-Termination Mortality	Count-weighted Exposures	Actual Deaths	Expected Deaths	Ratio of Actual Deaths to Expected Deaths
PERS Others				
Female	44,179	828	770	107.53%
Male	34,529	772	883	87.43%
Total	**78,708**	**1,600**	**1,653**	**96.79%**
Reported by Buck		**1,785**	**1,837**	**97.17%**
PERS Peace Off./Fire.				
Female	1,904	17	16	106.25%
Male	7,475	92	107	85.98%
Total	**9,379**	**109**	**123**	**88.62%**
Reported by Buck		**102**	**126**	**80.95%**
TRS				
Female	21,956	276	312	88.46%
Male	15,923	230	273	84.25%
Total	**37,879**	**506**	**585**	**86.50%**
Reported by Buck		**512**	**615**	**83.25%**

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Post-Termination Mortality	Benefit-weighted Exposures[1]	Actual Deaths	Expected Deaths	Ratio of Actual Deaths to Expected Deaths
PERS Others				
Female	575,910	9,723	9,420	103.22%
Male	695,020	13,286	16,875	78.73%
Total	**1,270,930**	**23,009**	**26,295**	**87.50%**
PERS Peace Off./Fire.				
Female	37,947	278	289	96.14%
Male	247,574	2,351	3,375	69.67%
Total	**285,521**	**2,629**	**3,664**	**71.75%**
TRS				
Female	630,669	7,211	8,757	82.35%
Male	552,239	7,260	9,670	75.07%
Total	**1,182,908**	**14,471**	**18,427**	**78.53%**

Our headcount-weighted analysis shows the ratio of actual to expected deaths is 97%, 89%, and 87% for PERS Others, PERS Peace Officer/Firefighter, and TRS, respectively. These figures are close to those reported by Buck. However, accounting for the relative size of members' benefits reveals lower ratios of actual to expected deaths across all three plans. This means that from an accrued liability standpoint, even less liability is being released from post-termination deaths compared to expected than when viewed based on headcounts only. In effect, there may be less conservatism built into the proposed assumption than was originally intended.

Another alternative would be to build no margin into the proposed assumption for the base year and apply generational improvements thereafter, instead of using a static projection to account for improvement in mortality rates. Applying generational improvement allows the valuation to reflect projected improvements in mortality in each future year. For example, using a generational mortality table, the rate at age 65 fifteen years from the valuation date will have fifteen years of improvement reflected.

The following tables summarize mortality experience for the exposure period, and include data for proposed rates based on a table Segal would have recommended in connection with the study – the RP-2000 Combined Mortality Table, set back 1 year for males for PERS and set back 4 years for males and 3 years for females for TRS, with generational improvement.

[1] Numbers shown in thousands.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SERVICE RETIREE AND BENEFICIARY MORTALITY RATES – PERS

Male

Age Range	Exposures[2]	Actual Deaths	Expected Deaths	Ratio of Actual to Expected	Proposed Expected Deaths	Ratio of Actual to Proposed
Under 50	14,270	36	31.2	115.53%	21.4	168.56%
50 – 54	64,818	213	238.6	89.28%	141.5	150.48%
55 – 59	214,427	967	1,342.9	72.01%	804.1	120.25%
60 – 64	232,373	1,890	2,554.0	74.00%	1,596.6	118.37%
65 – 69	172,689	2,698	3,290.7	81.99%	2,189.6	123.22%
70 – 74	113,588	2,138	3,452.7	61.92%	2,462.7	86.82%
75 – 79	71,173	2,932	3,413.4	85.90%	2,637.3	111.17%
80 – 84	37,561	2,375	2,984.0	79.59%	2,471.3	96.10%
85 and Over	21,695	2,388	2,942.7	81.15%	2,778.7	85.94%
Total	**942,594**	**15,637**	**20,250.1**	**77.22%**	**15,103.3**	**103.53%**

Female

Age Range	Exposures[2]	Actual Deaths	Expected Deaths	Ratio of Actual to Expected	Proposed Expected Deaths	Ratio of Actual to Proposed
Under 50	6,244	1	7.5	13.28%	7.1	14.10%
50 – 54	35,014	222	69.1	321.23%	67.7	327.96%
55 – 59	136,392	631	452.2	139.53%	473.1	133.38%
60 – 64	153,240	603	966.9	62.36%	984.4	61.26%
65 – 69	105,068	1,197	1,190.1	100.58%	1,211.4	98.81%
70 – 74	73,582	1,289	1,309.8	98.41%	1,440.7	89.47%
75 – 79	49,894	2,093	1,507.7	138.82%	1,590.8	131.57%
80 – 84	30,695	1,377	1,604.6	85.82%	1,620.6	84.97%
85 and Over	23,728	2,588	2,601.1	99.50%	2,613.1	99.04%
Total	**613,827**	**10,001**	**9,709.0**	**103.01%**	**10,008.9**	**99.92%**

Grand Total	**1,556,451**	**25,638**	**29,959.1**	**85.58%**	**25,112.1**	**102.09%**

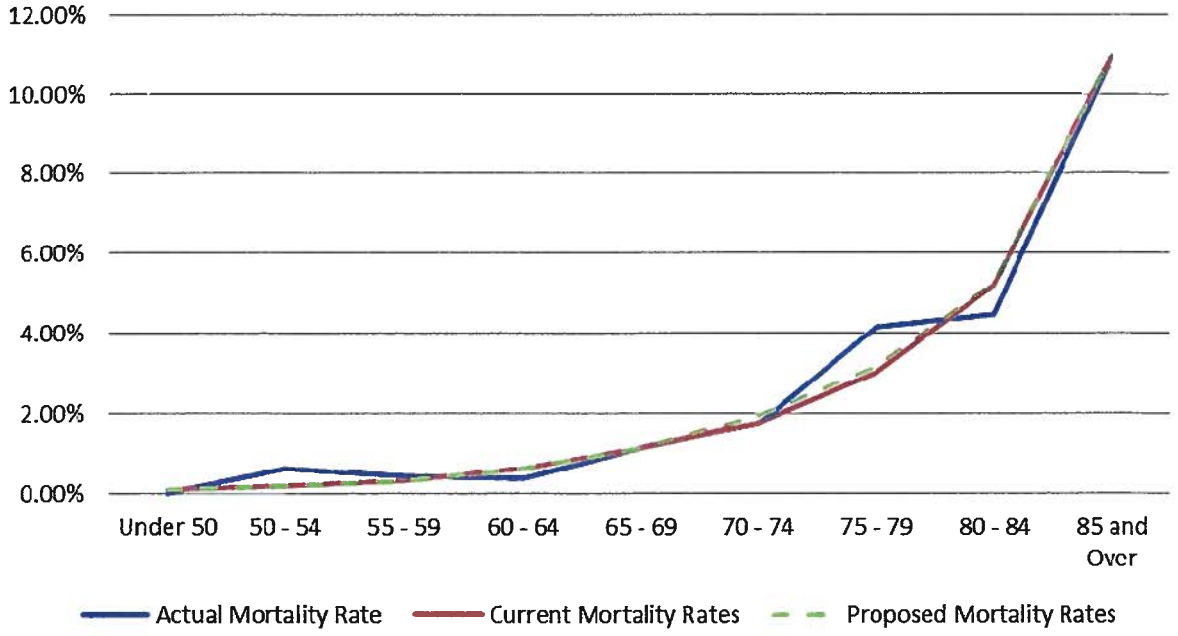
[2] Exposures and experience have been weighted by benefit payments and are shown above in thousands.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SERVICE RETIREE AND BENEFICIARY MORTALITY RATES – PERS

Males – Initial Year Only

Females – Initial Year Only



III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SERVICE RETIREE AND BENEFICIARY MORTALITY RATES – TRS

Male

Age Range	Exposures[3]	Actual Deaths	Expected Deaths	Ratio of Actual to Expected	Proposed Expected Deaths	Ratio of Actual to Proposed
Under 50	10,829	19	16.7	113.54%	12.8	148.85%
50 – 54	35,029	131	93.7	139.80%	59.4	220.53%
55 – 59	92,816	307	413.7	74.21%	241.4	127.16%
60 – 64	128,291	593	1,002.1	59.18%	610.1	97.20%
65 – 69	120,672	595	1,660.8	35.83%	1,060.8	56.09%
70 – 74	77,094	1,465	1,784.7	82.09%	1,224.1	119.68%
75 – 79	49,217	1,218	1,791.8	67.97%	1,321.7	92.15%
80 – 84	23,579	1,212	1,383.5	87.60%	1,090.9	111.10%
85 and Over	14,712	1,720	1,523.4	112.91%	1,358.3	126.63%
Total	**552,239**	**7,260**	**9,670.4**	**75.07%**	**6,979.5**	**104.02%**

Female

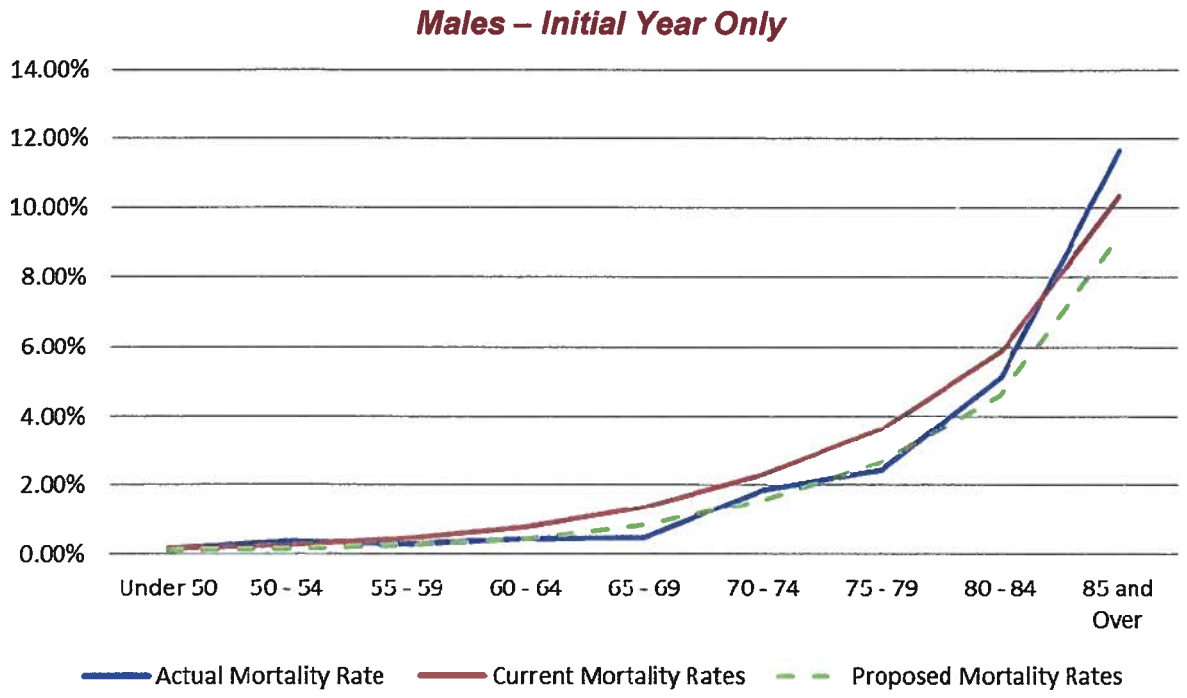
Age Range	Exposures[3]	Actual Deaths	Expected Deaths	Ratio of Actual to Expected	Proposed Expected Deaths	Ratio of Actual to Proposed
Under 50	16,866	11	18.6	59.20%	14.8	74.22%
50 – 54	46,556	127	82.7	153.62%	65.8	193.12%
55 – 59	126,196	304	368.9	82.40%	299.6	101.46%
60 – 64	158,433	624	879.1	70.98%	688.8	90.60%
65 – 69	114,931	893	1,173.0	76.13%	939.5	95.05%
70 – 74	71,771	542	1,158.4	46.79%	1,024.5	52.90%
75 – 79	44,557	1,181	1,203.5	98.13%	1,056.0	111.84%
80 – 84	26,490	994	1,251.3	79.44%	1,037.9	95.77%
85 and Over	24,869	2,535	2,621.1	96.71%	2,146.5	118.10%
Total	**630,669**	**7,211**	**8,756.6**	**82.35%**	**7,273.5**	**99.14%**

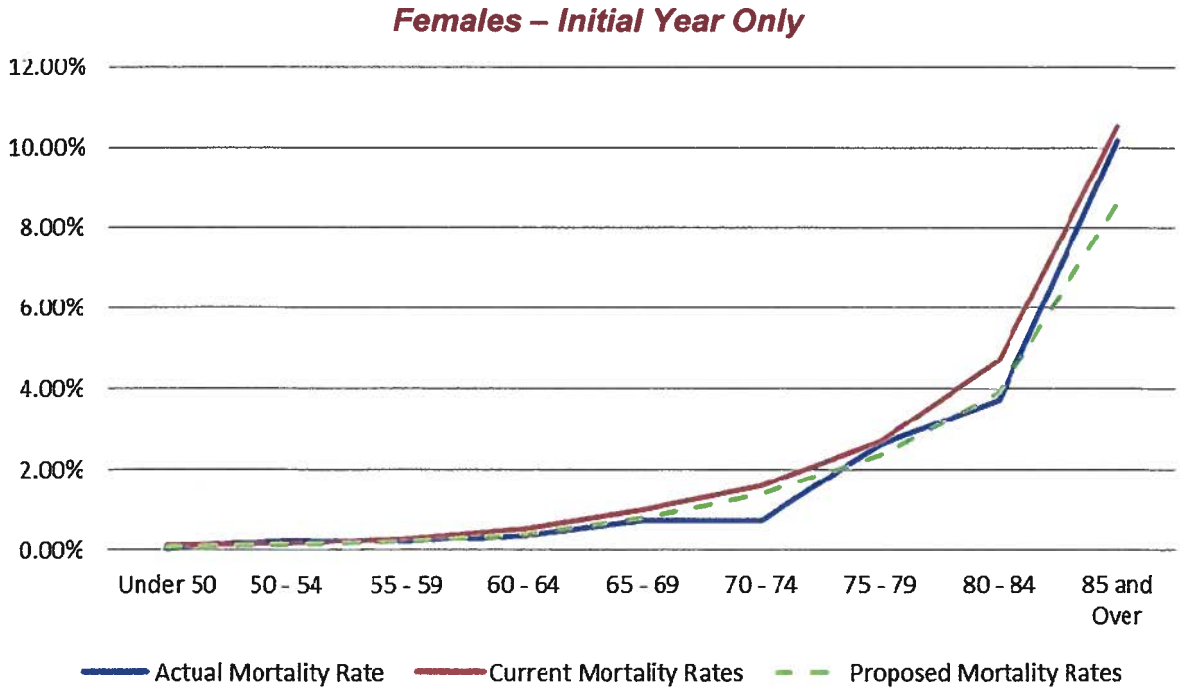
Grand Total	**1,182,908**	**14,471**	**18,427.0**	**78.53%**	**14,253.0**	**101.53%**

[3] Exposures and experience have been weighted by benefit payments and are shown above in thousands.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SERVICE RETIREE AND BENEFICIARY MORTALITY RATES – TRS





III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

The tables and charts above show that the suggested RP-2000 tables, with age setbacks, align well with the mortality experience over the experience period. By applying generational adjustments, future rates of mortality will contain adequate margin for improvements in mortality. Also, by weighting experience by benefit amounts, the positive correlation between the health of the annuitant and their benefit size is taken into consideration.

For mortality during active service, the PERS and TRS plans are not large enough to have credible experience for developing a table based on actual data. In many cases, when we recommend an assumption for active mortality, we base our recommendation on the table suggested for post-retirement lives and apply an adjustment to reflect the characteristics of the underlying group. For plans that cover general employees and teachers, the rates of mortality are generally lower than those in published tables. For plans that cover public safety employees, mortality rates are generally greater than those for general employees and teachers. We have reviewed Buck's recommendations with respect to pre-termination mortality and believe they are reasonable.

Mortality after Disability Retirement

Given the relatively small number of disability retirees, a review of the data does not provide a credible basis for setting an assumption. In cases like this, it is best to rely on an up-to-date published mortality table. This is what Buck did, as they recommended updating from the 1979 PBGC Disability Mortality Table to the RP-2000 Disabled Retiree Table. We agree with their recommendation.

Withdrawal from Service before Retirement

The assumed turnover rates used in annual actuarial valuations project the percentage of employees at each age or service duration that will terminate membership before retirement. These rates take account of possible terminations for all causes other than retirement, death, or disability. They include both voluntary and involuntary withdrawals from service.

Terminations before retirement give rise to some benefit rights, but may also involve the forfeiture of a portion of previously accrued benefits. Forfeitures resulting from turnover are anticipated in advance and help finance benefits that become payable to other members. In some cases, vested members who leave the plan and are eligible for deferred vested benefits withdraw their deposits, thus forfeiting the portion of their accrued benefit rights based on employer contributions.

For purposes of our analysis, the turnover experience studied includes all terminations from active employment. The types of terminations include members not vested at termination (since such members are not eligible for other benefits, termination of employment will, most likely, result in a withdrawal of employee contributions) and terminations of membership for members

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

who were vested and either withdrew their contributions or are eligible for future benefits. Only terminations of members who are not eligible to retire and receive an immediate benefit from the plan – whether reduced or unreduced – are included.

In our experience performing such studies, these terminations are typically offset by rehired members (not including members that had previously taken a refund of contributions) to arrive at "net" turnover for each year of the study period. For comparison purposes, the counts below are not adjusted by rehires since this was the approach used by Buck in their study.

Withdrawal from Service	Exposures	Actual Terms	Expected Terms	Ratio of Actual Terms to Expected Terms
PERS Others				
Female	52,287	6,537	5,943	109.99%
Male	36,446	3,846	3,771	101.99%
Total	**88,733**	**10,383**	**9,714**	**106.89%**
Reported by Buck		**10,085**	**9,603**	**105.02%**
PERS Peace Off./Fire.				
Female	1,346	99	86	115.12%
Male	7,450	405	392	103.32%
Total	**8,796**	**504**	**478**	**105.44%**
Reported by Buck		**525**	**477**	**110.06%**
TRS				
Female	18,156	1,514	1,366	110.83%
Male	8,273	677	657	103.04%
Total	**26,429**	**2,191**	**2,023**	**108.30%**
Reported by Buck		**2,172**	**1,982**	**109.59%**

In their experience study report, Buck indicates that they typically recommend withdrawal rates with a margin for conservatism, which is intended to offset losses experienced from new entrants with prior service or rehires who repay refunded contributions to reinstate prior service credit. They recommended minor changes in turnover rates that slightly decreased the amount of expected turnover for PERS (by 1.50% for Others and 0.42% for Peace Officer/Firefighter) and increased expected turnover for TRS (by 1.46%). Between 2006 and 2009, the valuation reports show that both PERS and TRS experienced actuarial losses due to termination experience in all four years (i.e., there was less actual turnover than expected). In addition, both PERS and TRS valuation reports for 2010 and 2011 – the two years subsequent to the experience study – showed actuarial losses due to termination experience. We believe these losses are related to a relatively large number of rehires that are not accounted for in the conservatism built into the turnover rates.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

As previously mentioned, an alternative approach would be to analyze the experience data "net" of rehires and base recommended rates on actual experience with little to no built in margin (unless actual experience is deemed to not be indicative of future expectations). For PERS Others, we agree with Buck's recommendation of a 5-year select period for a member's first 5 years of service. We also agree that actual experience for this cohort of members was different for members hired at earlier ages compared to members hired at later ages (Buck used age 35 as a cutoff point and we believe this is reasonable). In the Buck analysis, members hired prior to age 35 had a significantly greater probability of turnover during the first 5 years of employment than members hired after age 35. We observed a similar trend and believe that age 35 is an appropriate breakpoint. Beyond the select period of 5 years, Buck developed unisex age-based rates and we agree with this approach.

For PERS Peace Officer/Firefighter, Buck recommended unisex select rates for the first 5 years of service and sex-distinct age-based ultimate rates for 5 or more years of service. Based on our analysis, we would agree with Buck's approach with the exception that we would also have continued to use sex-distinct rates during the select period. Although the female exposures were relatively low, we did observe actual termination experience for females that was 50% greater than for males. However, given the low exposures of females compared to males in the select period, we do not find the use of unisex rates to be inappropriate.

For TRS, Buck recommended continued use of an 8-year, service-based, select period with sex-distinct rates and unisex age-based ultimate rates for 8 or more years of service. Despite the 8-year vesting schedule for TRS, we observed that the relationship between service and turnover was strongest over the first 5 years of service and therefore would have recommended a 5-year select period. In addition, we observed only a marginal difference between male and female experience in the first 5 years of service and would have recommended the use of unisex select rates. We do agree with Buck's recommendation of unisex ultimate turnover rates.

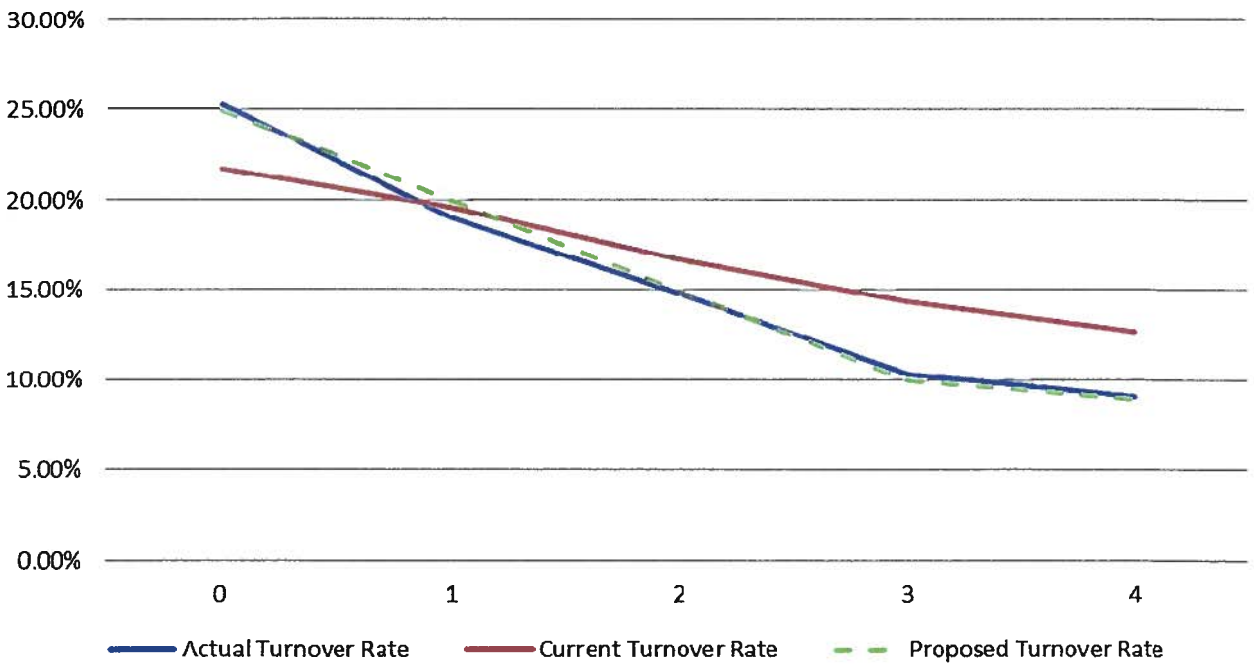
A comparison of the actual experience, current rates and proposed rates are shown in the following tables and charts.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Others

5-year Select Period; Hired Prior to Age 35

Service Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
0 – 0.99	3,761	952	817.5	116.46%	940.3	101.25%
1 – 1.99	3,883	739	761.3	97.07%	776.6	95.16%
2 – 2.99	3,718	552	621.6	88.80%	557.7	98.98%
3 – 3.99	3,062	318	440.3	72.23%	306.2	103.85%
4 – 4.99	2,722	248	345.6	71.76%	245.0	101.23%
Total	**17,146**	**2,809**	**2,986.3**	**94.06%**	**2,825.7**	**99.41%**

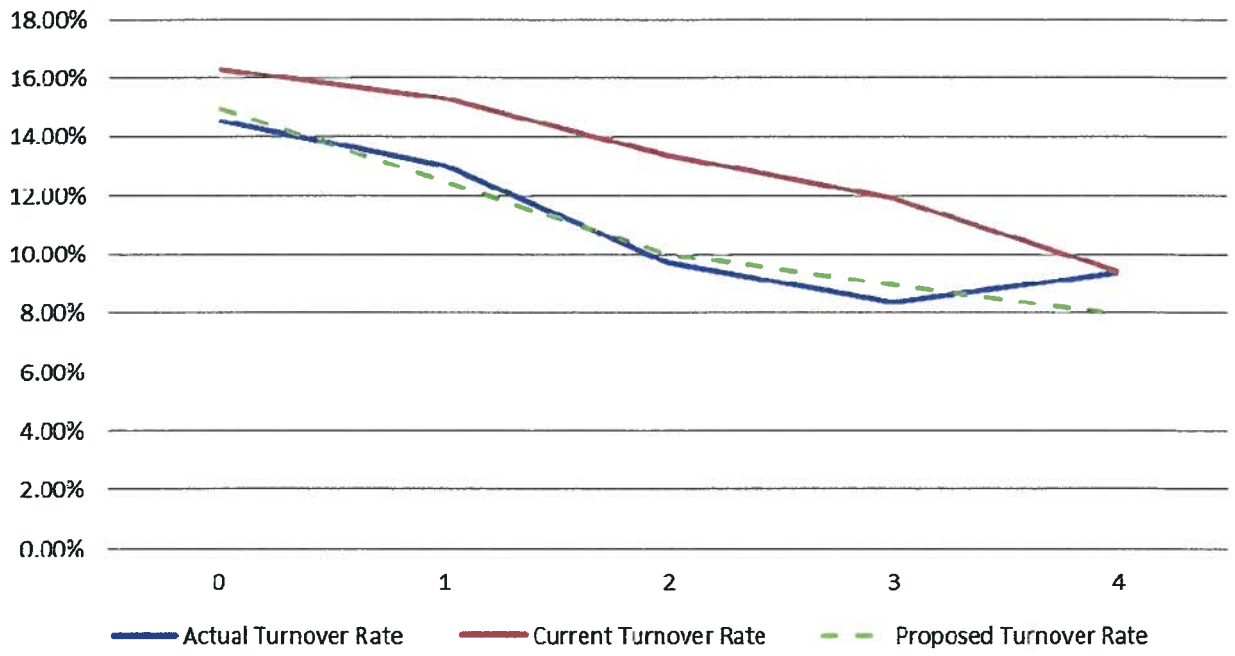


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Others

5-year Select Period; Hired On or After Age 35

Service Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
0 – 0.99	4,114	600	671.6	89.33%	617.1	97.23%
1 – 1.99	5,589	729	855.7	85.19%	698.6	104.35%
2 – 2.99	6,064	589	809.6	72.75%	606.4	97.13%
3 – 3.99	5,854	492	698.9	70.40%	526.9	93.38%
4 – 4.99	4,783	449	451.9	99.36%	382.6	117.34%
Total	**26,404**	**2,859**	**3,487.7**	**81.97%**	**2,831.6**	**100.97%**

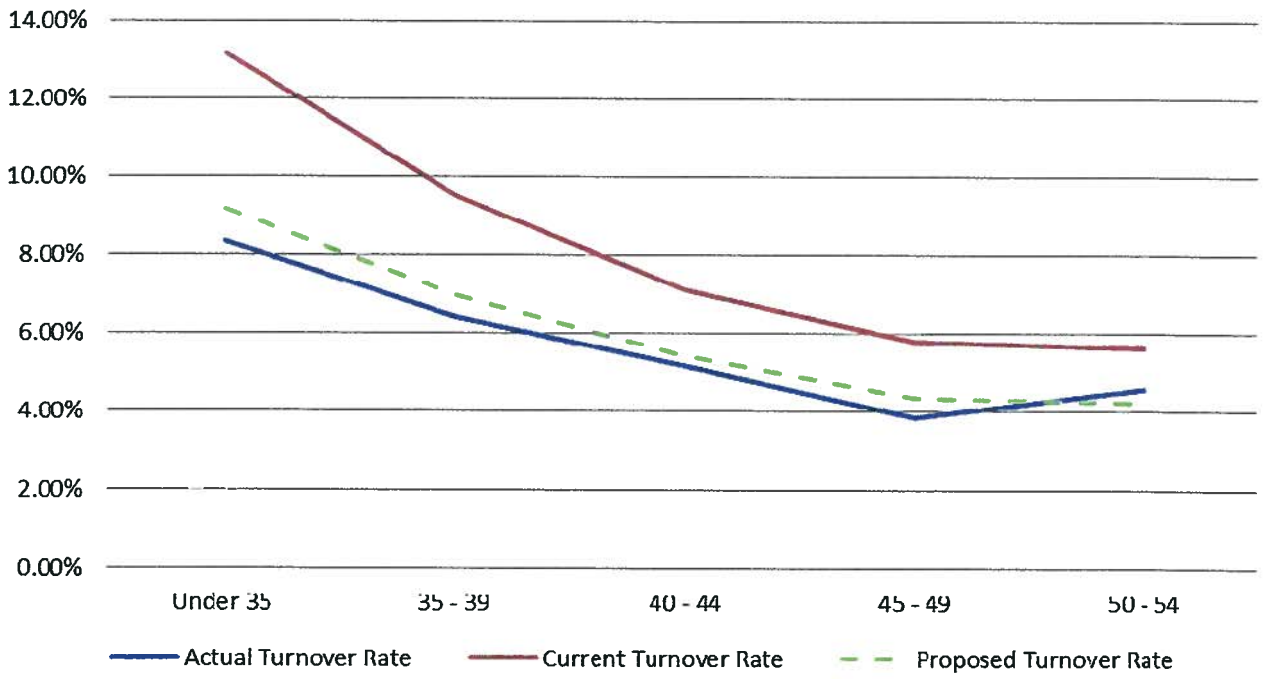


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Others

Ultimate Unisex Rates

Age Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
Under 35	4,036	338	531.3	63.62%	372.0	90.87%
35 – 39	5,780	373	550.1	67.81%	404.3	92.25%
40 – 44	9,497	492	676.0	72.78%	518.4	94.90%
45 – 49	15,459	596	896.5	66.48%	677.9	87.93%
50 – 54	10,360	477	584.7	81.59%	440.3	108.34%
Total	**45,132**	**2,276**	**3,238.5**	**70.28%**	**2,412.9**	**94.33%**

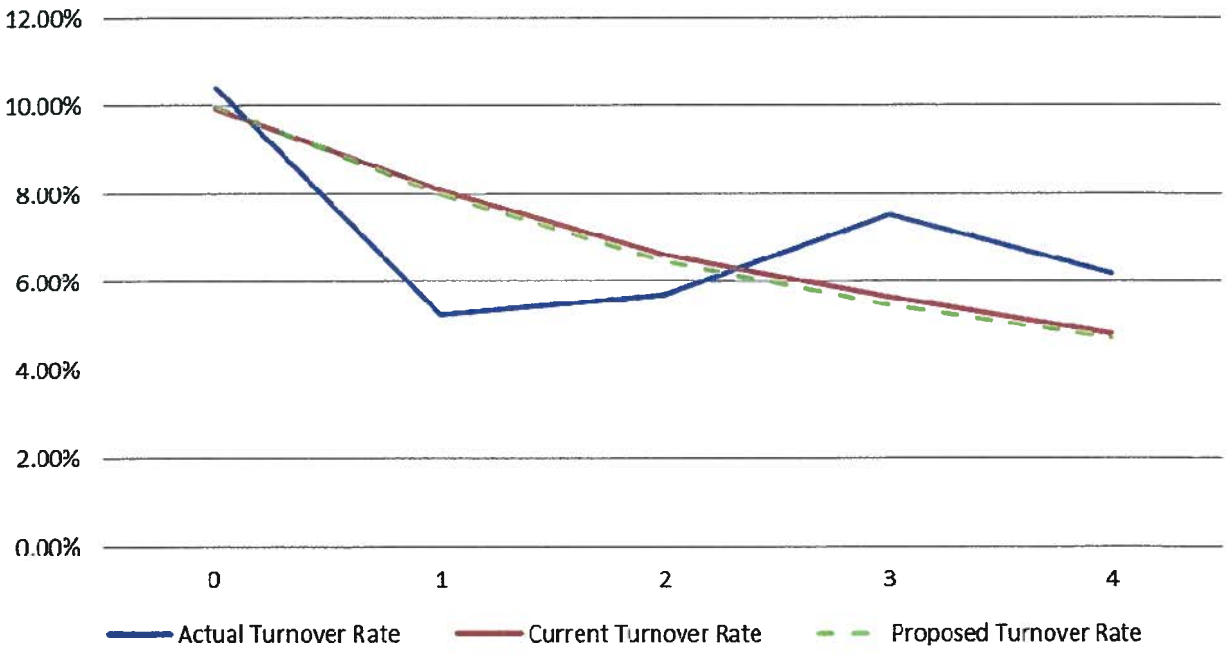


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Peace Officer/Firefighter

5-year Select Period; Males

Service Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
0 – 0.99	393	41	39.1	104.94%	39.3	104.33%
1 – 1.99	513	27	41.5	65.11%	41.0	65.79%
2 – 2.99	647	37	42.9	86.35%	42.1	87.98%
3 – 3.99	624	47	35.4	132.80%	34.3	136.95%
4 – 4.99	548	34	26.5	128.35%	26.0	130.62%
Total	**2,725**	**186**	**185.3**	**100.39%**	**182.7**	**101.78%**

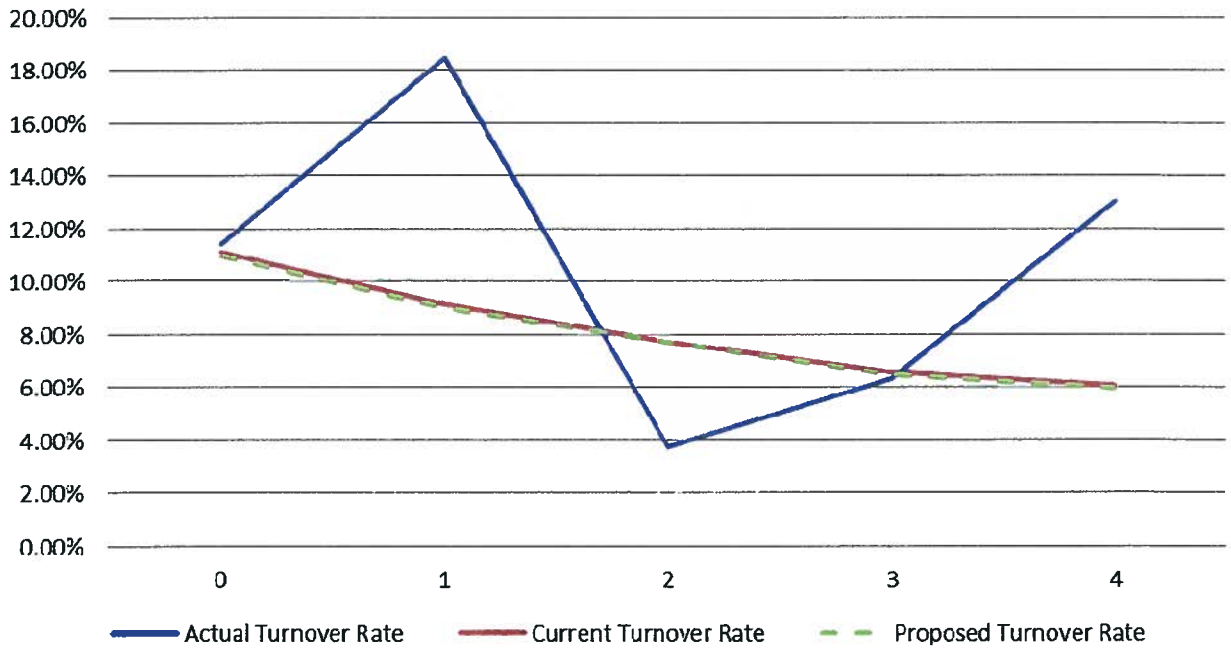


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Peace Officer/Firefighter

5-year Select Period; Females

Service Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
0 – 0.99	61	7	6.8	103.24%	6.7	104.32%
1 – 1.99	92	17	8.4	201.90%	8.3	205.31%
2 – 2.99	106	4	8.2	48.78%	8.2	48.69%
3 – 3.99	110	7	7.2	96.91%	7.2	97.90%
4 – 4.99	107	14	6.5	215.91%	6.4	218.07%
Total	**476**	**49**	**37.1**	**132.05%**	**36.8**	**133.24%**

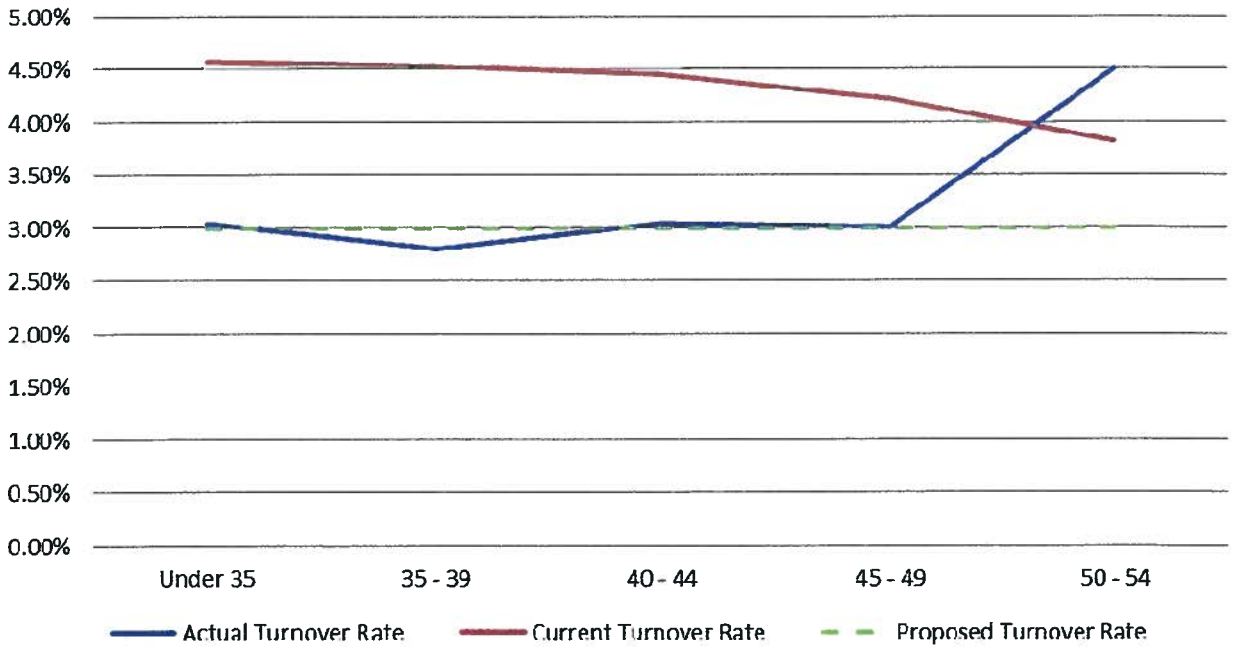


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Peace Officers/Firefighters

Ultimate Rates; Males

Age Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
Under 35	1,017	31	46.6	66.56%	30.5	101.61%
35 – 39	1,352	38	61.2	62.11%	40.6	93.69%
40 – 44	1,117	34	49.7	68.48%	33.5	101.46%
45 – 49	796	24	33.6	71.39%	23.9	100.50%
50 – 54	421	19	16.1	118.34%	12.6	150.44%
Total	**4,703**	**146**	**207.1**	**70.50%**	**141.1**	**103.48%**

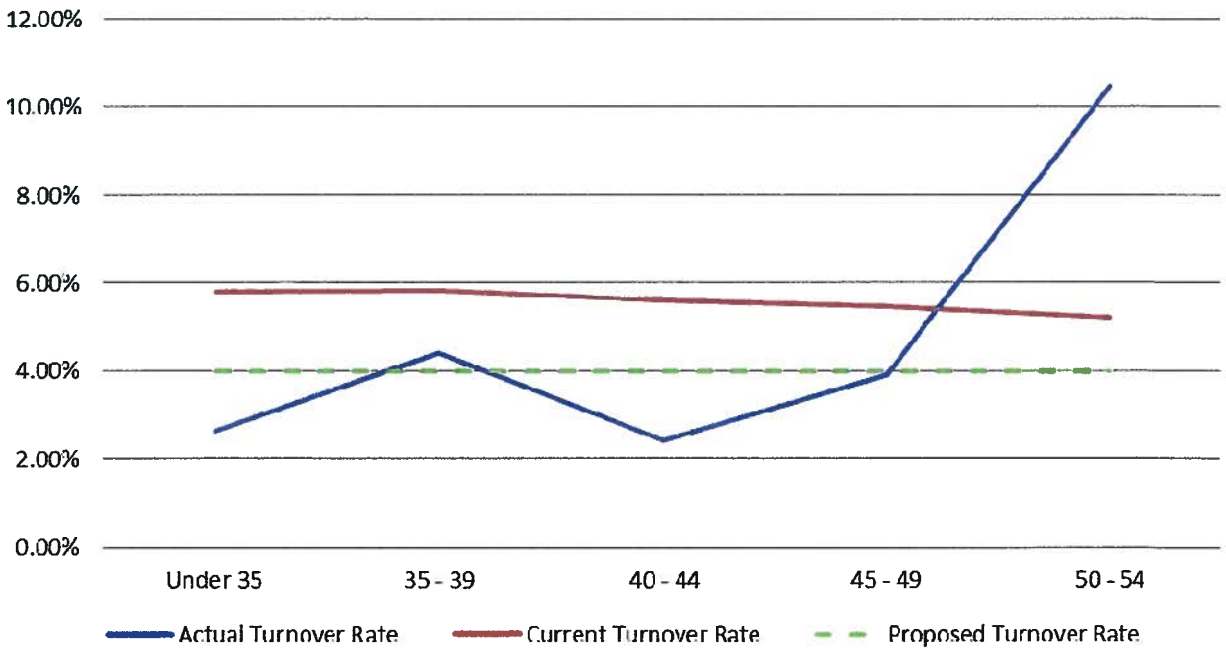


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – PERS Peace Officers/Firefighters

Ultimate Rates; Females

Age Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
Under 35	151	4	8.7	45.80%	6.0	66.23%
35 – 39	226	10	13.1	76.07%	9.0	110.62%
40 – 44	206	5	11.5	43.37%	8.2	60.68%
45 – 49	178	7	9.7	71.81%	7.1	98.31%
50 – 54	105	11	5.5	201.24%	4.2	261.90%
Total	**866**	**37**	**48.6**	**76.09%**	**34.6**	**106.81%**

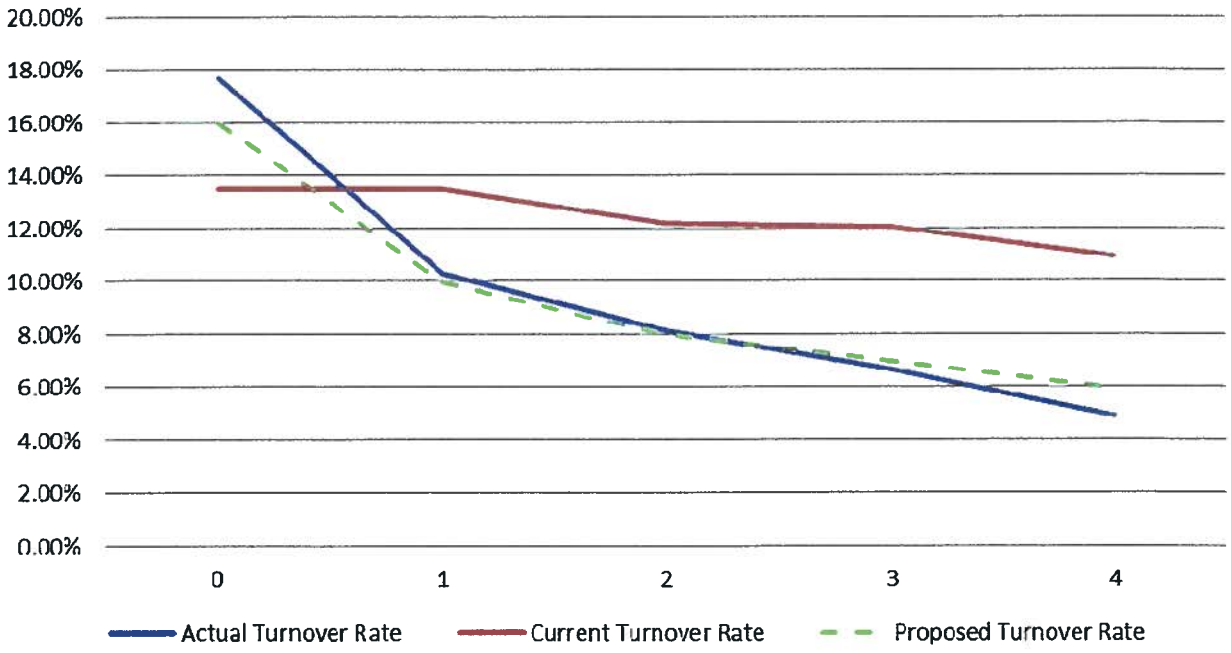


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – TRS

5-year Unisex Select Period

Service Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
0 – 0.99	395	70	53.3	131.41%	63.2	110.76%
1 – 1.99	1,581	163	212.9	76.58%	158.1	103.10%
2 – 2.99	1,938	158	236.4	66.84%	155.0	101.91%
3 – 3.99	2,291	153	275.8	55.48%	160.4	95.40%
4 – 4.99	2,169	107	237.3	45.09%	130.1	82.22%
Total	**8,374**	**651**	**1,015.6**	**64.10%**	**666.9**	**97.62%**

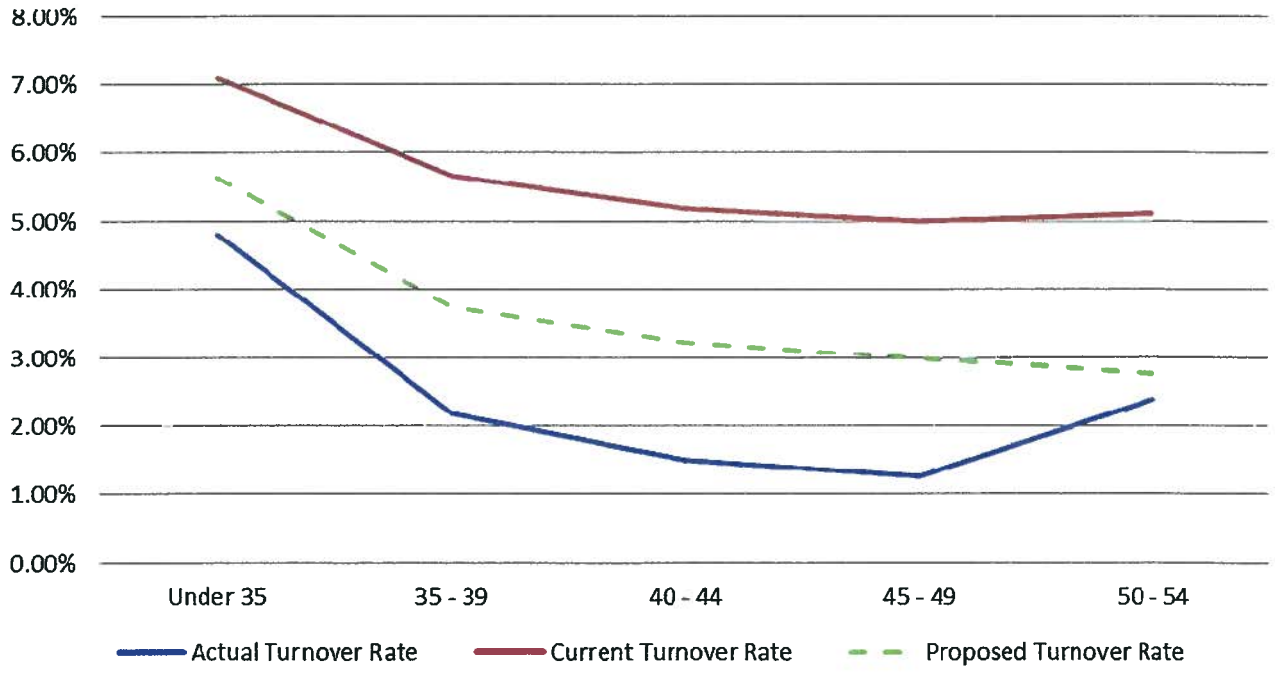


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

TURNOVER RATES – TRS

Unisex Ultimate Rates

Age Range	Exposures	Actual Turnover	Expected Turnover	Ratio of Actual to Expected	Proposed Turnover	Ratio of Actual to Proposed
Under 35	2,469	119	175.2	67.91%	139.7	85.21%
35 – 39	3,697	81	209.3	38.70%	138.7	58.41%
40 – 44	4,100	62	212.4	29.19%	133.2	46.55%
45 – 49	4,145	53	207.7	25.52%	124.4	42.62%
50 – 54	2,831	68	144.7	47.00%	78.7	86.38%
Total	**17,242**	**383**	**949.3**	**40.34%**	**614.6**	**62.32%**



III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Retirement and Terminated Vested Retirement Age

Retirement from active status

Under the plans, members are eligible to retire following attainment of various eligibilities. In general, the normal retirement eligibility conditions for the various plans/tiers are:

PERS Others Tier 1: Age 55 with 5 years of service or 30 years of service
PERS Others Tiers 2 & 3: Age 60 with 5 years of service or 30 years of service

PERS Peace Officer/Firefighter Tier 1: Age 55 with 5 years of service or 20 years of service
PERS Peace Officer/Firefighter Tiers 2 & 3: Age 60 with 5 years of service or 20 years of service

TRS Others Tier 1: Age 55 with 8 years of service or 25 years of creditable service (20 years of membership service)
TRS Others Tier 2: Age 60 with 8 years of service or 25 years of creditable service (20 years of membership service)

Participants are allowed to retire early with an actuarially reduced benefit if they meet the following eligibility:

PERS Others Tier 1: Age 50 with 5 years of service
PERS Others Tiers 2 & 3: Age 55 with 5 years of service

PERS Peace Officer/Firefighter Tier 1: Age 50 with 5 years of service
PERS Peace Officer/Firefighter Tiers 2 & 3: Age 55 with 5 years of service

TRS Others Tier 1: Age 50 with 8 years of service
TRS Others Tier 2: Age 55 with 8 years of service

The retirement assumptions are significant in order to predict the relative importance of retirement benefits versus ancillary (i.e., death and disability) benefits, and to properly measure the overall magnitude of retirement liabilities.

The actual number of retirements was generally more than expected for those retiring with an actuarially reduced benefit and lower than expected for those retiring with an unreduced benefit (shown in the following table). Male and female actual experience was generally consistent with one another (meaning that when actual retirements were more than expected, both male and female experience was more than expected and vice versa).

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Reduced Retirement	Exposures	Actual Retirement	Expected Retirement	Ratio of Actual to Expected Retirement
PERS Others				
Female	9,232	716	662	108.16%
Male	7,420	515	526	97.93%
Total	**16,652**	**1,231**	**1,188**	**103.63%**
Reported by Buck		**1,380**	**1,218**	**113.30%**
PERS Peace Off./Fire.				
Female	126	9	14	63.23%
Male	401	28	47	60.04%
Total	**527**	**37**	**61**	**60.79%**
Reported by Buck		**48**	**63**	**76.19%**
TRS				
Female	2,221	168	159	105.78%
Male	920	77	56	136.65%
Total	**3,141**	**245**	**215**	**113.87%**
Reported by Buck		**253**	**225**	**112.44%**

Unreduced Retirement	Exposures	Actual Retirement	Expected Retirement	Ratio of Actual to Expected Retirement
PERS Others				
Female	6,958	1,358	1,453	93.49%
Male	5,920	1,239	1,332	93.01%
Total	**12,878**	**2,597**	**2,785**	**93.26%**
Reported by Buck		**2,548**	**2,903**	**87.77%**
PERS Peace Off./Fire.				
Female	258	46	54	85.95%
Male	1,209	207	253	81.96%
Total	**1,467**	**253**	**306**	**82.66%**
Reported by Buck		**255**	**323**	**78.95%**
TRS				
Female	5,036	707	926	76.35%
Male	2,653	356	487	73.07%
Total	**7,689**	**1,063**	**1,413**	**75.22%**
Reported by Buck		**1,042**	**1,410**	**73.90%**

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Currently, the retirement assumption used in the valuations is based on the members' age and gender, and whether or not they are eligible for reduced or unreduced retirement benefits. We did examine experience by gender to determine whether there is enough difference in male and female experience to warrant using separate sex-distinct tables for the retirement assumption. However, we did not see a large enough difference in the experience data for any of the groups to recommend continued use of sex-distinct rates for these plans.

Actual experience for PERS Others members retiring with a reduced benefit was slightly more than expected, yet approximately 7% less than expected for members retiring with an unreduced benefit. Similarly, actual experience for TRS members retiring with a reduced benefit was approximately 14% more than expected and 25% less than expected for members retiring with an unreduced benefit. Therefore, we would recommend decreasing the retirement rates for ages associated with reduced benefits (particularly for TRS; PERS Others will remain largely unchanged) and increasing the rates for ages associated with unreduced benefits.

Actual experience for PERS Peace Officers/Firefighters was less than expected for members at both reduced and unreduced benefits. Therefore, we would recommend an overall increase in retirement rates for this group.

According to the experience data for PERS Others and TRS, there are more than a de minimum number of exposures older than age 70. Based on this analysis, we would have recommended 100% retirement at age 75 for these two groups. Buck's recommendation included raising the 100% retirement age for all three groups: age 70 for PERS Peace Officer/Firefighter, age 85 for TRS, and age 90 for PERS Others. In our opinion, this extends the assumed retirement age beyond what we believe is reasonable and could lead to experience losses in future valuations.

Our analysis revealed that a sizeable portion of members that "retire" from active status do not immediately commence payment of their annuity and, instead, defer payment to a later age. Based on our review of the data, and the members that fall into this category, 50% of members in PERS Other and TRS and 35% of members in PERS Peace Officer/Firefighter that retire with a reduced benefit defer payment to a later age. In addition, 10% of members in PERS Other, 17% of members in TRS, and 7% of members in PERS Peace Officer/Firefighter that retire with an unreduced benefit defer payment to a later age. This experience is not common, but we would recommend Buck study this experience and consider an additional assumption to defer payments for these members.

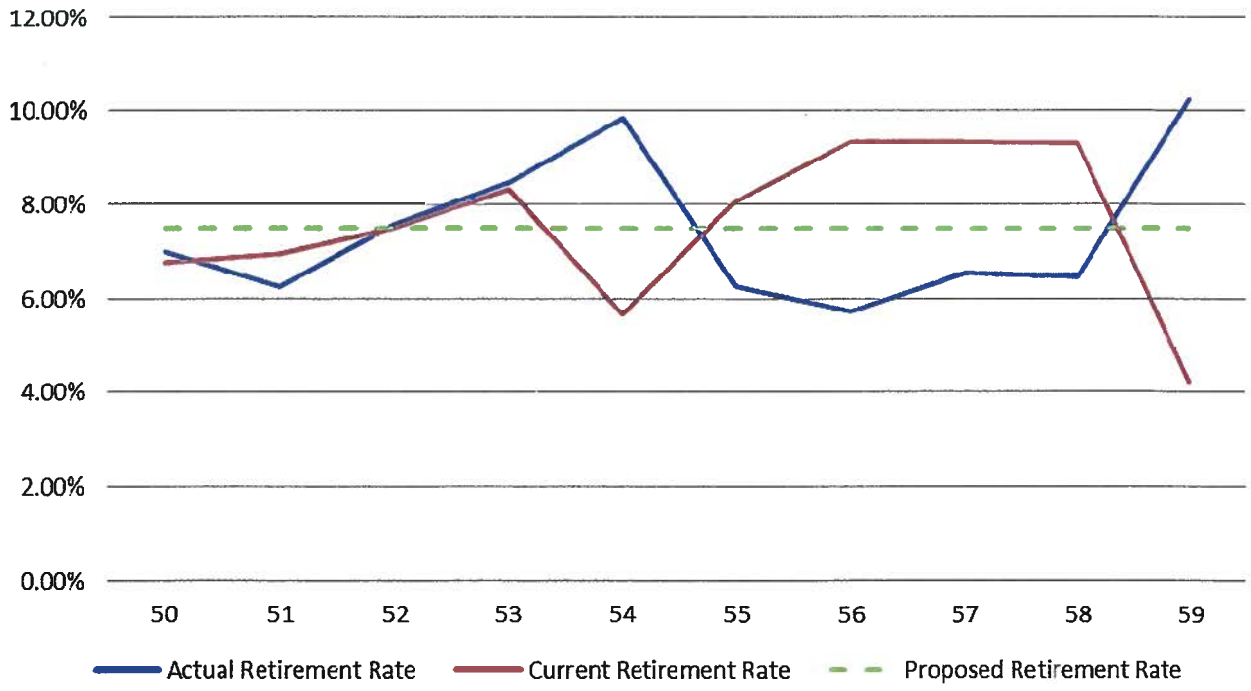
In addition, we recommended that Buck study the retirement experience separately for Tier 1 and Tier 2 (plus Tier 3 in the the case of PERS) since these groups have different retirement eligibility criteria. It would not be unusual for separate rates to apply for Tier 1 and Tier 2/3, or at least introduce a "bump" in rates at the first eligibility age for each Tier.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – PERS Others

Reduced Benefit; Unisex Rates

Age	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
50	1,614	113	103.3	109.34%	121.1	93.35%
51	1,693	106	112.5	94.24%	127.0	83.48%
52	1,754	133	125.9	105.62%	131.6	101.10%
53	1,816	154	143.7	107.14%	136.2	113.07%
54	1,672	165	89.3	184.69%	125.4	131.58%
55	1,949	122	147.0	82.98%	146.2	83.46%
56	1,777	102	154.4	66.07%	133.3	76.53%
57	1,588	104	136.7	76.07%	119.1	87.32%
58	1,433	93	121.8	76.33%	107.5	86.53%
59	1,356	139	47.6	261.73%	101.7	136.68%
Total	**16,652**	**1,231**	**1,187.9**	**103.63%**	**1,248.9**	**98.57%**

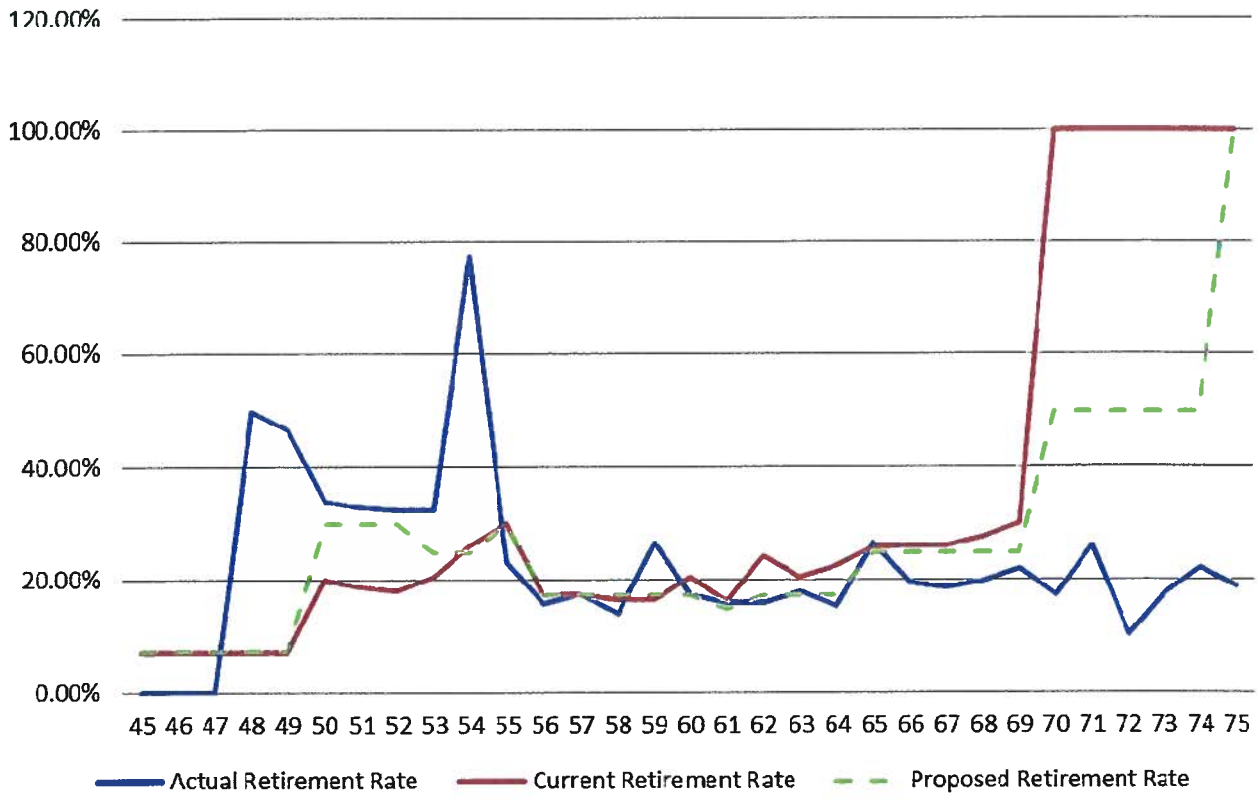


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – PERS Others

Unreduced Benefit; Unisex Rates

Age Range	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
45 – 49	37	17	0.9	1990.63%	2.8	612.61%
50 – 54	525	285	58.8	484.30%	141.0	202.20%
55 – 59	5,434	1,064	1,020.2	104.29%	1,142.7	93.11%
60 – 64	5,220	870	1,027.1	84.71%	881.8	98.66%
65 – 69	1,356	303	374.0	81.02%	339.0	89.38%
70 – 74	232	44	229.6	19.17%	116.0	37.93%
75+	74	14	74.0	17.49%	74.0	18.92%
Total	**12,878**	**2,597**	**2,784.6**	**93.26%**	**2,697.3**	**96.28%**

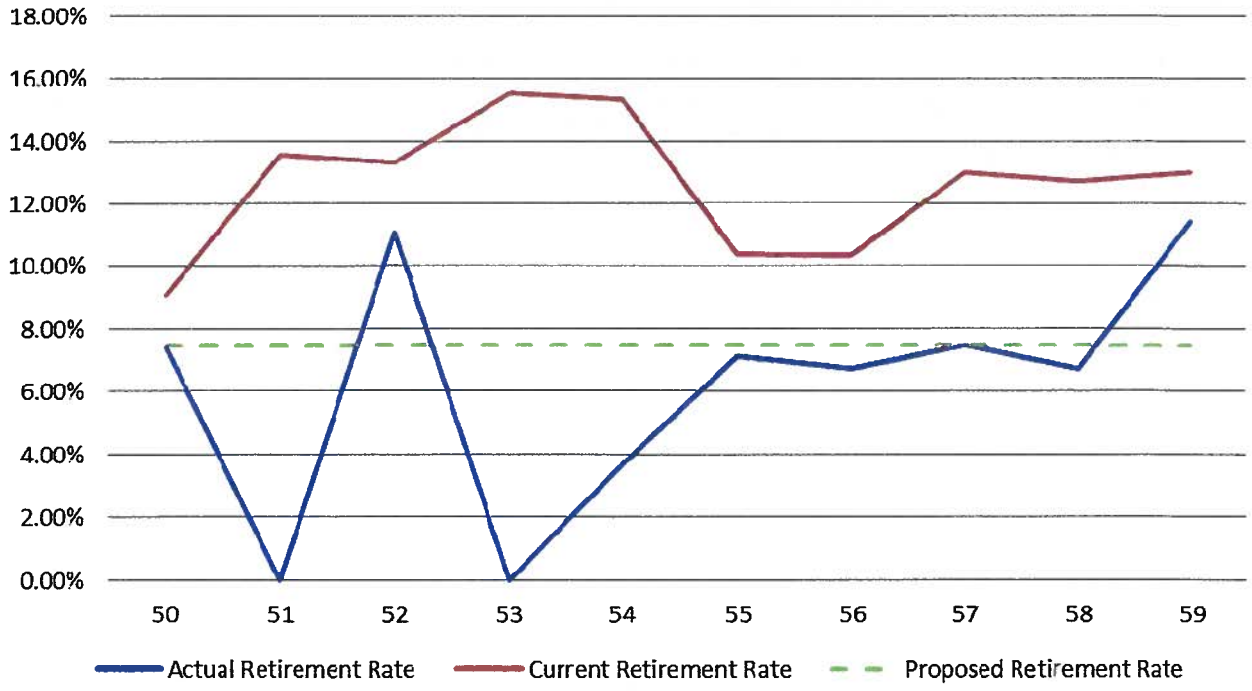


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – PERS Peace Officer/Firefighter

Reduced Benefit; Unisex Rates

Age	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
50	27	2	2.5	81.40%	2.0	98.77%
51	23	0	3.1	0.00%	1.7	0.00%
52	27	3	3.4	87.59%	2.0	148.15%
53	21	0	3.3	0.00%	1.6	0.00%
54	27	1	3.8	26.01%	2.0	49.38%
55	98	7	9.5	73.50%	7.4	95.24%
56	89	6	8.9	67.40%	6.7	89.89%
57	80	6	9.9	60.73%	6.0	100.00%
58	74	5	8.9	56.02%	5.6	90.09%
59	61	7	7.5	92.96%	4.6	153.01%
Total	**527**	**37**	**60.9**	**60.79%**	**39.5**	**93.61%**

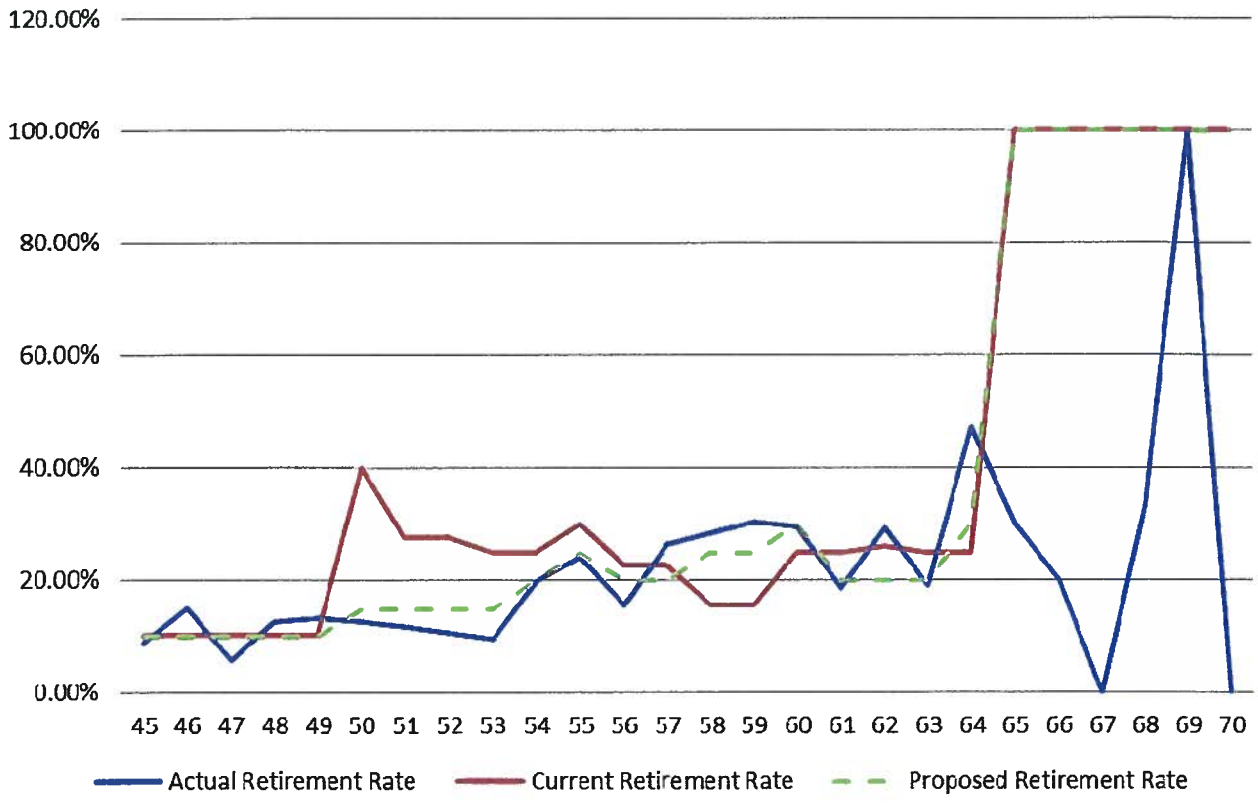


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – PERS Peace Officer/Firefighter

Unreduced Benefit; Unisex Rates

Age Range	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
45 – 49	433	46	32.0	143.65%	43.3	106.24%
50 – 54	446	58	122.4	47.40%	71.5	81.18%
55 – 59	327	78	72.4	107.69%	75.2	103.79%
60 – 64	238	64	57.3	111.73%	58.3	109.78%
65+	23	7	22.0	31.82%	23.0	30.43%
Total	**1,467**	**253**	**306.1**	**82.66%**	**271.2**	**93.29%**

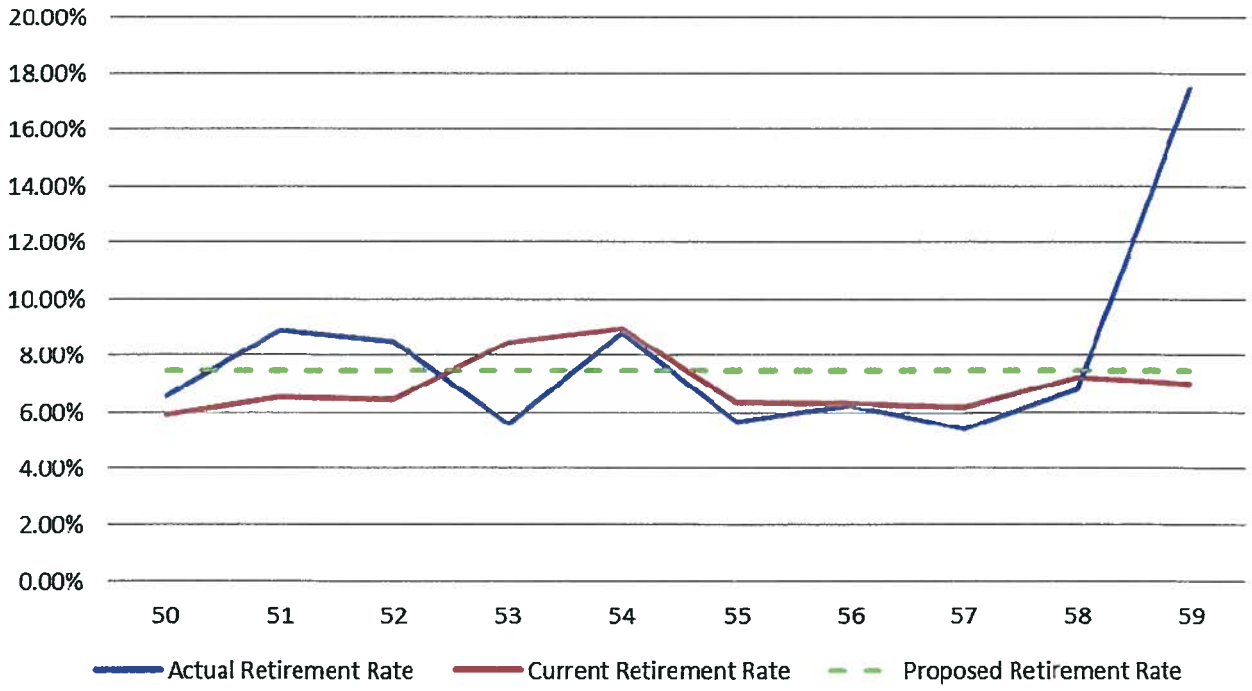


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – TRS

Reduced Benefit; Unisex Rates

Age	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
50	258	17	15.3	111.35%	18.1	94.13%
51	281	25	18.4	136.17%	19.7	127.10%
52	282	24	18.2	132.04%	19.7	121.58%
53	267	15	22.6	66.47%	18.7	80.26%
54	249	22	22.3	98.83%	17.4	126.22%
55	440	25	28.0	89.19%	30.8	81.17%
56	415	26	26.1	99.45%	29.1	89.50%
57	350	19	21.6	87.94%	24.5	77.55%
58	308	21	22.3	94.04%	21.6	97.40%
59	291	51	20.4	249.78%	21.8	233.68%
Total	**3,141**	**245**	**215.2**	**113.87%**	**235.6**	**104.00%**

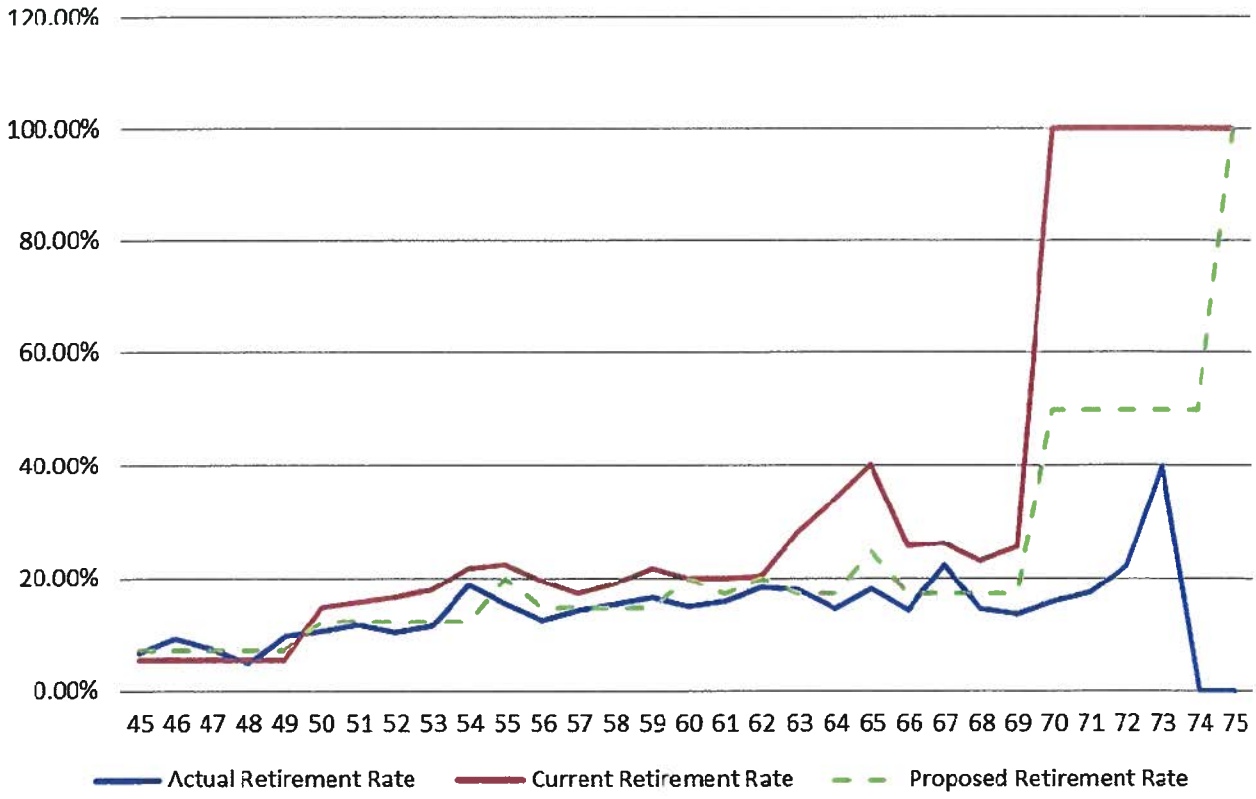


III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

RETIREMENT RATES – TRS

Unreduced Benefit; Unisex Rates

Age Range	Exposures	Actual Rets.	Expected Rets.	Ratio of Actual to Expected	Proposed Rets.	Ratio of Actual to Proposed
45 – 49	1,079	83	48.7	170.54%	80.9	102.56%
50 – 54	2,006	261	338.3	77.14%	250.8	104.09%
55 – 59	2,580	384	503.6	76.25%	419.3	91.58%
60 – 64	1,581	258	345.6	74.66%	296.6	87.00%
65 – 69	375	65	111.1	58.51%	75.9	85.64%
70 – 74	56	11	54.0	20.37%	28.0	39.29%
75+	12	1	12.0	8.33%	12.0	8.33%
Total	**7,689**	**1,063**	**1,413.3**	**75.22%**	**1,163.4**	**91.37%**



III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Retirement from deferred vested status

The current benefit commencement assumption for deferred vested members is that payments will begin at their earliest retirement age. We agree with Buck's assessment that actual experience shows that these members are waiting longer to retire. Buck's recommendation to change the PERS Others and TRS assumption to the earliest unreduced age and age 53 for Tier 1 and age 60 for Tier 2 and Tier 3 for PERS Peace Officer/Firefighter is reasonable.

Disability Retirement

The table below compares the actual and expected disability retirement counts of our analysis of the data and Buck's analysis.

Disability Retirements	Actual Disabilities	Expected Disabilities	Ratio of Actual Disabilities to Expected
PERS Others			
Female	38	85	44.71%
Reported by Buck	**37**	**83**	**44.58%**
Male	33	74	44.59%
Reported by Buck	**33**	**72**	**45.83%**
PERS Peace Off./Fire.			
Female	3	4	75.00%
Reported by Buck	**3**	**4**	**75.00%**
Male	15	22	68.18%
Reported by Buck	**15**	**21**	**71.43%**
TRS			
Female	13	26	50.00%
Reported by Buck	**13**	**26**	**50.00%**
Male	5	15	33.33%
Reported by Buck	**5**	**14**	**35.71%**

As the table above demonstrates, we matched Buck's counts very closely (in many cases, exactly). Based on the experience data, we believe Buck's recommendations for changes to the disability retirement rates are reasonable.

Withdrawal of Contributions at Termination

Active members who terminate with a vested benefit have the option of withdrawing their contributions with interest or leaving their account balances in the plan and therefore be entitled

to a deferred annuity at retirement. In most cases, it is more valuable to a member to leave their balances in the plan and receive the deferred retirement annuity. However, in some cases the value of the contributions with interest may have a greater present value than the deferred annuity, or a terminating member may simply choose to take the refund for other reasons. Following is an analysis of refund elections from the experience period for withdrawing members who were vested upon termination:

	PERS Others	PERS Peace Officer/Fire.	TRS
Number of member who terminated vested	4,920	292	947
Terminating members who elected a refund	865	118	30
Rate electing refunds	**17.6%**	**40.4%**	**3.2%**
Reported by Buck	**11%**	**22%**	**2%**

We agree with Buck that, based on the data, a small amount of TRS members elect a refund of contributions, and do not disagree with maintaining a relatively small election percentage (10%) for this group. We were unable to match the rate electing refunds for PERS and were significantly higher than Buck's values for both groups. We recommend Buck review the data, monitor this experience and revise this assumption if warranted.

An alternative method for valuing the refund of contributions benefit is to assume that terminated members will elect the choice that has the greatest value to them on an individual basis. Then, as part of the valuation program, the liability associated with the turnover decrement is equal to the larger of the present value of a deferred annuity or the amount of accumulated member contributions with interest.

Other Demographic Assumptions

Marriage Assumption, Age Difference, and Number of Dependent Children

We reviewed the data and proposed assumptions related to percent married, age difference between husbands and wives, and number of dependent children.

The assumptions regarding percent married and age difference between husbands and wives can have a noticeable impact on the value of retiree health care benefits. In developing their assumption, Buck reviewed the marital status of all members who are eligible to retire. However, since only a fraction of retirees under age 60 are assumed to elect health care coverage, the experience of the retirees under age 60 should be reviewed separately to ensure that the assumption is appropriate for this subset of the retirees. We performed such an analysis, and conclude that the current assumption is appropriate.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

When reviewing the age difference between husbands and wives, Buck looked at the age spread for all retirees electing the joint and survivor form of payment. Since the assumption is applied to future retirees, we would suggest that Buck instead focus on new retirees when evaluating the appropriateness of the assumption. In many plans, we have observed a trend over time towards a smaller age spread between husband and wife among new retirees. Using retirees currently under age 65 as a proxy for "newer retirees", the 2009 data shows:

Average age spread between husband and wife		
2009 Data	**Male retirees**	**Female retirees**
All retirees	3.7 years	1.7 years
Retirees under age 65 ("newer retirees")	2.9 years	1.8 years
Assumption	**3.0 years**	**3.0 years**

While the age spread between husbands and wives for younger (newer) female retirees is similar to the age spread for the entire female retiree population, the age spread for male retirees is noticeably younger for newer retirees.

While the current 3-year age spread assumption for both male and female retirees is not unreasonable, Buck should consider a separate assumption for male and female retirees, and monitor any trend towards a smaller age spread among new retirees.

Alaska Residency

Since payment of the Alaska cost of living allowance is predicated on a benefit recipient's residence in Alaska, this assumption is important as the Alaska COLA has considerable value.

	PERS Others	PERS Peace Officer/Fire.	TRS
Number of benefit recipient exposures	92,708	10,767	45,907
Number of recipients receiving Alaska COLA	56,298	6,475	25,509
Portion receiving Alaska COLA	**60.7%**	**60.1%**	**55.6%**
Reported by Buck	**61%**	**59%**	**55%**
Total benefit amount of all COLA eligible benefit recipient exposures (in thousands)	109,385	23,832	93,396
Total benefit amount of recipients receiving Alaska COLA (in thousands)	75,396	15,622	57,531
Portion receiving Alaska COLA	**68.9%**	**65.5%**	**61.6%**
Reported by Buck	**69%**	**65%**	**61%**

We matched the counts reported by Buck very closely and we agree with their recommended assumptions of 70% for PERS members and 60% for TRS members.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Number of Unused Sick Days (TRS only)

This assumption is used to estimate the amount of additional service credit TRS members will receive due to unused sick days at retirement. The current assumption is that a member's service will be increased by 2.73% (or 4.7 days for each year of service).

	Segal's Analysis	Reported by Buck
Total benefit amount for all retirees	$ 74,700,118	$ 74,700,118
Total sick leave benefit amount for all retirees	$ 1,749,999	$ 1,750,000
Portion receiving sick leave benefit	2.34%	2.34%

Our analysis matched Buck's calculations exactly and we agree with their recommendation to stay with the more conservative 2.73% assumption until more experience data can be gathered.

Part-time Service Earned During the Year

For those active members who are employed on a part-time basis, an assumption is made regarding what portion of a year of service they will accrued in each future valuation year. For PERS Others the assumption is 0.65 years and for TRS the assumption is 0.55 years. There is no assumption made for PERS Peace Officer/Firefighter with respect to part-time service earned.

	PERS Others	TRS
Average increase in service	**0.64**	**0.58**
Reported by Buck	**0.66**	**0.61**

We agree with Buck's recommendations to increase the assumption for TRS from 0.55 to 0.60 years and to keep the PERS Others assumption at 0.65 years.

Occupational versus Non-occupational Disability and Death

Due to different benefits that are payable to members who become disabled or die due to occupational causes (death only, in the case of TRS), an assumption is made as to the proportion of disabilities that occur for occupational reasons. While there is insufficient data available to analyze occupational versus non-occupational causes of death, there is data regarding the number of disabled members currently receiving occupational or non-occupational disability benefits. The proportion of disability benefit recipients that are from occupational causes can be used as a proxy for what portion of future disabilities will be occupational.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

	PERS Others	PERS Peace Officer/Fire.
Members receiving a non-occupational disability benefit	788	105
Member receiving an occupational disability benefit	836	187
Portion of disability benefits that are occupational	**51.5%**	**64.0%**
Reported by Buck	**52%**	**64%**

Our analysis matched Buck's calculations exactly and we have no issue with their recommendation to increase the assumption for PERS Others from 50% to 55% and to maintain the assumption for PERS Peace Officers/Firefighters at 75%. Both assumptions appear to be slightly conservative compared to an analysis of the data and we believe this is reasonable.

With the lack of data regarding deaths from active status due to occupational versus non-occupational reasons, it is within reason to assume that actual experience would mimic that of disabilities. Therefore, we agree with the recommendations relative to the PERS assumptions for the proportion of active deaths due to occupational reasons (i.e., 55% for Others and 75% for Peace Officers/Firefighters).

For TRS, the existing assumption was 0% of deaths are occupational, but for conservatism and consistency between the DCR and DB valuations, this assumption was increased to 15%. We agree that there should be consistency between the DCR and DB valuations. However, a 15% assumption for occupational deaths in a plan that covers primarily teachers is on the high-end relative to what we see from other teacher plans. As a result, this assumption may be a little too conservative.

ECONOMIC ASSUMPTIONS

The economic assumptions have a significant impact on the development of plan liabilities. Changes to these assumptions can substantially alter the results determined by the actuary. The goal of an experience study is to produce a consistent set of economic assumptions that appropriately reflect expected future economic trends.

The primary economic assumptions that affect the Plan's funding are:

- Inflation;
- Investment Rate of Return;
- Salary Scale;
- Payroll Growth Rate; and
- Administration Expenses

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

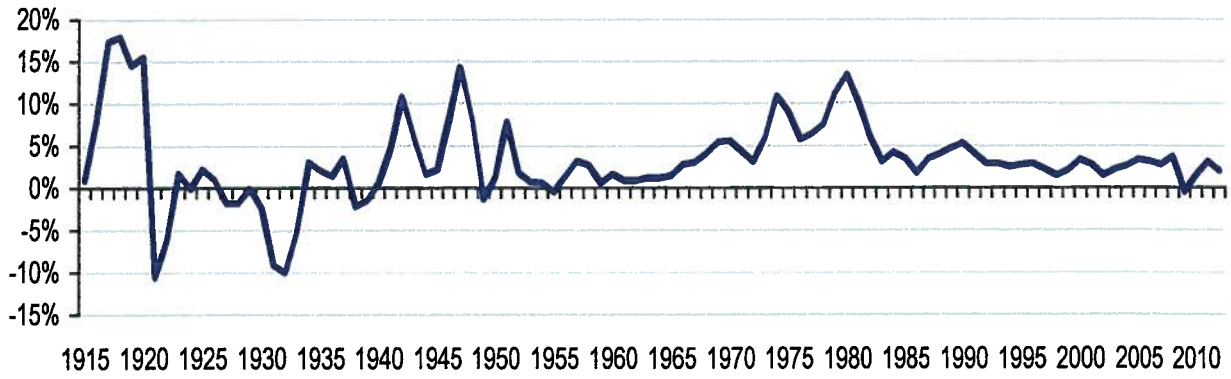
The Actuarial Standards Board (ASB) has adopted Actuarial Standard of Practice No. 27 (ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations) to provide actuaries guidance in developing economic assumptions. A key feature of the ASB's guidance is the "building block" approach in developing economic assumptions.

The "building block" approach uses the actuary's best estimate for key components of economic assumptions. The actuary begins with a reasonable range of each component then selects a specific point within the range based on historical data, plan specific data and future economic environment.

The inflation component is included in all economic assumptions, and therefore is key to developing a consistent set of actuarial assumptions. The investment rate of return assumption includes an inflation component and a real rate of return component. The components of the salary increase assumption are inflation, productivity, and merit increases. The components of the payroll growth assumption include inflation and productivity.

Inflation

Inflation continues at relatively low levels from a historical perspective, as shown in the graph below.



In developing the recommendation for the assumed inflation component, actuarial standards of practice suggest the actuary review appropriate inflation data. This data may include consumer price indexes, the implicit price deflator, forecasts of inflation, and yields on government securities of various maturities. For this study, we referred to commonly referenced historical measures of inflation: the "Anchorage, AK" consumer price index and National Consumer Price Index for all urban consumers (CPI-U).

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

The table below shows that recent inflation experience (measured up through June 2009) was well below the longer-term average rate.

Average Annual Change	Anchorage, AK	CPI-U
Past 5 Years	2.51%	2.60%
Past 10 Years	2.45%	2.64%
Past 20 Years	2.70%	2.80%

The average annual rate of increase in the CPI-U in the 2000s has been at its lowest levels since the early 1960s. Regional inflation has been close to, but slightly less than, National CPI. Historical trend is a less important consideration for the assumed rate of inflation, but assists in determining the reasonable bounds of expected inflation.

Next, we would also consider the measure of future inflation expectation. An indication of future expectation is a market-based forecast. Treasury Inflation Protection Securities (TIPS) are government bonds, which, in addition to a fixed yield, add the actual percentage change in CPI to the principal value. Therefore, the spread between the TIPS and the Conventional Treasury note/bond of the same maturity is an indication of the market's forecast for inflation.

Because of the inflation protection, TIPS' yields are almost always considerably lower than those of regular Treasury securities of similar maturities. As of the end of May 2010 (around the time when the Buck study was being prepared), 30-year Treasuries yielded 2.39% more than 30-year TIPS. This means that for 30-year TIPS to match the return of the conventional 30-year Treasury for a buy-and-hold income investor, inflation would have to measure 2.39% per year over the next 30 years. The market's expectation of inflation alone is not a definitive basis for an inflation assumption, but is useful as one indicator of future trends.

Considering this information, we would have determined a reasonable range to be between 2.50% and 3.00%.

As a check of the validity of this reasonable range, we reference the *2010 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (2010 OASDI Trustees Report).* The range of inflation rates in this report was 1.80% for the low-cost projection, 2.80% for the intermediate projection, and 3.80% for the high-cost projection. The 2.80% assumptions used in the OASDI report falls within our established reasonable range.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Once the reasonable range is set, we determine the specific point in the range that is the best estimate of long-term future inflation rates. The current inflation assumption is 3.50% per annum. Buck's experience study report recommended a reasonable range between 3.00% and 3.50%, but did not offer a recommendation as to a specific assumption with that range. Based on all of the above information, we would have recommended that the assumption be lowered to 3.00%.

Investment Return

The investment rate of return is used to determine the present value of expected future plan payments. The existing assumption was 8.25%, net of all (i.e., investment and administrative) expenses.

The investment rate of return assumption is developed using the "building block" approach as outlined in ASOP 27. Under this approach, the investment rate of return assumption is made up of two components; the inflation component and the real rate of return component, with adjustment for investment expense and risk. The reasonable range of the real rate of return component is combined with the inflation assumption to determine a reasonable range of the investment return. The selection of an investment return assumption considers historical returns, capital market outlook and the Plan's portfolio mix.

In developing the real rate of return, we examined the capital market assumptions used by The Segal Group's investment consulting department, Segal Advisors. The assumptions for the asset classes and the portfolio's expected real return as of 2010 are shown below.

Asset Class	Real Return	Target Allocation	Weighted Average
Domestic Equities	5.75%	30%	1.73%
Global Equities (non-U.S.)	6.33%	22%	1.39%
Fixed Income	1.65%	20%	0.33%
Real Assets	4.50%	16%	0.72%
Private Equity	5.87%	7%	0.41%
Absolute Return	5.00%	5%	0.25%
Total		**100%**	**4.83%**

The real rate of return for the portfolio needs to be reduced to account for expenses. If administrative expenses are included as a component of the plan's normal cost, then the adjustment to the real rate of return needs to include only investment expenses. Since Buck does not include a provision for administrative expenses in normal cost, this adjustment should include both investment and administrative expenses.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

The investment and administrative expenses as a percent of the average actuarial value of assets for the past four years are shown on the following table.

Year Ended June 30	Average Actuarial Value of Assets (000's)	Admin and Investment Expenses (000's)	
		Amount	Percent
2009	$15,940,777	$35,120	0.22%
2008	14,424,768	42,887	0.29%
2007	13,002,741	38,306	0.29%
2006	12,223,682	38,240	0.31%
Total	**$55,591,968**	**$154,553**	**0.28%**

The real rate of return assumption for the portfolio should also be adjusted to reflect potential risk of shortfalls in the return assumptions. The Plan's asset allocation determines this portfolio risk, since volatility varies by asset class.

The purpose of this risk adjustment is to increase the likelihood of achieving the expected investment return. The 4.83% expected real rate of return is the expected average arithmetic return and is expected to be met or exceeded 50% of the time. The risk adjustment is intended to increase this probability, which is consistent with our experience that retirement plan fiduciaries would generally prefer that returns exceed the assumed rate more often than not.

In our model, the confidence level represents the likelihood that the actual average return would be at least the assumed value over a 10-year period. For example, if our real rate of return assumption is set using a risk adjustment that produces a confidence level of 51%, then there would be a 51% chance that the average return over 10 years will be equal to or greater than the assumed value. The following table summarizes the components of the investment return assumption.

Assumption Component	Recommended Assumption
1. Inflation	3.00%
2. Portfolio Real Rate of Return	4.83%
3. Expenses	0.28%
4. Risk Adjustment	0.05%[4]
5. Total [(1) + (2) - (3) - (4)]	**7.50%**
6. Confidence Level	51%

[4] Based on an annual portfolio return standard deviation of 12.25%.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Based on this analysis, we would have recommended lowering the investment return assumption from 8.25% to 7.50%.

Individual Salary Increases

The salary scale assumption is used to determine participants' projected benefits provided by the Plan. Generally, a participant's salary will change over the long term in accordance with inflation, productivity growth, and merit scale. The actuary should review available compensation data when selecting this assumption, including: plan sponsor's current compensation practices and any anticipated changes; historical compensation increases and practices of the plan sponsor and other sponsors in the same industry or geographic area; and historical national wage and productivity increases.

The best estimate salary scale is generally constructed using the "building block" approach recommended in ASOP 27, which combines best-estimate ranges for the components of salary scale: inflation, productivity and merit. The inflation and productivity components are combined to produce the assumed rate of wage inflation. This rate represents the "across the board" average annual increase in salaries shown in the experience data. The merit component includes the additional increases in salary due to performance, seniority, promotions, etc.

We evaluated the historical compensation data for the experience period based on age and service. A strong service-related trend occurs for the first several years of employment in all three participant groups. For PERS Others, the trend is strong during the first 5 years; beyond this point, experience seemed to be more or less tied to age, with a decreasing trend as age increases. For the PERS Peace Officer/Firefighter and TRS participant groups, the correlation between years of employment and salary increase were stronger than the correlation with age for all years of service. Therefore, we would have recommended the use of a select and ultimate salary scale assumption based on years of service in the select period and age-based ultimate rates for PERS Others, and service-based only tables for PERS Peace Officer/Firefighter and TRS.

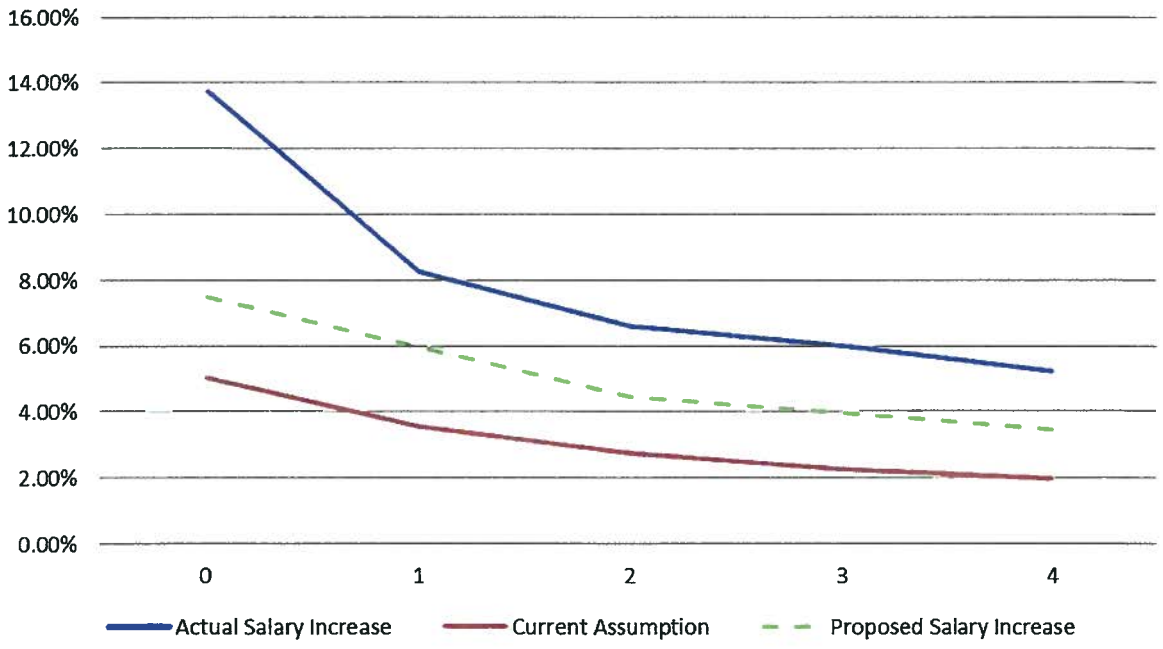
The historical compensation data for the experience period (shown in the tables that follow) were adjusted by approximately 3% to account for actual inflation during the study period. Our recommended scale is based on estimates of real wage growth (productivity and merit) plus expected future inflation (using the building block approach).

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SALARY INCREASE EXPERIENCE — PERS Others

Service Related Rates; First Five years of Service

Service Range	Total Exposures	Actual Increase[5]	Expected Increase[6]	Proposed Increase[7]	Proposed + Inflation[8]
0 – 0.99	5,739	13.77%	5.06%	7.50%	10.50%
1 – 1.99	7,590	8.28%	3.58%	6.00%	9.00%
2 – 2.99	8,362	6.65%	2.77%	4.50%	7.50%
3 – 3.99	7,863	6.04%	2.25%	4.00%	7.00%
4 – 4.99	7,238	5.25%	1.99%	3.50%	6.50%
Total	**36,792**	**7.49%**	**2.95%**	**4.87%**	**7.87%**
Reported by Buck		**8.90%**	**3.10%**	**3.60%**	**7.10%**



5 Adjusted for actual average inflation of approximately 3% during the experience period.

6 Adjusted for assumed inflation of 3.5%.

7 Proposed salary scale table is based on completed years of service as of the valuation date and does not reflect underlying assumption for inflation.

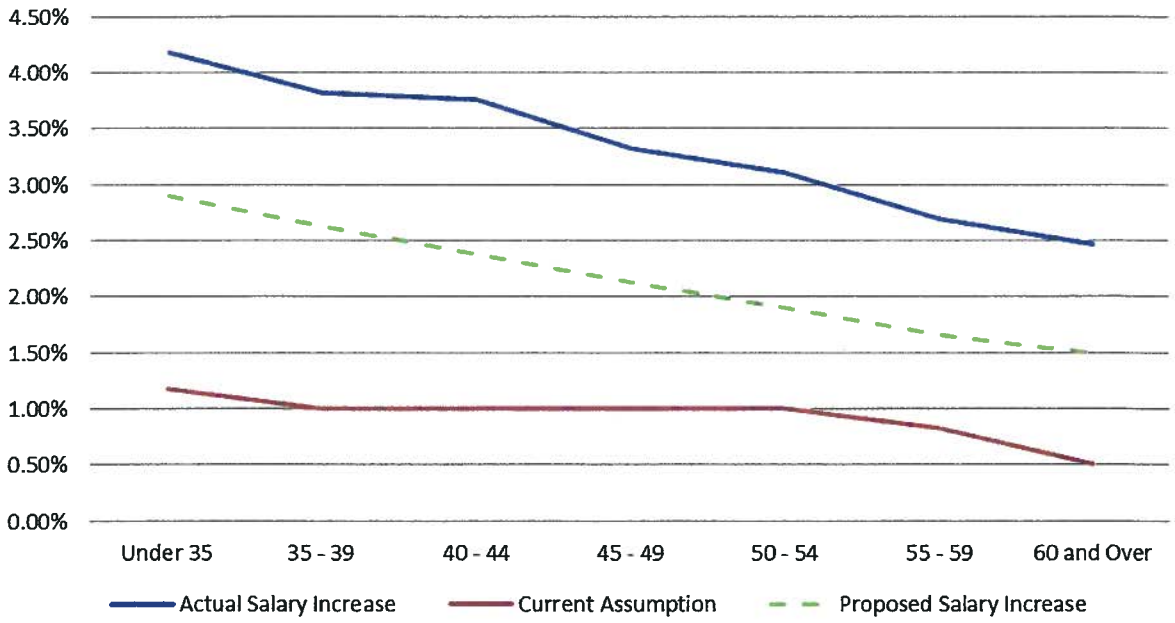
8 Reflects Segal's proposed inflation assumption of 3% and Buck's assumption of 3.5%.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SALARY INCREASE EXPERIENCE — PERS Others

Age Related Rates; Five or More Years of Service

Age Range	Total Exposures	Actual Increase[9]	Expected Increase[10]	Proposed Increase[11]	Proposed + Inflation[12]
Under 35	3,620	4.20%	1.18%	2.90%	5.90%
35 – 39	5,309	3.83%	1.01%	2.64%	5.64%
40 – 44	8,827	3.77%	1.01%	2.39%	5.39%
45 – 49	14,555	3.34%	1.00%	2.14%	5.14%
50 – 54	17,394	3.12%	1.00%	1.90%	4.90%
55 – 59	10,983	2.70%	0.83%	1.66%	4.66%
60 and Over	5,178	2.47%	0.51%	1.50%	4.50%
Total	**65,866**	**3.24%**	**0.94%**	**2.05%**	**5.05%**
Reported by Buck		**2.60%**	**1.00%**	**1.30%**	**4.80%**



[9] Adjusted for actual average inflation of approximately 3% during the experience period.

[10] Adjusted for assumed inflation of 3.5%.

[11] Proposed salary scale table is based on age as of the valuation date and does not reflect underlying assumption for inflation.

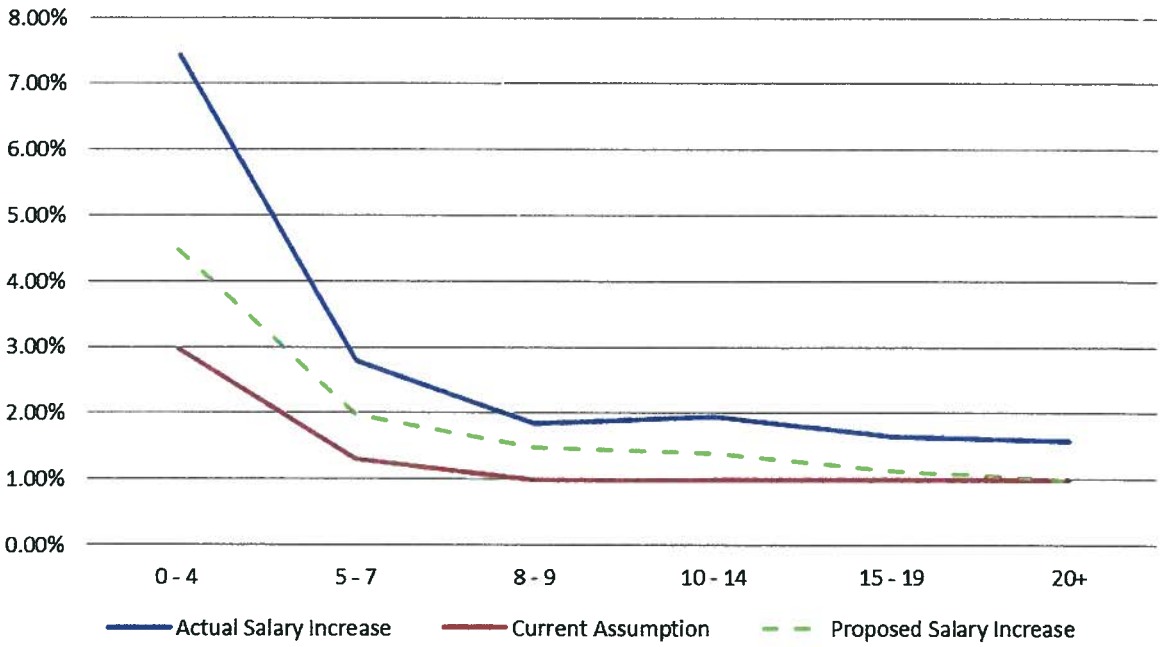
[12] Reflects Segal's proposed inflation assumption of 3% and Buck's assumption of 3.5%.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SALARY INCREASE EXPERIENCE — PERS Peace Officer/Firefighter

Service Related Rates

Service Range	Total Exposures	Actual Increase[13]	Expected Increase[14]	Proposed Increase[15]	Proposed + Inflation[16]
0 – 4.99	2,908	7.46%	2.98%	4.50%	7.50%
5 – 7.99	1,833	2.81%	1.31%	2.00%	5.00%
8 – 9.99	973	1.85%	1.00%	1.50%	4.50%
10 – 14.99	1,952	1.96%	1.00%	1.41%	4.41%
15 – 19.99	1,301	1.66%	1.00%	1.16%	4.16%
20+	918	1.59%	1.00%	1.00%	4.00%
Total	**9,885**	**3.43%**	**1.56%**	**2.24%**	**5.24%**
Reported by Buck		**3.70%**	**1.60%**	**1.70%**	**5.20%**



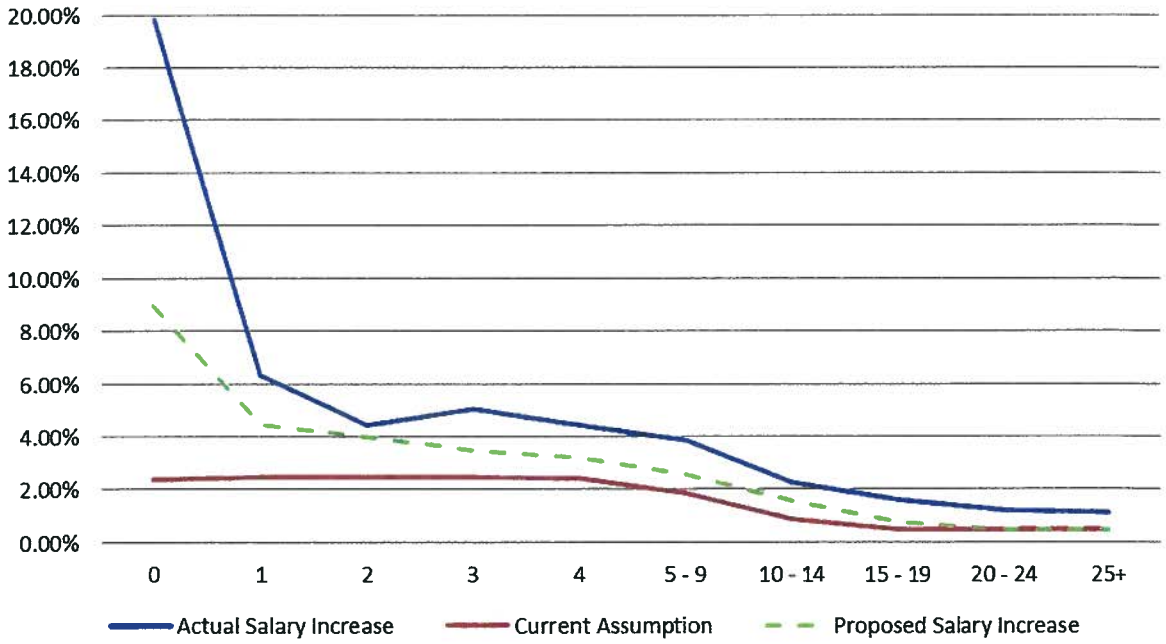
[13] Adjusted for actual average inflation of approximately 3% during the experience period.
[14] Adjusted for assumed inflation of 3.5%.
[15] Proposed salary scale table is based on completed years of service as of the valuation date and does not reflect underlying assumption for inflation.
[16] Reflects Segal's proposed inflation assumption of 3% and Buck's assumption of 3.5%.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

SALARY INCREASE EXPERIENCE — TRS

Service Related Rates

Service Range	Total Exposures	Actual Increase[17]	Expected Increase[18]	Proposed Increase[19]	Proposed + Inflation[20]
0 – 0.99	253	19.87%	2.40%	9.00%	12.00%
1 – 1.99	1,280	6.34%	2.49%	4.50%	7.50%
2 – 2.99	1,639	4.45%	2.49%	4.00%	7.00%
3 – 3.99	2,027	5.07%	2.47%	3.50%	6.50%
4 – 4.99	1,950	4.47%	2.45%	3.25%	6.25%
5 – 9.99	9,261	3.91%	1.84%	2.60%	5.60%
10 – 14.99	6,483	2.28%	0.90%	1.62%	4.62%
15 – 19.99	5,477	1.62%	0.50%	0.82%	3.82%
20 – 24.99	3,094	1.23%	0.50%	0.50%	3.50%
25+	1,989	1.16%	0.50%	0.50%	3.50%
Total	**33,453**	**2.89%**	**1.25%**	**1.88%**	**4.88%**
Reported by Buck		**2.70%**	**1.40%**	**1.90%**	**5.40%**



[17] Adjusted for actual average inflation of approximately 3% during the experience period.
[18] Adjusted for assumed inflation of 3.5%.
[19] Proposed salary scale table is based on completed years of service as of the valuation date and does not reflect underlying assumption for inflation.
[20] Reflects Segal's proposed inflation assumption of 3% and Buck's assumption of 3.5%.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Payroll Growth

The payroll growth assumption represents the expected annual increase in total covered payroll from one year to the next. This assumption is used to determine the amortization of unfunded actuarial accrued liability (in the actuarially determined contribution) as a level percentage of payroll. The current assumption for payroll growth is 4% per year. To the extent that actual payroll increases were less than 4%, fewer dollars have gone toward paying off the unfunded liability than anticipated and future amortization payments are larger.

We match the 4-year average increase Buck calculations (5.0% for PERS and 3.8% for TRS) exactly. However, given the fact that we would have recommended a decrease in the inflation assumption from 3.5% to 3.0%, we would have recommended that the payroll growth assumption be lowered by 0.5% as well, from 4.0% to 3.5%.

Since existing law states that contribution rates will be paid for the members in both the defined benefit plan and the DCR plan, we agree with the recommendation to utilize a payroll growth assumption. However, we recommend that consideration be given to adopting a level dollar approach for amortizing the unfunded liability for the two "closed group" defined benefit plans.

General Comments about the Economic Assumptions

Some additional observations surrounding the economic assumptions are:

- Buck states on page 47 of their report that "A change in [the inflation assumption] alone has no material impact on the funding…" However, some cost of living allowances are tied to CPI and, therefore, the inflation assumption would have a direct impact on the liability and normal cost calculations for benefits that receive such COLAs.

- In the economic assumptions section of the report, the inflation assumption should be analyzed first, followed by the investment return and other related assumptions. The inflation assumption is the base component of all the economic assumptions under the "building block" approach, and therefore we believe it makes sense to discuss and establish a recommendation for this assumption prior to the other economic assumptions.

- Actual salary increase experience was significantly greater than expected for all groups in all years (except fiscal 2007 for TRS). In the valuations during the study period, there were consistent experience losses due to salaries (again, except for fiscal 2007 for TRS). We would have recommended that the assumption be brought at least half way up to actual increases over the period; Buck's recommendations were for relatively minor increases. In the two valuations subsequent to the assumption change, the net impact of salary experience has been actuarial losses.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

- In 2010/2011, many funds were lowering their investment return assumptions to below 8%. As it stands in 2013, expectations are slightly better than they were three years ago. Using capital market expectations from today, Segal would likely recommend an investment return assumption of 7.75% to 8%.

POSTEMPLOYMENT HEALTHCARE ASSUMPTIONS

Base Claim Cost Rate Derivation

Base claim cost rates are the initial annual benefit costs for estimating the future health care obligations. The accuracy of the measurement model depends in large part on its ability to forecast annual claims costs for the plan. In the actuarial development of health care rates, plan experience is generally considered the best predictor of future claims experience, preferable to sole reliance on normative claims databases or other measures. Therefore, preferred methods involve development of annual per capita health care rates from the claim experience of the retiree group benefits plan. Buck utilized this preferred method.

We agree with their use of the "trend and blend" approach to claims development, whereby separate claims cost rates are developed for each of the three prior years, each rate is adjusted to the valuation year, and then the three rates are blended.

Buck appropriately developed claim cost rates separately for medical and prescription drug benefits, further distinguished by Medicare status (non-Medicare, Medicare A and B, Medicare B only). Since the experience study was performed, Buck has been provided with additional information regarding members with Medicare Part B only, so they have been able to refine their estimate of the claims for that group.

Claims experience was not provided separately by plan (TRS, PERS, etc.), and therefore claim cost rates were not developed separately by plan. If it were possible to develop such claims costs separately by plan, the resulting per capita claims costs might be different between the plans, but the total projected health care costs across all plans would likely remain essentially unchanged.

Using the raw data provided, we matched the initial per capita claims costs rates for all benefit types (pre-Medicare medical, Medicare A&B medical, Medicare B only medical, and prescription drug). For the June 30, 2011 valuation, Buck followed their prior recommendation and changed from weighting each year's data in the 5-year experience period at 20% to a 3-year experience period at 33-1/3%. We would agree if Buck were to recommend an additional change in the weighting of experience periods from a straight average to a greater emphasis on more recent years.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Health Care Trend Rate

Trend is a measure of the rate of change, over time, of the per capita health care rates. It includes factors such as medical inflation, utilization, plan design, and technology improvements.

Buck utilizes the Society of Actuaries (SOA) LongTerm Healthcare Cost Trend Resource Model to develop health care trend rates. This model provides a benchmark projection of medical cost increases when estimating retiree health benefits liabilities and premium increases for the next 5 to 75 years. The model provides for plan-specific inputs. We agree with the use of the model, but would recommend that the valuation reports include the sample report language provided by the SOA, which explicitly details the differences between the baseline assumptions and the input variables. Without this information, we were unable to independently assess the appropriateness of the input variables used. However, the trend rates developed are reasonable, and produced results consistent with trend rates used for other similar plans.

Morbidity

Morbidity or aging factors are used to estimate variation in per capita health care rates by age for the benefits being modeled. The aging factors used by Buck are reasonable and appropriate for the valuation.

While it is appropriate to develop the relationship between the rates at various ages based on normative databases, we agree with Buck's intention to use the expanded data available from the new administrator to assess these factors using experience specific to the State of Alaska.

Retiree-Paid Premiums

Report descriptions indicate that Buck is using retiree premiums based on actual dependent coverage for current retirees, and for future retirees they are using a composite rate (a weighted blend of retiree-only and retiree-plus-dependent(s) rates). However, it appears that they actually used the retiree-only rate for those projected to have single coverage and two times the single rate for those projected to have a covered spouse. We believe that valuing the individual rates in this manner is the preferred approach. While this approach does not account for the additional contributions from those covering children, the overall difference would be minimal.

Participation Rates

The participation assumption is used to project what percentage of members elect retiree health coverage upon retirement.

The current assumption is that 100% of those eligible for System-paid coverage will participate, while only 10% of non-System-paid retirees will participate. It is also assumed that non-System-paid retirees who waived coverage will resume participation at age 60 when benefits are System-paid.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

While the Actuarial Experience Study did not detail any analysis, our review of the enrollment experience for 2008 and 2009 supports Buck's assumed participation rates.

TRS	Non-System-Paid				System-Paid			
Year	Receiving Pension & Health	Receiving Pension Only	Total	Percent Enrolled	Receiving Pension & Health	Receiving Pension Only	Total	Percent Enrolled
2008	3	36	39	**7.7%**	9,160	51	9,211	**99.4%**
2009	2	32	34	**5.9%**	9,370	28	9,398	**99.7%**
Total	5	68	73	**6.8%**	18,530	79	18,609	**99.6%**
Assumption				**10.0%**				**100.0%**

PERS	Non-System-Paid				System-Paid			
Year	Receiving Pension & Health	Receiving Pension Only	Total	Percent Enrolled	Receiving Pension & Health	Receiving Pension Only	Total	Percent Enrolled
2008	27	287	314	**8.6%**	20,857	270	21,127	**98.7%**
2009	17	275	292	**5.8%**	21,669	330	21,999	**98.5%**
Total	44	562	606	**7.3%**	42,526	600	43,126	**98.6%**
Assumption				**10.0%**				**100.0%**

We recommend that Buck continue to monitor the non-System-paid participation rates.

ANALYSIS OF DCR EXPERIENCE STUDY RECOMMENDATIONS

We have also reviewed the recommendations outlined by Buck in their letter dated March 9, 2011 with respect to proposed changes to assumptions for the PERS and TRS defined contribution plans. The letter outlines recommended changes to certain demographic and economic assumptions.

Demographic and Economic Assumptions

In general, Buck recommended that since there is not a large body of experience to study for these groups, that changes be made that mimic the recommendations for the respective defined benefit plans. We agree that this is the correct approach for this situation since the characteristics of members in the DCR plans are highly likely to match that of members in the DB plans. In this regard, we believe it is reasonable to recommend the same assumption for mortality, disability, percent married, spouse age difference, part time service, and occupational versus non-occupational death and disability benefits.

For the retirement assumption, Buck recommends no change to the rates as there is no experience to analyze. We agree with Buck, but find the recommendation inconsistent with their recommendations to increase the retirement ages for the PERS and TRS plans. For example, for the TRS DB plan, the retirement rates include assumptions that teachers could work as late as age 85 while for the DCR plan the retirement assumption stops at age 70.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

We believe that to the extent that plan-managed assets are invested in a substantially similar way to the DB plan assets, the investment return assumption (including the underlying rate of inflation) should be the same. Also, since there was not much actual experience relative to individual salary increases, we believe it would be reasonable to recommend the same salary increase assumption as was recommended for the DB plans.

In future experience studies, since new members are entering the DCR membership only, we would recommend that some assumptions be studied with exposures from the DB and DCR populations combined. For example, in order to get a clear picture of the productivity and merit components of individual salary increases across all ages and lengths of service, Buck should study PERS Others, PERS Peace Officers/Firefighters and TRS membership in the aggregate. As more experience emerges, we believe this approach would be reasonable for assumptions such as individual salary increases, payroll growth, mortality, incidence of disability (as well as type), percent married, and spouse age difference

Postemployment Healthcare Assumptions

Base Claim Cost Rate Derivation and Health Trend

As there was no claims experience that could be used to develop the base claim rate, the Experience Analysis indicates that healthcare costs and trends will be updated to be consistent with the PERS and TRS DB plans.

The DCR base claims rates were developed by applying factors to reduce the base claims rates used for the TRS, PERS, and JRS plans to account for anticipated differences in plan design. The Actuarial Experience Analysis does not address how these factors were developed, and the reports do not include a description of the "substantive plan" that is being valued. We understand that no formal DCR plan of benefits had been adopted; accounting standards indicate that if there is no comprehensive plan document, other information should be considered when determining the benefits to be valued.

In reviewing the differences between the plan of benefits described in the "Retiree Insurance Information Booklet (May 2003)" and the "PERS and TRS Defined Contribution Retirement Plan - Plan Summary (January 1, 2012)", we arrived at a similar factor for the medical per capita cost and a smaller factor (bigger reduction in costs) for the prescription drug per capita cost. This would indicate that the per capita prescription drug cost may be conservative, but we believe that both the medical and the prescription drug per capita claims costs are reasonable. Both factors should continue to be re-evaluated as the plan designs evolve, until claims experience becomes available for the DCR plan.

III (B). Experience Study and Assumptions: Replication of Experience Study and Assessment of Assumptions

Retiree-Paid Premiums and Participation Rates

Under the DCR plan, retirees under age 65 pay the full plan premium (no subsidy), and retirees age 65 and over will pay 10-30% of the full premium depending on service. Buck's approach of applying the retiree's required percentage to the age-graded average per capita cost (instead of a single average premium) is appropriate, since it takes into account anticipated changes to the covered retiree population (and resulting changes in premiums) over time. We also find it appropriate to set service-based participation rates for those who are Medicare-eligible. The rates are consistent with those generally seen for participants who pay a given percentage of the full premium. Actual experience should be monitored as it develops.

III (C). Experience Study and Assumptions: Format of Report

The format of the experience study report is generally acceptable and provides the majority of information that should be communicated in this type of study. We believe the report format could be improved by making the following changes or additions:

- Include the number of exposures in the report tables. Including exposures will allow the reader to assess the current and proposed rates.
- Show the total of male and female for each assumption. Showing totals will provide additional information to the reader.
- In the economic assumptions section of the report, the inflation assumption should be analyzed first, followed by the investment return and other related assumptions. The inflation assumption is the base component of all the economic assumptions under the "building block" approach, and therefore we believe it makes sense to discuss and establish a recommendation for this assumption prior to the other economic assumptions.

IV (A). Actuarial Valuations: Data

Segal requested and was provided with summaries of the data assumptions used by Buck to process the data into a valuation-ready format for the JRS and TRS defined benefit plans. In general, the data assumptions described are reasonable and consistent with similar assumptions used for valuations performed by Segal.

We received census data for all plans within the scope of this study from Buck. These files consisted of the "scrubbed" data files that were used to perform the actuarial valuations. The head counts from each status matched those reported in the valuation reports. Typically, when aspects of the raw census data are incomplete or missing, the actuary relies on a series of assumptions and procedures to make the data whole. We assume that Buck relies on assumptions for filling in missing data for the ARMB plans, but a description of the assumptions is not shown in the valuation reports; we recommend that Buck add a brief paragraph in the assumptions and methods section of their reports that outlines their adjustments for missing data.

In any event, we believe the data files provided are comprehensive enough to perform actuarial valuations and develop conclusions from the results.

We noted that the "Tier" designator within plans and the Plan designator (between PERS/TRS versus DCR) are sometimes inconsistent with the date of hire. We do not know whether Buck resolved this inconsistency with those who provided the census data. The valuations used Tier and Plan designators, not date of hire, to determine a participant's plan of benefits.

The data included a field that indicates whether those with retiree health coverage were also covering a spouse. For JRS, the code indicated that most surviving spouses receiving retiree health coverage were also covering a dependent spouse, so total retiree health liabilities included liability for a dependent spouse of a surviving spouse. According to Buck, this was remedied in the 2012 valuation data.

PERS

Comparison of Valuation Results

In replicating the results of the PERS June 30, 2011 valuation, we found that overall, Buck has a sound valuation process. We successfully matched all valuation statistics and liabilities for PERS within a tolerable range.

PERS (June 30, 2011)	Buck	Segal	Ratio of Segal/Buck
Members			
Active members	24,393	24,393	100.0%
Average age	49.22	49.22	
Average credited service	12.60	12.60	
Average entry age	36.62	36.58	
Average annual earnings	$63,201	$63,201	
Terminated vested members	6,414	6,414	100.0%
Average age	50.29	50.30	
Average monthly pension	$821	$822	
Number nonvested with account balances	14,028	14,028	
Average account balance	$5,074	$5,074	
Retirees, disableds, beneficiaries	27,359	27,359	100.0%
Average age	67.05	67.05	
Average monthly pension	$1,662	$1,662	
Accrued Liability ($000s)			
Active members			
Pension	$4,261,530	$4,250,420	99.7%
Healthcare, net of Part D subsidy	$3,008,658	$2,951,746	98.1%
Terminated members			
Pension	$545,950	$559,324	102.4%
Healthcare, net of Part D subsidy	$927,093	$914,417	98.6%
Retirees, disableds, beneficiaries			
Pension	$6,111,567	$6,148,332	100.6%
Healthcare, net of Part D subsidy	$3,885,752	$3,853,675	99.2%
Total Accrued Liability	$18,740,550	$18,677,914	99.7%
Assets and Funding ($000s)			
Actuarial Value of Assets	$11,813,774	$11,813,774	100.0%
Unfunded Accrued Liability	$6,926,776	$6,864,140	99.1%
Funded Ratio	63.0%	63.3%	100.5%

IV (B). Actuarial Valuations: Replication of Valuations

Normal Cost			
Pension	$172,968	$174,744	102.7%
Healthcare, net of Part D subsidy	$115,940	$108,828	93.9%
Total	$288,908	$283,572	98.2%

Further, Segal reviewed the calculations for the actuarial gain and loss analysis and actuarial value of assets, and found that these calculations were performed correctly.

All data, assumptions, methods and plan provisions used to perform this actuarial valuation are described in Buck's report, *State of Alaska Public Employees' Retirement System Actuarial Valuation Report as of June 30, 2011.*

Comments

A review of test lives indicate that the percent married assumption was applied to current disableds and retirees, instead of using current marital status.

TRS

Comparison of Valuation Results

In replicating the results of the TRS June 30, 2011 valuation, we found that overall, Buck has a sound valuation process. We successfully matched all valuation statistics and liabilities for TRS within a tolerable range.

TRS (June 30, 2011)	Buck	Segal	Ratio of Segal/Buck
Members			
Active members	7,303	7,303	100.0%
Average age	48.50	48.50	
Average credited service	14.52	14.52	
Average entry age	33.98	33.50	
Average annual earnings	$74,648	$74,648	
Terminated vested members	852	852	100.0%
Average age	49.75	49.75	
Average monthly pension	$1,184	$1,183	
Number nonvested with account balances	2,675	2,675	
Average account balance	$16,274	$16,274	
Retirees, disableds, beneficiaries	11,016	11,016	100.0%
Average age	67.40	67.40	
Average monthly pension	$2,729	$2,729	
Accrued Liability ($000s)			
Active members			
Pension	$1,844,069	$1,838,139	99.7%
Healthcare, net of Part D subsidy	$1,053,127	$1,065,282	101.2%
Terminated members			
Pension	$139,111	$139,215	100.1%
Healthcare, net of Part D subsidy	$158,446	$155,060	97.9%
Retirees, disableds, beneficiaries			
Pension	$4,212,924	$4,199,764	99.7%
Healthcare, net of Part D subsidy	$1,721,118	$1,696,550	98.6%
Total Accrued Liability	$9,128,795	$9,094,010	99.6%
Assets and Funding ($000s)			
Actuarial Value of Assets	$4,937,937	$4,937,937	100.0%
Unfunded Accrued Liability	$4,190,858	$4,156,073	99.2%
Funded Ratio	54.1%	54.3%	100.4%

IV (B). Actuarial Valuations: Replication of Valuations

Normal Cost			
Pension	$69,548	$70,392	101.2%
Healthcare, net of Part D subsidy	$28,308	$28,332	100.1%
Total	$97,856	$98,724	100.9%

Further, Segal reviewed the calculations for the actuarial gain and loss analysis and actuarial value of assets, and found that these calculations were performed correctly.

All data, assumptions, methods and plan provisions used to perform this actuarial valuation are described in Buck's report, *State of Alaska Teachers' Retirement System Actuarial Valuation Report as of June 30, 2011.*

Comments

For those who terminate due to non-occupational death, retiree health benefits (but not expenses) were reduced by 10%. Buck informed us that this is due to an assumption that 10% are assumed to withdraw their contributions. However, this assumption was not applied to pension benefits, nor to those who terminate due to occupational death.

A review of test lives indicate that the percent married assumption was applied to current non-occupational disableds, instead of using current marital status as was done for other retirees.

DCR

Comparison of Valuation Results

In replicating the results of the DCR June 30, 2011 valuations, we found that overall, Buck has a sound valuation process. We successfully matched all valuation statistics and liabilities for the DCR within a tolerable range.

DCR (June 30, 2011)	Buck	Segal	Ratio of Segal/Buck
PERS Members			
Active members	10,965	10,965	100.0%
Average age	38.76	38.76	
Average credited service	2.02	1.98	
Average entry age	36.74	36.75	
Average annual earnings	$47,796	$47,796	
Terminated members	4	4	100.0%
Retirees, disableds, beneficiaries	1	1	100.0%
Average age	N/A	N/A	
Average monthly benefits	N/A	N/A	
PERS Accrued Liability ($000s)			
Active members			
Occupational Death and Disability	$1,721	$1,728	100.4%
Healthcare, net of Part D subsidy	$11,302	$11,611	102.7%
Retirees, disableds, beneficiaries			
Occupational Death and Disability	$228	$228	100.0%
Healthcare, net of Part D subsidy	$0	$0	
PERS Total Accrued Liability	$13,251	$13,657	102.4%
PERS Assets and Funding ($000s)			
Actuarial Value of Assets	$19,058	$19,058	100.0%
Unfunded Accrued Liability	($5,807)	($5,401)	93.0%
Funded Ratio	143.8%	139.5%	97.0%
Total Normal Cost			
Occupational Death and Disability	$1,981	$1,924	97.1%
Healthcare, net of Part D subsidy	$2,784	$2,819	101.3%
Total	$4,765	$4,743	99.5%

IV (B). Actuarial Valuations: Replication of Valuations

TRS Members			
Active members	2,708	2,708	100.0%
Average age	37.25	37.25	
Average credited service	2.62	2.59	
Average entry age	34.63	34.63	
Average annual earnings	$55,860	$55,860	
Terminated members	24	24	100.0%
Retirees, disableds, beneficiaries	0	0	100.0%
Average age	N/A	N/A	
Average monthly benefits	N/A	N/A	
TRS Accrued Liability ($000s)			
Active members			
Occupational Death and Disability	$57	$56	98.2%
Healthcare, net of Part D subsidy	$3,801	$3,827	100.7%
Retirees, disableds, beneficiaries			
Occupational Death and Disability	$0	$0	
Healthcare, net of Part D subsidy	$0	$0	
TRS Total Accrued Liability	$3,858	$3,883	100.6%
TRS Assets and Funding ($000s)			
Actuarial Value of Assets	$7,566	$7,566	100.0%
Unfunded Accrued Liability	($3,708)	($3,683)	99.3%
Funded Ratio	196.1%	194.8%	99.4%
Total Normal Cost			
Occupational Death and Disability	$80	$80	100.0%
Healthcare, net of Part D subsidy	$867	$866	99.9%
Total	$947	$946	99.9%

Further, Segal reviewed the calculations for the actuarial gain and loss analysis and actuarial value of assets, and found that these calculations were performed correctly.

All data, assumptions, methods and plan provisions used to perform these actuarial valuations are described in Buck's reports, *State of Alaska Public Employees' Retirement System Defined Contribution Retirement Plan For Occupational Death and Disability And Retiree Medical Benefits Actuarial Valuation Report as of June 30, 2011* and *State of Alaska Teachers' Retirement System Defined Contribution Retirement Plan For Occupational Death and Disability And Retiree Medical Benefits Actuarial Valuation Report as of June 30, 2011.*

IV (B). Actuarial Valuations: Replication of Valuations

Comments

The full plan premiums (per capita costs) used to determine the retiree rates do not take into account the plan's anticipated Medicare Part D reimbursements. If these reimbursements are factored into the premium rates charged to retirees, then the projected retiree contributions would be lower and the projected retiree health obligation would be higher.

JRS

Comparison of Valuation Results

In replicating the results of the JRS June 30, 2010 valuation, we found that overall, Buck has a sound valuation process. We successfully matched all valuation statistics and liabilities for the JRS within a tolerable range.

JRS (June 30, 2010)	Buck	Segal	Ratio of Segal/Buck
Members			
Active members	72	72	100.0%
Average age	56.58	56.58	
Average credited service	9.20	9.03	
Average entry age	47.38	48.38	
Average annual earnings	$167,813	$167,813	
Terminated vested members	4	4	100.0%
Average age	57.53	57.53	
Average monthly pension	$6,823	$6,823	
Number nonvested with account balances	0	0	
Average account balance	$0	$0	
Retirees, disableds, beneficiaries	99	99	100.0%
Average age	71.42	71.42	
Average monthly pension	$7,484	$7,482	
Accrued Liability			
Active members			
Pension	$44,680,046	$44,065,684	98.6%
Healthcare, net of Part D subsidy	$5,673,507	$5,656,446	99.7%
Terminated members			
Pension	$5,193,610	$5,244,665	101.0%
Healthcare, net of Part D subsidy	$867,200	$850,807	98.1%
Retirees, disableds, beneficiaries			
Pension	$114,650,119	$113,945,771	99.4%
Healthcare, net of Part D subsidy	$13,763,624	$13,719,027	99.7%
Total Accrued Liability	$184,828,106	$183,482,400	99.3%
Assets and Funding			
Actuarial Value of Assets	$134,694,195	$134,694,195	100.0%
Unfunded Accrued Liability	$50,133,911	48,788,205	97.3%
Funded Ratio	72.9%	73.4%	100.7%

Normal Cost			
Pension	$4,885,249	$5,118,949	104.8%
Healthcare, net of Part D subsidy	$661,591	$715,706	108.2%
Total	$5,546,840	$5,834,655	105.2%

Further, Segal reviewed the calculations for the actuarial gain and loss analysis and actuarial value of assets, and found that these calculations were performed correctly.

All data, assumptions, methods and plan provisions used to perform this actuarial valuation are described in Buck's report, *State of Alaska Judicial Retirement System Actuarial Valuation Report as of June 30, 2010.*

Comments

The data included a field that indicates whether those with retiree health coverage were also covering a spouse. For JRS, the code indicated that most surviving spouses receiving retiree health coverage were also covering a dependent spouse, so total retiree health liabilities included liability for a dependent spouse of a surviving spouse. According to Buck, this was remedied in the 2012 valuation data.

NGNMRS

Comparison of Valuation Results

In replicating the results of the NGNMRS June 30, 2010 valuation, we found that overall, Buck has a sound valuation process. We successfully matched all valuation statistics and liabilities for the NGNMRS within a tolerable range.

NGNMRS (June 30, 2010)	Buck	Segal	Ratio of Segal/Buck
Members			
Active members	4,085	4,085	100.0%
Average age	33.99	33.99	
Average total military service	12.14	12.13	
Terminated vested members	1,251	1,251	100.0%
Average age	54.78	54.78	
Average total military service	25.61	25.61	
Retirees, disableds, beneficiaries	547	547	100.0%
Average age	58.75	58.76	
Average years remaining	11.61	11.85	
Accrued Liability			
Active members	$10,846,367	$10,829,128	99.8%
Terminated members	$14,705,434	$14,622,862	99.4%
Retirees, disableds, beneficiaries	$4,482,606	$4,481,659	100.0%
Total Accrued Liability	$30,034,407	29,933,649	99.7%
Assets and Funding			
Actuarial Value of Assets	$32,000,585	$32,000,585	100.0%
Unfunded Accrued Liability	($1,966,178)	($2,066,936)	105.1%
Funded Ratio	106.5%	106.9%	100.4%
Normal Cost, including expense load	$739,097	$780,905	105.7%

Further, Segal reviewed the calculations for the actuarial gain and loss analysis and actuarial value of assets, and found that these calculations were performed correctly.

All data, assumptions, methods and plan provisions used to perform this actuarial valuation are described in Buck's report, *State of Alaska National Guard and Naval Militia Retirement System Actuarial Valuation Report as of June 30, 2010.*

OVERALL COMMENTS

Application of Decrements

When applying the decrement rates, the service used to trigger certain events seems to be inconsistent between decrements. For example, the termination rates should stop when retirement rates start. However, it appears from some of the test lives provided that that the service used to determine whether someone is eligible for retirement is sometimes inconsistent with the service used to "turn off" the termination rates. While this inconsistency can have a noticeable effect on the liability of an individual, the overall effect on the valuations is not material.

Healthcare Retiree Premiums

Report descriptions indicate that Buck is using retiree premiums based on actual dependent coverage for current retirees, and for future retirees they are using a composite rate (a weighted blend of retiree-only and retiree-plus-dependent(s) rates). However, it appears that they actually used the retiree-only rate for those projected to have single coverage and two times the single rate for those projected to have a covered spouse. We believe that valuing the individual rates in this manner is the preferred approach.

IV (C). Actuarial Valuations: Assessment of Conclusions

Based on our replication valuations, we believe that, overall, the results are reasonable, consistent, and accurate. We believe the valuation conclusions accurately portray the actuarial status of the systems and accurately generate the required contributions rates. We offer comments for improvement throughout this report.

IV (D). Actuarial Valuations: Review of Information for Financial Reporting Purposes

For financial reporting purposes, GASB requires that two schedules be included in the footnotes to the financial statements. The first schedule is the "Schedule of Funding Progress," which includes a short history of the Accrued Liability, Actuarial Value of Assets, Unfunded Actuarial Obligation, Funded Ratio, Covered Payroll, and the Unfunded Accrued Liability, Funded Ratio, Member Payroll, and Unfunded Accrued Liability as a Percentage of Member Payroll. The second required schedule is the "Schedule of Employer Contributions," which shows a short history comparing the actual employer contributions made for a given fiscal year to the Annual Required Contribution (ARC) for that year. Typically, the ARC under GASB rules is an amount equal to the Normal Cost for the year, plus the amortization of Unfunded Actuarial Obligation over a period not to exceed 30 years. The Unfunded Accrued Liability for this purpose can be either positive (i.e., when the Accrued Liability exceeds the Actuarial Value of Assets) or negative (i.e., when the Actuarial Value of Assets exceeds the Accrued Liability). There is flexibility in the method for determining the amortization component. For example, it can be computed either on a level dollar basis or as a level percent of payroll.

Both of the required schedules appear in the valuation reports, are consistent with the GASB requirements, and appropriately reflect the information required to be disclosed.

In addition to the two schedules required by GASB standards, we commonly see two additional tables in the financial reporting section of valuation reports. First is a table that outlines the actuarial methods and assumptions applicable to the amortization component of the ARC. The other is a "Solvency Test" that compares components of the Accrued Liability (typically, active member contributions, the liability of inactive members, and the amount of the employer-financed portion of active members) to the Actuarial Value of Assets, showing the percentage of each component that is covered. These tables are in the valuation reports and are appropriate.

IV (E). Actuarial Valuations: Format of Reports

Buck provides ARMB with comprehensive actuarial valuation reports that contain a summary of the data, the actuarial funding results, development of the actuarial value of assets, a reconciliation of the actuarial gains/losses, accounting information, as well as various projections of contribution rates and funding ratios. These reports generally include enough information for an individual to gain a clear understanding of the financial picture of the Plans. Overall, all of the valuation reports communicate results with clarity, are complete, and follow the required actuarial standards of practice for actuarial communications.

We offer the following recommendations for adding useful information or improving the clarity of these reports.

Public Employees' Retirement System (June 30, 2011)

Page 9: As in noted in the table, the rates are based upon total salaries for DB and DC members, combined. "Normal Cost Rate Net of Member Contributions" is determined as a percent of payroll that includes DCR members (as required by law.) It may be informational to show the DB and the DCR payrolls separately.

Page 9: The contribution rates for the DCR employers are noted, but the mechanism or calculations that determine these amounts are not discussed in detail. We recommend a brief description of this mechanism in this section or in the Summary of Plan Provisions.

Page 12: Maturity Ratio is shown, but no definition is provided. We recommend that the definition be included in this section.

Page 27: Relative to the "Actuarial Gain/(Loss) for FY11," it is unclear how the total gain/(loss) for 2011 is allocated between Peace Officer/Firefighters (page 19) and Others (page 22) for both Pension or Healthcare. If the amounts are allocated by the UAL as in past years, it should be noted. If the amounts are calculated independently, those calculations should be included in the report.

Page 34: Liquidity Factor is shown, but no definition is provided. We recommend that the definition be included in this section and that commentary be added about the potential impact of this figure on the Plan. Information about the Liquidity Factor trend would also be useful.

Page 37: Only seven years of historical information are shown in the "Historical Asset Rate of Return" table. It may be useful to show more years of data in this schedule. Ten years are shown in the "History of UAAL and Funded Ratio" on page 31.

Page 44: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

Pages 45 – 47: We recommend that the interest rates be included. For example, on page 47 there is a statement that the healthcare liabilities are calculated using the funding assumptions. The interest assumption would be informational.

Page 49: Projections are shown under the "Best Case", "Optimistic" and "Pessimistic" asset return scenarios. All scenarios assume a 1% increase in total active member population. It may be more appropriate to assume a 0% increase for the "Best Case" scenario, 1% increase for the "Optimistic" scenario, and 1% decrease for the "Pessimistic" scenario.

Page 64-65: For the age and service distributions, it may be useful to add a table that combines the data in "Annual Earnings by Age" and "Annual Earnings by Credited Service" into a single table similar to "Years of Credited Service by Age".

Page 101: For future retirees projected to pay a retired member contribution, the description says that Buck used a composite rate (a weighted blend of retiree-only and retiree-plus-dependent(s) rates), but individual rates were valued instead.

Page 101: Healthcare Participation correctly describes the assumption regarding the percentage of retirees assumed to elect coverage upon retirement. However, the report should also indicate that 100% of those who retired prior to age 60 and declined coverage are assumed to re-enroll at age 60.

Teachers' Retirement System (June 30, 2011)

Page 9: As in noted in the table, the rates are based upon total salaries for DB and DC members, combined. "Normal Cost Rate Net of Member Contributions" is determined as a percent of payroll that includes DCR members (as required by law.) It may be informational to show the DB and the DCR payrolls separately.

Page 9: The contribution rates for the DCR employers are noted, but the mechanism or calculations that determine these amounts are not discussed in detail. We recommend a brief description of this mechanism in this section or in the Summary of Plan Provisions.

Page 14: Maturity Ratio is shown, but no definition is provided. We recommend that the definition be included in this section.

Page 25: Liquidity Factor is shown, but no definition is provided. We recommend that the definition be included in this section and that commentary be added about the potential impact of this figure on the Plan. Information about the Liquidity Factor trend would also be useful.

Page 28: Only seven years of historical information are shown in the "Historical Asset Rate of Return" table. It may be useful to show more years of data in this schedule. Ten years are shown in the "History of UAAL and Funded Ratio" on page 22.

Page 35: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

Pages 36 – 38: We recommend that the interest rates be included. For example, on page 36 there is a statement that the healthcare liabilities are calculated using the funding assumptions. The interest assumption would be informational.

Page 40: Projections are shown under the "Best Case", "Optimistic" and "Pessimistic" asset return scenarios. All scenarios assume a 1% increase in total active member population. It may be more appropriate to assume a 0% increase for the "Best Case" scenario, 1% increase for the "Optimistic" scenario, and 1% decrease for the "Pessimistic" scenario.

Page 54: For the age and service distributions, it may be useful to add a table that combines the data in "Annual Earnings by Age" and "Annual Earnings by Credited Service" into a single table similar to "Years of Credited Service by Age".

Page 82: For future retirees projected to pay a retired member contribution, the description says that Buck used a composite rate (a weighted blend of retiree-only and retiree-plus-dependent(s) rates), but individual rates were valued instead.

Page 83: Healthcare Participation correctly describes the assumption regarding the percentage of retirees assumed to elect coverage upon retirement. However, the report should also indicate that 100% of those who retired prior to age 60 and declined coverage are assumed to re-enroll at age 60.

Judges Retirement System (June 30, 2010)

Page 2: The description of the actuarial value of assets should mention the 80%/120% market value corridor that is part of the method. According to page 9, the Actuarial Asset Value is subject to the Market Value corridor for the Pension plan. It would be appropriate to note this in the highlights section of the report and to briefly discuss the effects on the smoothing method.

Page 10: The calculation of the 6/30/2009 asset gain/(loss) amounts for Pension and Healthcare are not shown. If these amounts were not calculated in the 2009 roll-forward report, they should be included here.

Page 13: Since the Actuarial Value of Assets and Market Value of Assets differ significantly, it is appropriate to calculate the recommended contribution using the Market Value of Assets as an informational item.

Page 20: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

Page 27: For the age and service distributions, it may be useful to add a table that combines the data in "Annual Earnings by Age" and "Annual Earnings by Credited Service" into a single table similar to "Years of Credited Service by Age".

National Guard and Naval Militia Retirement System (June 30, 2010)

Page 7: The calculation of the 6/30/2009 asset gain/(loss) amount is not shown. If these amounts were not calculated in the 2009 roll-forward report, they should be included here.

Page 13: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

PERS Defined Contribution Retirement Plan (June 30, 2011)

Page 19: Relative to the "Actuarial Gain/(Loss) for FY11," it is unclear how the total gain/(loss) for 2011 is allocated between Peace Officer/Firefighters (page 11) and Others (page 14) for either Occupational Death and Disability or Retiree Medical. If the amounts are allocated by the UAL as in past years, it should be noted. If the amounts are calculated independently, those calculations should be included in the report.

Page 30: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

Page 36: For the age and service distributions, it may be useful to add a table that combines the data in "Annual Earnings by Age" and "Annual Earnings by Credited Service" into a single table similar to "Years of Credited Service by Age".

TRS Defined Contribution Retirement Plan (June 30, 2011)

Page 22: "Asset Valuation Method" should mention the 80%/120% market value corridor that is part of the method.

Page 28: For the age and service distributions, it may be useful to add a table that combines the data in "Annual Earnings by Age" and "Annual Earnings by Credited Service" into a single table similar to "Years of Credited Service by Age".

V. Glossary of Actuarial Terms

Actuarial Obligation For Actives: The equivalent of the accumulated normal costs allocated to the years before the valuation date.

Actuarial Obligation For Retirees: The single sum value of lifetime benefits to existing retirees. This sum takes account of life expectancies appropriate to the ages of the retirees and of the interest which the sum is expected to earn before it is entirely paid out in benefits.

Actuarial Present Value of Total Projected Benefits (PVB): Present value of all future benefit payments for current retirees and active employees taking into account assumptions about demographics, turnover, mortality, disability, retirement, health care trends, and other actuarial assumptions.

Actuarial Value of Assets (AVA): The value of assets used by the actuary in the valution. These may be at market value or some other method used to smooth variations in market value from one valuation to the next.

Amortization of the Unfunded Actuarial Obligation: Payments made over a period of years equal in value to the Program's unfunded actuarial obligation.

Annual Required Contribution (ARC): The ARC is equal to the sum of the normal cost and the amortization of the unfunded actuarial accrued liability.

ARC as a Percentage of Covered Payroll: The ratio of the annual required contribution to covered payroll.

Assumptions or Actuarial Assumptions: The estimates on which the cost of the Program is calculated including:

(a) Investment return — the rate of investment yield that the Program will earn over the long-term future;

(b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;

V. Glossary of Actuarial Terms

(c) Retirement rates — the rate or probability of retirement at a given age;

(d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Covered Payroll: Annual reported salaries for all active participants on the valuation date.

Funded Ratio: The ratio of Actuarial Value of Assets to Actuarial Obligation.

Health Care Cost Trend Rates: The annual rate of increase in net claims costs per individual benefiting from the Program.

Investment Return (discount rate): The rate of earnings of the Program from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next. If the Program is funded on a pay-as-you-go basis, the discount rate is tied to the expected rate of return on day-to-day employer funds.

Net OPEB Obligation (NOO): The NOO is the cumulative difference between the ARC and actual contributions made. If the Program is not pre-funded, the actual contribution would be equal to the annual benefit payments less retiree contributions. There are additional adjustments in the NOO calculations to adjust for timing differences between cash and accrual accounting, and to prevent double counting of OPEB Program costs.

Normal Cost: The amount of contributions required to fund the benefit allocated to the current year of service.

Unfunded Actuarial Obligation: The extent to which the actuarial obligation of the Program exceeds the assets of the Program. There is a wide range of approaches to paying off the unfunded actuarial obligation, from meeting the interest accrual only to amortizing it over a specific period of time.